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ABSTRACT

Documents announced with VT numbers only in the Volume 5 Number 2 issue (VT 015 456) of "Abstracts of Research and Related Materials in Vocational and Technical Education" (ARM) are included in this microfiche set. Microfiche availability for these documents is shown on the ARM resume as MF AVAILABLE IN VT-ERIC SET. The microfiche set is arranged in the following sequence: (1) a Vocational Technical (VT) number index to documents in the microfiche collection, (2) The Subject and author indexes from ARM, and (3) the full text of documents listed in the VT number index. The texts are filmed continuously in VT number sequence. (CD)

Microfiche Collection of Clearinghouse Documents

Reported in Abstracts of Research Materials

in Vocational and Technical Education

(ARM)

Compiled and Indexed by The Center for
Vocational and Technical Education

Vol. 5 No. 2
1972

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VT015457

INTRODUCTION

This collection of microfiche consists of the documents which are announced with VT numbers only in Abstracts of Research Materials in Vocational and Technical Education (ARM), Vol. 5 No. 2, 1972. Microfiche availability is shown in the resume as MF AVAILABLE IN VT-ERIC SET. The documents are grouped in VT number sequence and filmed continuously as a microfiche set. These documents are not available on microfiche as individual items, but are obtainable only through purchase of this set, or from agencies who have this set and have the capability of reproducing microfiche. The microfiche set includes the following sections:

1. Vocational Technical (VT) Number Index to Microfiche Collection of Clearinghouse Documents Reported in ARM, Vol. 5 No. 2, 1972.

2. Selected indexes from ARM, Vol. 5 No. 2, 1972.

   a. Subject and Identifier Index.
   b. Personal and Institutional Author Index.

   The documents identified in the indexes with an ERIC Document (ED) number are usually available as separate documents from the ERIC Document Reproduction Service (EDRS). Information about EDRS Service can be found in ARM or Research in Education (RIE).[1] Items not available through EDRS will include a source of availability. The page numbers shown in these indexes refer to the location of the abstracts in ARM, Vol. 5 No. 2, 1972.

3. The full text of documents listed in the Vocational Technical (VT) Number Index to Microfiche Collection of Clearinghouse Documents Reported in ARM, Vol. 5 No. 2, 1972.

[1] Research in Education is published 12 times a year. The first issue was no. 11, November 1966. Subscription: Domestic $21.00 a year; foreign $5.25 additional. Single copy: Domestic $1.75; Send a check or money order (no stamps) to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

TABLE OF CONTENTS

	Page
Introduction	ii
Vocational Technical (VT) Number Index to Microfiche Collection	i
Subject and Identifier Index	2
Personal and Institutional Author Index.	68

Document Texts Listed in Vocational Technical (VT) Number Index to Microfiche Collection follow in VT-Number Order.

Vocational Technical (VT) Number

Index to Microfiche Collection of Clearinghouse Documents

Reported in ARM, Vol. 5, No. 2

VT Number	VT Number
VT 002 713	VT 013 957
VT 007 748	VT 013 993
VT 010 943	VT 014 006
VT 012 163	VT 014 064
VT 012 492	VT 014 069
VT 012 493	VT 014 073
VT 012 496	VT 014 074
VT 013 089	VT 014 083
VT 013 090	VT 014 086
VT 013 292	VT 014 132
VT 013 324	VT 014 166
VT 013 351	VT 014 169
VT 013 352	VT 014 218
VT 013 353	VT 014 219
VT 013 354	VT 014 226
VT 013 572	VT 014 248
VT 013 609	VT 014 266
VT 013 699	VT 014 318
VT 013 704	VT 014 321
VT 013 716	VT 014 348
VT 013 723	VT 014 364
VT 013 736	VT 014 376
VT 013 744	VT 014 377
VT 013 762	VT 014 379
VT 013 763	VT 014 394
VT 013 764	VT 014 421
VT 013 765	VT 014 448
VT 013 774	VT 014 451
VT 013 810	VT 014 452
VT 013 823	VT 014 453
VT 013 826	VT 014 462
VT 013 830	
VT 013 843	
VT 013 874	
VT 013 884	
VT 013 897	
VT 013 917	
VT 013 919	
VT 013 946	
VT 013 948	

PAGE

AUDIOLINGUAL SKILLS
VT 013 776 ED 054 369 415
THE EFFECT OF OCCUPATIONAL INFORMATION UPON SECONDARY SCHOOL YOUTH WITH VARYING INTERESTS REGARDING A TEACHING CAREER IN THE FIELD OF INDUSTRIAL ARTS.

ABILITY IDENTIFICATION
VT 014 168 ED 056 219 467
A DIAGNOSTIC WORK SAMPLE INSTRUMENT FOR ASSESSING AUTOMOTIVE TRADE COMPETENCE.

ABSTRACTS
VT 013 926 ED 054 381 434
ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.

ACADEMIC ACHIEVEMENT
VT 010 850 ED 054 319 385
AREA SCALES OF THE NAVY VOCATIONAL INTEREST INVENTORY AS PREDICTORS OF SCHOOL PERFORMANCE AND RATING ASSIGNMENT.
VT 013 792 ED 054 374 420
A COMPARISON OF THE EFFECTIVENESS OF A PROGRAMMED TEXT AND A COMPUTER BASED DISPLAY UNIT MEDIA IN TEACHING FORTRAN IV.
VT 014 022 ED 055 232 451
THE EFFECT ON SELF CONCEPT OF THE CHATTANOOGA NEIGHBORHOOD YOUTH CORPS AND OF EDUCATION, VOCATIONAL ASPIRATION, AND SEX ROLE.
VT 014 064 451
EFFECTS OF PROGRAMED VERSUS CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS.
VT 014 127 ED 055 250 463
ENTRY INTO THE AMERICAN LABOR FORCE.
VT 014 451 483
CAREER GRADUATES: A PROFILE OF JOB EXPERIENCE AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES.

ACADEMIC ASPIRATION
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.

ACCIDENT PREVENTION
VT 014 394 481
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.
VT 014 401 482
SPECIAL STUDY--YOUTH AND TRAFFIC SAFETY EDUCATION.

PAGE

ACCREDITATION (INSTITUTIONS)
VT 014 132 463
EDUCATION FOR NURSING--THE DIPLOMA WAY.
VT 014 248 474
ASSOCIATE DEGREE EDUCATION FOR NURSING. INFORMATION ABOUT STATE-APPROVED ASSOCIATE DEGREE PROGRAMS IN NURSING.

ACHIEVEMENT GAINS
VT 013 788 ED 054 372 419
A COMPARISON OF TWO APPROACHES TO DEVELOPING AN UNDERSTANDING OF INDUSTRIAL ENTERPRISE AT THE EIGHTH GRADE LEVEL.
VT 013 790 ED 055 178 420
EFFECTS OF SMALL GROUP INSTRUCTION ON ACHIEVEMENT OF TECHNICAL INFORMATION BY NINTH GRADE INDUSTRIAL ARTS STUDENTS.

ACHIEVEMENT TESTS
VT 007 748 376
RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS BY STUDENTS MAJORING IN ELECTRONICS TECHNOLOGY.

ADJUSTMENT (TO ENVIRONMENT)
VT 010 921 ED 054 325 387
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME III.
VT 010 932 ED 056 159 387
AN EVALUATION OF REHABILITATION SERVICES AND THE ROLE OF INDUSTRY IN THE COMMUNITY ADJUSTMENT OF PSYCHIATRIC PATIENTS FOLLOWING HOSPITALIZATION. FINAL REPORT.

ADMINISTRATIVE ORGANIZATION
VT 013 962 ED 055 219 441
AN ANALYSIS OF THE ADMINISTRATIVE STRUCTURE AND THE ROLE OF THE CHIEF VOCATIONAL-TECHNICAL EDUCATION ADMINISTRATOR IN PUBLIC JUNIOR COLLEGES.
VT 014 145 ED 056 209 465
JOB DESCRIPTIONS AND ORGANIZATIONAL ANALYSIS FOR HOSPITALS AND RELATED HEALTH SERVICES.

ADMINISTRATIVE PRINCIPLES
VT 013 995 ED 056 182 447
PRINCIPLES AND PRACTICES FOR FIRST-LINE SUPERVISORS IN REHABILITATION.

ADMINISTRATOR ATTITUDES
VT 013 712 ED 054 359 407
PRINCIPLES FOR VOCATIONAL EDUCATION--VALIDATION OF STATEMENTS OF BELIEFS SELECTED FROM THE LITERATURE AND RESEARCH.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 837 ED 055 194 427
THE FEASIBILITY OF A SYSTEM FOR THE EXCHANGE OF INFORMATION ABOUT LOCALLY PRODUCED INSTRUCTIONAL MATERIALS BETWEEN INDUSTRIAL ARTS PROGRAMS IN HIGHER EDUCATION.
VT 013 932 ED 054 383 436
VOCATIONAL EDUCATION IN SELECTED HIGH SCHOOLS.
VT 013 963 ED 055 220 441
AN EXAMINATION OF SELECTED SALIENT CORRELATES OF NEBRASKA SCHOOL ADMINISTRATORS AS RELATED TO VOCATIONAL EDUCATION.
VT 014 125 ED 056 206 463
AN ATTITUDINAL SURVEY CONCERNING THE RESPONSIBILITIES OF THE INTERMEDIATE-LEVEL DIRECTOR OF VOCATIONAL EDUCATION IN CALIFORNIA.

ADMINISTRATOR BACKGROUND
VT 013 959 ED 055 217 440
FACTORS ASSOCIATED WITH PARTICIPATION BY MICHIGAN SCHOOL SUPERINTENDENTS IN PROGRAMS AUTHORIZED UNDER THE PROVISIONS OF THE VOCATIONAL EDUCATION ACT OF 1963.
VT 013 963 ED 055 220 441
AN EXAMINATION OF SELECTED SALIENT CORRELATES OF NEBRASKA SCHOOL ADMINISTRATORS AS RELATED TO VOCATIONAL EDUCATION.

ADMINISTRATOR EVALUATION
VT 014 023 ED 055 233 451
A VOCATIONAL AND TECHNICAL PURVIEW FOR EDUCATIONAL ADMINISTRATORS.

ADMINISTRATOR GUIDES
VT 013 103 ED 054 334 393
PREVOCATIONAL EXPLORATORY PROGRAMS IN MANPOWER DEVELOPMENT AND TRAINING.
VT 013 759 ED 054 365 412
TRAINING EVALUATION: A GUIDE TO ITS PLANNING, DEVELOPMENT, AND USE IN AGENCY TRAINING COURSES. TRAINING SYSTEMS AND TECHNOLOGY SERIES 4.

ADMINISTRATOR QUALIFICATIONS
VT 013 962 ED 055 219 441
AN ANALYSIS OF THE ADMINISTRATIVE STRUCTURE AND THE ROLE OF THE CHIEF VOCATIONAL-TECHNICAL EDUCATION ADMINISTRATOR IN PUBLIC JUNIOR COLLEGES.

ADMINISTRATOR RESPONSIBILITY
VT 014 125 ED 056 206 463
AN ATTITUDINAL SURVEY CONCERNING THE RESPONSIBILITIES OF THE INTERMEDIATE-LEVEL DIRECTOR OF VOCATIONAL EDUCATION IN CALIFORNIA.

PAGE

ADMINISTRATOR ROLE
VT 013 962 ED 055 219 441
AN ANALYSIS OF THE ADMINISTRATIVE STRUCTURE AND THE ROLE OF THE CHIEF VOCATIONAL-TECHNICAL EDUCATION ADMINISTRATOR IN PUBLIC JUNIOR COLLEGES.
VT 013 963 ED 055 220 441
AN EXAMINATION OF SELECTED SALIENT CORRELATES OF NEBRASKA SCHOOL ADMINISTRATORS AS RELATED TO VOCATIONAL EDUCATION.

ADULT BASIC EDUCATION
VT 011 052 ED 057 169 390
EFFECT OF BASIC LITERACY TRAINING ON TEST SCORES.

ADULT EDUCATION
VT 013 976 444
THE RELATION BETWEEN NUTRITION KNOWLEDGE AND THE DIETARY INTAKE OF SELECTED WOMEN: A BASIS FOR ADULT EDUCATION PROGRAM DEVELOPMENT.

ADULT EDUCATION PROGRAMS
VT 013 779 ED 054 371 416
STATUS OF NON-CREDIT ADULT EDUCATION IN THE COMMUNITY COLLEGES OF THE NORTH CENTRAL ACCREDITING REGION.

ADULT PROGRAMS
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.

ADULT VOCATIONAL EDUCATION
VT 013 103 ED 054 334 393
PREVOCATIONAL EXPLORATORY PROGRAMS IN MANPOWER DEVELOPMENT AND TRAINING.

ADVISORY COMMITTEES
VT 013 718 ED 055 159 407
VOCATIONAL EDUCATION AMENDMENTS OF 1968, PUBLIC LAW 90-576. FIFTH REPORT.
VT 013 726 ED 055 161 408
STATE ADVISORY COUNCILS ON VOCATIONAL EDUCATION; A GUIDE FOR IMPLEMENTING RULES AND REGULATIONS.
VT 014 379 481
SECOND ANNUAL REPORT, 1970-71.

AGENCY ROLE
VT 010 784 ED 054 300 378
PAST AND PRESENT COUNSELING AND PLACEMENT PROCEDURES IN PRIVATE EMPLOYMENT AGENCIES--AN EMPIRICAL STUDY.

AGRIBUSINESS
VT 013 731 ED 054 362 409
AGRICULTURE AND NATURAL RESOURCES POSTSECONDARY PROGRAMS.

4

SUBJECT AND IDENTIFIER INDEX

PAGE

AGRICULTURAL EDUCATION
VT 012 103 ED 054 329 390
SUMMER INSTITUTE IN AGRICULTURAL MECHANICS EDUCATION, SOUTHERN REGION, PROCEEDINGS (BLACKSBURG, VIRGINIA, AUGUST 3-7, 1970).
VT 013 563 ED 054 352 403
DETERMINATION OF SUBJECT MATTER UNITS TAUGHT IN WISCONSIN AND THE EXTENT OF CONTRIBUTION MADE TOWARD MEETING THE NATIONAL OBJECTIVES OF VOCATIONAL AGRICULTURE.
VT 013 572 403
JOBS AND AGRICULTURAL DEVELOPMENT; A STUDY OF THE EFFECTS OF A NEW AGRICULTURAL TECHNOLOGY ON EMPLOYMENT IN POOR NATIONS.
VT 013 711 ED 054 358 406
FACTORS RELATED TO VOCATIONAL CHOICES OF AGRICULTURAL EDUCATION STUDENTS.
VT 013 731 ED 054 362 409
AGRICULTURE AND NATURAL RESOURCES POSTSECONDARY PROGRAMS.
VT 013 830 426
THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO.
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.
VT 013 869 ED 054 380 429
GUIDELINES FOR THE DEVELOPMENT OF STUDENT ORGANIZATIONS ASSOCIATED WITH AGRICULTURAL PROGRAMS AT TWO-YEAR, POST-SECONDARY EDUCATIONAL INSTITUTIONS IN THE UNITED STATES. RESEARCH REPORT.
VT 013 919 433
AGRICULTURAL EDUCATION IN "LIFE 2000." A REPORT OF A TASK FORCE ON LONG RANGE PLANNING.
VT 013 965 ED 056 178 442
A STUDY OF THE RELATIONSHIP BETWEEN SELECTED EDUCATIONAL EXPERIENCES OF VOCATIONAL AGRICULTURE STUDENTS AND THEIR ENROLLING IN A COLLEGE OF AGRICULTURE.

AGRICULTURAL ENGINEERING
VT 012 103 ED 054 329 390
SUMMER INSTITUTE IN AGRICULTURAL MECHANICS EDUCATION, SOUTHERN REGION, PROCEEDINGS (BLACKSBURG, VIRGINIA, AUGUST 3-7, 1970).

AGRICULTURAL MACHINERY
VT 010 962 ED 054 327 389
POTENTIAL MECHANIZATION IN THE FLUE-CURED TOBACCO INDUSTRY--WITH EMPHASIS ON HUMAN RESOURCE ADJUSTMENT.

AGRICULTURAL PRODUCTION
VT 010 962 ED 054 327 389
POTENTIAL MECHANIZATION IN THE FLUE-CURED TOBACCO INDUSTRY--WITH EMPHASIS ON HUMAN RESOURCE ADJUSTMENT.

AGRICULTURAL SAFETY
VT 014 000 ED 055 229 447
AGRICULTURAL TRACTOR SAFETY ON PUBLIC ROADS AND FARMS.

AGRICULTURAL TRENDS
VT 013 919 433
AGRICULTURAL EDUCATION IN "LIFE 2000." A REPORT OF A TASK FORCE ON LONG RANGE PLANNING.

AIR FORCE
VT 013 874 429
AEROMEDICAL EVACUATION TECHNICIAN GUIDE.

ALASKA
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.

ALCOHOL EDUCATION
VT 014 401 482
SPECIAL STUDY--YOUTH AND TRAFFIC SAFETY EDUCATION.

ALCORN AGRICULTURAL AND MECHANICAL COLLEGE
VT 013 782 ED 055 174 417
ORIGIN AND DEVELOPMENT OF INDUSTRIAL EDUCATION AT ALCORN AGRICULTURAL AND MECHANICAL COLLEGE.

ANCILLARY SERVICES
VT 014 106 ED 055 243 459
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE V.
VT 014 109 ED 055 246 460
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS.

ANGLO AMERICANS
VT 010 919 ED 054 323 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME I.

ANNOTATED BIBLIOGRAPHIES
VT 013 120 ED 054 335 393
EQUIVALENCY AND PROFICIENCY TESTING. A DESCRIPTIVE COMPILATION OF EXISTING TESTING PROGRAMS IN ALLIED HEALTH AND OTHER HEALTH OCCUPATIONS, WITH AN ANNOTATED BIBLIOGRAPHY.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 681 ED 054 355 405
ANNOTATED REFERENCES ON: ENGINEERING MAINTENANCE, SANITATION PUBLIC HEALTH, SANITATION HEALTH CARE FACILITY, HOUSEKEEPING, AND PURCHASING.
VT 013 741 ED 054 363 410
COST-BENEFIT ANALYSIS: THEORY AND APPLICATION TO MANPOWER TRAINING PROGRAMS. A BIBLIOGRAPHY.
VT 013 770 ED 055 170 414
A BIBLIOGRAPHY ON POLICE ADMINISTRATION.

ANNUAL REPORTS
VT 014 226 473
EXEMPLARY PROGRAMS OF THE STATE OF NEW MEXICO. ANNUAL REPORT, 1970-71.
VT 014 379 481
SECOND ANNUAL REPORT, 1970-71.

APTITUDE TESTS
VT 011 051 ED 057 168 389
DEVELOPMENT OF USTES APTITUDE TEST BATTERY FOR PHOTOGRAPH FINISHER (ANY INDUSTRY) I 976.886.

AREA VOCATIONAL SCHOOLS
VT 012 930 ED 054 333 392
ASSESSMENT OF THE CURRENT STATUS OF REGIONAL OCCUPATIONAL CENTERS AND REGIONAL OCCUPATIONAL PROGRAMS.
VT 013 884 430
A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS. PROJECT MINI-SCORE.
VT 014 076 ED 055 236 453
A RATIONALE FOR THE ESTABLISHMENT OF AREA VOCATIONAL EDUCATION PROGRAMS IN MICHIGAN.

ARMED FORCES
VT 010 844 ED 054 313 383
PERSONNEL IMPLICATIONS OF NEW TECHNOLOGICAL DEVELOPMENTS: UNDERSEA TECHNOLOGIES.
VT 010 846 ED 054 315 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM. PHASE II. VALIDATION OF THE SYSTEM FOR GRADES E-4 THROUGH E-7.
VT 010 848 ED 054 317 384
THREE STUDIES OF JOB INVENTORY PROCEDURES: SELECTING DUTY CATEGORIES, INTERVIEWING, AND SAMPLING.
VT 010 850 ED 054 319 385
AREA SCALES OF THE NAVY VOCATIONAL INTEREST INVENTORY AS PREDICTORS OF SCHOOL PERFORMANCE AND RATING ASSIGNMENT.

ARTICULATION (PROGRAM)
VT 013 235 ED 050 296 395
THE PLAN FOR IMPLEMENTATION OF AN EXEMPLARY OCCUPATIONAL EDUCATION PROGRAM IN A RURAL COMMUNITY.

PAGE

ASSOCIATE DEGREES
VT 012 725 ED 054 331 391
EMPLOYMENT CHARACTERISTICS OF THE PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE GRADUATES.
VT 013 461 ED 054 347 401
ASSOCIATE DEGREE TECHNICIANS' JUDGMENTS ON QUALITY OF INSTRUCTION AND COURSE RELEVANCY.
VT 013 768 ED 054 366 413
ASSOCIATE DEGREE EDUCATION FOR NURSING--CURRENT ISSUES, 1971.
VT 014 248 474
ASSOCIATE DEGREE EDUCATION FOR NURSING. INFORMATION ABOUT STATE-APPROVED ASSOCIATE DEGREE PROGRAMS IN NURSING.

AUDIO EQUIPMENT
VT 013 791 ED 055 179 420
A COMPARISON AND COST ANALYSIS OF TWO APPROACHES TO THE PROVISION OF OCCUPATIONAL INFORMATION.

AUDIOVISUAL INSTRUCTION
VT 013 784 ED 055 176 417
EFFECTS OF AUDIO-VISUAL ORDER OF PRESENTATION AND STRENGTH OF GRIP ON MANIPULATIVE TASK PERFORMANCE.

AUTO MECHANICS
VT 014 168 ED 056 219 467
A DIAGNOSTIC WORK SAMPLE INSTRUMENT FOR ASSESSING AUTOMOTIVE TRADE COMPETENCE.

AVIATION DATA ANALYST
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.

BASIC OCCUPATIONAL LANGUAGE TRAINING
VT 010 827 ED 055 151 381
BASIC OCCUPATIONAL LANGUAGE TRAINING (BOLT), FINAL REPORT.

BEHAVIOR PATTERNS
VT 013 492 ED 054 349 402
YOUTH AND WORK: TOWARD A MODEL OF LIFETIME ECONOMIC PROSPECTS.

BEHAVIORAL OBJECTIVES
VT 013 786 ED 057 188 418
THE EFFECT OF INSTRUCTIONAL OBJECTIVES AND GENERAL OBJECTIVES ON STUDENT SELF-EVALUATION OF PSYCHOMOTOR PERFORMANCE IN POWER MECHANICS.
VT 014 100 ED 055 240 457
THE DEVELOPMENT OF INDIVIDUALIZED INSTRUCTION IN VOCATIONAL EDUCATION.

SUBJECT AND IDENTIFIER INDEX

PAGE

BEHAVIORAL SCIENCE RESEARCH
VT 013 232 ED 050 293 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME I.
VT 013 233 ED 050 294 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME 2.

BELIEFS
VT 013 712 ED 054 359 407
PRINCIPLES FOR VOCATIONAL EDUCATION--VALIDATION OF STATEMENTS OF BELIEFS SELECTED FROM THE LITERATURE AND RESEARCH.

BENEFIT COST ANALYSIS
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.

BIBLIOGRAPHIES
VT 009 637 ED 056 208 377
INVENTORY OF MANPOWER RESEARCH PROJECTS IN INDIANA. REPORT NO. 4.
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).
VT 013 353 397
ENVIRONMENTAL INFORMATION (INFORMATION PACK).
VT 013 770 ED 055 170 414
A BIBLIOGRAPHY ON POLICE ADMINISTRATION.

BIOMEDICAL EQUIPMENT
VT 014 171 ED 056 220 468
THE DETERMINATION OF A TECHNICAL CORE CURRICULUM FOR A TWO YEAR TECHNICAL PROGRAM IN BIO-MEDICAL ELECTRONICS.

BLIND
VT 010 928 ED 054 326 387
THE DEVELOPMENT OF A SYLLABUS FOR INSTRUCTION OF COMMUNICATIVE SKILLS IN A REHABILITATION CENTER FOR THE BLIND. FINAL REPORT.

BLUE COLLAR OCCUPATIONS
VT 010 939 ED 055 153 388
FEDERAL TRAINING PROGRAMS FOR DISPERSED EMPLOYMENT OCCUPATIONS.
VT 013 960 ED 055 218 440
ATTITUDES OF SLUM DWELLERS AND SUBURBANITES TOWARD BLUE-COLLAR OCCUPATIONS AND VOCATIONAL EDUCATION.
VT 014 084 ED 056 193 455
THE JOB ATTITUDES OF WORKERS FROM DIFFERENT ETHNIC BACKGROUNDS.

PAGE

BRAIN DRAIN
VT 013 704 405
THE EMIGRATION OF HIGHLY--SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES.

BUILDING TRADES
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.

BUSINESS
VT 013 952 ED 055 216 439
MANPOWER PLANNING: EVOLVING SYSTEMS.

BUSINESS EDUCATION
VT 013 381 ED 054 340 398
A FACTOR ANALYSIS OF PROFESSIONAL EDUCATION COMPETENCIES AND SELECTED COMMUNITY COLLEGE INSTRUCTORS.
VT 013 795 ED 055 182 421
A STUDY TO DETERMINE THE EFFECT OF THE VOCATIONAL EDUCATION ACT OF 1963 UPON BUSINESS TEACHER EDUCATION PROGRAMS IN SELECTED COLLEGES AND UNIVERSITIES.
VT 013 835 ED 055 193 427
AN ANALYSIS OF FACTORS THAT AFFECT JOB SATISFACTION OF PUBLIC HIGH SCHOOL BUSINESS TEACHERS IN OHIO.
VT 013 917 433
EVALUATION OF CURRICULAR REQUIREMENTS FOR THE TWO-YEAR SECRETARIAL PROGRAM AT NEW MEXICO STATE UNIVERSITY, 1965-1969.
VT 013 921 ED 055 207 434
MODIFYING DISADVANTAGED STUDENTS' PERCEPTIONS OF OFFICE WORK.
VT 013 934 ED 055 212 437
AN ANALYSIS OF THE IMPACT OF THE VOCATIONAL EDUCATION ACT OF 1963 ON BUSINESS EDUCATION IN THE PUBLIC SECONDARY SCHOOLS OF MISSOURI WITH IMPLICATIONS FOR TEACHER PREPARATION.
VT 014 021 ED 055 231 450
THE KNOWLEDGE AND OPINIONS OF BUSINESS EDUCATORS TOWARD VOCATIONAL EDUCATION WITH SPECIAL EMPHASIS TOWARD DISTRIBUTIVE EDUCATION.

BUSINESS EDUCATION TEACHERS
VT 013 835 ED 055 193 427
AN ANALYSIS OF FACTORS THAT AFFECT JOB SATISFACTION OF PUBLIC HIGH SCHOOL BUSINESS TEACHERS IN OHIO.
VT 014 021 ED 055 231 450
THE KNOWLEDGE AND OPINIONS OF BUSINESS EDUCATORS TOWARD VOCATIONAL EDUCATION WITH SPECIAL EMPHASIS TOWARD DISTRIBUTIVE EDUCATION.

BUSINESS SKILLS
VT 014 308 476
PROPRIETARY PRODUCTS: PROJECT EARNING POWER.

SUBJECT AND IDENTIFIER INDEX

PAGE

CALIFORNIA
VT 012 930 ED 054 333 392
ASSESSMENT OF THE CURRENT STATUS OF REGIONAL OCCUPATIONAL CENTERS AND REGIONAL OCCUPATIONAL PROGRAMS.
VT 014 448 482
AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT.
VT 014 452 483
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

CAREER CHOICE
VT 013 232 ED 050 293 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME I.
VT 013 233 ED 050 294 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME 2.
VT 013 711 ED 054 358 406
FACTORS RELATED TO VOCATIONAL CHOICES OF AGRICULTURAL EDUCATION STUDENTS.
VT 013 968 ED 055 222 442
VARIABLES RELATED TO THE EDUCATIONAL-VOCATIONAL DECISION-MAKING OF HIGH SCHOOL SENIORS.

CAREER DEVELOPMENT
VT 013 292 396
THE JOB DESCRIPTION: ACTION TOWARD CAREER DEVELOPMENT.
VT 013 411 ED 054 342 400
NEIGHBORHOOD-BASED CHILD CARE SERVICES FOR THE INNER CITY: A SERVICE MODEL, A STAFFING PLAN AND A PROGRAM IMPLEMENTATION STRATEGY.

CAREER EDUCATION
VT 013 234 ED 050 295 395
CAREER EDUCATION--MORE THAN A NAME.
VT 013 385 ED 056 166 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SEATTLE. SUMMARY, 1971.
VT 013 386 ED 056 167 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SAN FRANCISCO. SUMMARY, 1971.
VT 013 387 ED 056 168 399
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DENVER. SUMMARY, 1971.
VT 013 947 ED 055 215 438
OCCUTAPES.
VT 013 973 ED 055 225 444
THE OCCUPAC PROJECT (A PROJECT TO DEVELOP OCCUPATIONAL INFORMATION LEARNING ACTIVITY PACKAGES FOR GRADES K-9). FINAL REPORT.
VT 014 105 ED 055 242 459
IMPROVING OCCUPATIONAL ORIENTATION PROGRAMS FOR JUNIOR HIGH SCHOOL STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VIII.
VT 014 114 ED 056 203 462
CAREER EDUCATION.
VT 014 205 ED 056 228 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, NEW YORK. SUMMARY, 1971.
VT 014 206 ED 056 229 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, PHILADELPHIA. SUMMARY, 1971.
VT 014 207 ED 056 230 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, ATLANTA. SUMMARY 1971.
VT 014 208 ED 056 231 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DALLAS. SUMMARY, 1971.
VT 014 209 ED 056 232 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, CHICAGO. SUMMARY, 1971.
VT 014 210 ED 056 233 471
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, BOSTON. SUMMARY, 1971.
VT 014 222 ED 056 235 472
PERSPECTIVES ON PROGRESS: CAREER EDUCATION IN FLORIDA; STATEWIDE EVALUATION OF VOCATIONAL-TECHNICAL EDUCATION 1970-1971.
VT 014 228 ED 056 239 473
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, KANSAS CITY. SUMMARY, 1971.

CAREER LADDERS
VT 013 354 397
TECHNICIAN DESCRIPTIONS (INFORMATION PACK). PROGRAMS OF TRAINING AND EDUCATION IN ENVIRONMENTAL TECHNOLOGY. (POTEET).
VT 013 411 ED 054 342 400
NEIGHBORHOOD-BASED CHILD CARE SERVICES FOR THE INNER CITY: A SERVICE MODEL, A STAFFING PLAN AND A PROGRAM IMPLEMENTATION STRATEGY.

CAREER OPPORTUNITIES
VT 013 957 440
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.
VT 014 156 ED 056 213 465
STUDENT HEALTH OPPORTUNITIES PROGRAM: A SUMMER YOUTH EMPLOYMENT PROGRAM.

SUBJECT AND IDENTIFIER INDEX

PAGE

CAREER PLANNING
VT 012 163 390
PRE-VOCATION PROGRAM.
VT 012 730 ED 056 165 391
REVIEW AND SYNTHESIS OF INFORMATION ON OCCUPATIONAL EXPLORATION.
VT 013 385 ED 056 166 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SEATTLE. SUMMARY, 1971.
VT 013 386 ED 056 167 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SAN FRANCISCO. SUMMARY, 1971.
VT 013 387 ED 056 168 399
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DENVER. SUMMARY, 1971.
VT 013 947 ED 055 215 438
OCCUTAPES.
VT 014 105 ED 055 242 459
IMPROVING OCCUPATIONAL ORIENTATION PROGRAMS FOR JUNIOR HIGH SCHOOL STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VIII.
VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.
VT 014 205 ED 056 228 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, NEW YORK. SUMMARY, 1971.
VT 014 206 ED 056 229 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, PHILADELPHIA. SUMMARY, 1971.
VT 014 207 ED 056 230 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, ATLANTA. SUMMARY 1971.
VT 014 208 ED 056 231 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DALLAS. SUMMARY, 1971.
VT 014 209 ED 056 232 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, CHICAGO. SUMMARY, 1971.
VT 014 210 ED 056 233 471
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, BOSTON. SUMMARY, 1971.
VT 014 228 ED 056 239 473
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, KANSAS CITY. SUMMARY, 1971.

CAREERS
VT 010 901 ED 054 322 386
PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS IN REHABILITATION COUNSELING.

PAGE

CASE STUDIES
VT 014 313 477
LABOR SUPPLY IN THE CONSTRUCTION INDUSTRY: A CASE STUDY OF UPSTATE NEW YORK.

CHANGE AGENTS
VT 012 875 ED 057 179 392
INDUSTRIAL ARTS CURRICULUM IMPROVEMENTS: A CHANGE AGENT'S GUIDE.
VT 013 793 ED 055 180 421
THE ADOPTION OF EDUCATIONAL INNOVATIONS AMONG EXPERIENCED TEACHERS OF VOCATIONAL AGRICULTURE IN PREDOMINANTLY NEGRO SCHOOLS IN NORTH CAROLINA.

CHANGING ATTITUDES
VT 013 806 ED 054 376 422
THE TRANSITION FROM SCHOOL TO WORK; A STUDY OF THE CHILD'S CHANGING PERCEPTION OF WORK FROM THE AGE OF SEVEN.
VT 013 878 ED 055 199 429
DEVELOPMENT OF AN INSTRUMENT TO MEASURE THE CHANGE ORIENTATION OF VOCATIONAL TEACHERS.

CHIEF ADMINISTRATORS
VT 014 023 ED 055 233 451
A VOCATIONAL AND TECHNICAL PURVIEW FOR EDUCATIONAL ADMINISTRATORS.

CHILD DEVELOPMENT
VT 013 806 ED 054 376 422
THE TRANSITION FROM SCHOOL TO WORK; A STUDY OF THE CHILD'S CHANGING PERCEPTION OF WORK FROM THE AGE OF SEVEN.
VT 013 988 ED 056 180 446
OBSERVATION OF CHILDREN IN A HOME ECONOMICS PROGRAM.

CHILD LABOR
VT 013 841 ED 055 197 428
WORKING CHILDREN: A REPORT ON CHILD LABOR.

CHILD LABOR LAWS
VT 013 368 ED 054 337 397
A GUIDE TO CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT.
VT 013 841 ED 055 197 428
WORKING CHILDREN: A REPORT ON CHILD LABOR.

CHINESE AMERICANS
VT 010 786 ED 054 301 379
SOCIOLOGICAL ASPECTS OF SELF-EMPLOYMENT AND SOCIAL WELFARE AMONG CHINESE, JAPANESE, AND NEGROES IN NORTHERN, URBAN AREAS OF THE UNITED STATES, 1900-1940.

CITY GOVERNMENT
VT 013 716 407
COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE V: PLANNING.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 119 ED 056 204 462
POLICE TRAINING AND PERFORMANCE STUDY.

CIVIL LIBERTIES
VT 013 426 ED 055 157 400
A MATTER OF SIMPLE JUSTICE.

CLERICAL OCCUPATIONS
VT 013 927 435
ANALYSES OF SELECTION AND PERFORMANCE MEASURES FOR CNA SUPPORT PERSONNEL.

CLOTHING INSTRUCTION
VT 013 641 ED 055 158 405
BROWARD COUNTY HOME ECONOMICS CURRICULUM DEVELOPMENT PROJECT, JULY 1, 1967 TO JULY 1, 1970.

CLUSTER GROUPING
VT 013 816 ED 054 378 424
THE CLUSTER CONCEPT PROGRAM AS AN APPROACH TO VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL.

COGNITIVE DEVELOPMENT
VT 013 784 ED 055 176 417
EFFECTS OF AUDIO-VISUAL ORDER OF PRESENTATION AND STRENGTH OF GRIP ON MANIPULATIVE TASK PERFORMANCE.

COGNITIVE PROCESSES
VT 013 232 ED 050 293 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME I.
VT 013 233 ED 050 294 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME 2.

COLLEGE ATTENDANCE
VT 013 965 ED 056 178 442
A STUDY OF THE RELATIONSHIP BETWEEN SELECTED EDUCATIONAL EXPERIENCES OF VOCATIONAL AGRICULTURE STUDENTS AND THEIR ENROLLING IN A COLLEGE OF AGRICULTURE.

COLLEGE STUDENTS
VT 013 970 ED 054 385 443
AN EXPERIMENT COMPARING THE EFFECTIVENESS OF LOW COST INSTRUCTIONAL SIMULATION AGAINST HIGH COST EQUIPMENT UTILIZATION IN TEACHING NUMERICAL CONTROL PRINCIPLES.

COLOR PRESENTATION
VT 014 321 478
THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS.

PAGE

COMMUNICATION (THOUGHT TRANSFER)
VT 013 920 ED 056 172 433
OPINION LEADERSHIP AND COMMUNICATION LINKAGES AMONG AGRICULTURAL EDUCATORS.
VT 013 987 ED 055 226 445
GATEKEEPERS IN VOCATIONAL EDUCATION.

COMMUNICATION SKILLS
VT 010 928 ED 054 326 387
THE DEVELOPMENT OF A SYLLABUS FOR INSTRUCTION OF COMMUNICATIVE SKILLS IN A REHABILITATION CENTER FOR THE BLIND. FINAL REPORT.

COMMUNITY ACTION
VT 010 787 ED 054 302 379
COMMUNITY ORGANIZATION AND THE MOBILIZATION OF RESOURCES FOR MANPOWER DEVELOPMENT PROGRAMS.

COMMUNITY ACTION PROGRAMS
VT 013 716 407
COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE V: PLANNING.

COMMUNITY CHANGE
VT 013 971 ED 055 223 443
COMMUNITY POWER AND SOCIAL CHANGE: A CASE FOR SOCIAL ACTION WITH IMPLICATIONS FOR OCCUPATIONAL EDUCATION.

COMMUNITY COLLEGES
VT 013 381 ED 054 340 398
A FACTOR ANALYSIS OF PROFESSIONAL EDUCATION COMPETENCIES AND SELECTED COMMUNITY COLLEGE INSTRUCTORS.
VT 013 779 ED 054 371 416
STATUS OF NON-CREDIT ADULT EDUCATION IN THE COMMUNITY COLLEGES OF THE NORTH CENTRAL ACCREDITING REGION.
VT 014 202 ED 057 204 469
AN APPRAISAL OF THE IMPACT OF FEDERAL FUNDS GRANTED UNDER SECTION 4(A) OF THE VOCATIONAL EDUCATION ACT OF 1963 ON THE OCCUPATIONAL PROGRAMS OFFERED BY THE PUBLIC TWO-YEAR COLLEGES IN NEW YORK STATE.
VT 014 451 483
CAREER GRADUATES: A PROFILE OF JOB EXPERIENCE AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES.
VT 014 452 483
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

SUBJECT AND IDENTIFIER INDEX

PAGE

COMMUNITY HEALTH SERVICES
VT 013 273 ED 055 156 395
GUIDELINES FOR DIETITIANS AND PUBLIC HEALTH NUTRITIONISTS IN HOME HEALTH SERVICES.

COMMUNITY ROLE
VT 014 019 ED 055 230 450
VOCATIONAL EDUCATION PROGRAMS OFFERED IN THE METROPOLITAN PUBLIC HIGH SCHOOLS OF THE UNITED STATES.

COMMUNITY SERVICES
VT 013 292 396
THE JOB DESCRIPTION: ACTION TOWARD CAREER DEVELOPMENT.

COMPARATIVE ANALYSIS
VT 013 777 ED 054 370 415
COMPARATIVE EFFECTIVENESS OF TWO STRATEGIES OF COMPUTER-ASSISTED INSTRUCTION FOR TEACHING ORTHOGRAPHIC PROJECTIONS.

COMPREHENSIVE PROGRAMS
VT 014 167 ED 056 218 467
GUIDELINES FOR HEALTH OCCUPATIONS EDUCATION PROGRAMS.

COMPUTER ASSISTED INSTRUCTION
VT 013 777 ED 054 370 415
COMPARATIVE EFFECTIVENESS OF TWO STRATEGIES OF COMPUTER-ASSISTED INSTRUCTION FOR TEACHING ORTHOGRAPHIC PROJECTIONS.
VT 013 792 ED 054 374 420
A COMPARISON OF THE EFFECTIVENESS OF A PROGRAMMED TEXT AND A COMPUTER BASED DISPLAY UNIT MEDIA IN TEACHING FORTRAN IV.

COMPUTER PROGRAMS
VT 014 134 ED 055 252 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENT COLLECTIONS: A FINAL REPORT.
VT 014 135 ED 056 208 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENTS COLLECTIONS: A USER AND INSTALLATION HANDBOOK.

CONFERENCE REPORTS
VT 010 199 ED 054 295 377
JOB HORIZONS FOR WOMEN AND GIRLS IN THE DISTRICT OF COLUMBIA.
VT 013 555 ED 054 350 402
NEW DIRECTIONS FOR VOCATIONAL HOME ECONOMICS.
VT 013 744 411
REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER.
VT 014 109 ED 055 246 460
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS.
VT 014 358 ED 057 237 479
MAN--SOCIETY--TECHNOLOGY.
VT 014 360 ED 057 239 479
NEW CONCEPTS IN INDUSTRIAL ARTS.
VT 014 364 479
EMERGING TECHNOLOGIES...APPLICATION FOR TOMORROW.

CONSTRUCTION INDUSTRY
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.
VT 014 214 471
FOREIGN EXPERIENCE IN PROVIDING WINTER JOBS IN THE CONSTRUCTION INDUSTRY.
VT 014 305 476
PROJECT BUILD: PREPARING DISADVANTAGED YOUTH FOR APPRENTICABLE CONSTRUCTION TRADES.
VT 014 313 477
LABOR SUPPLY IN THE CONSTRUCTION INDUSTRY: A CASE STUDY OF UPSTATE NEW YORK.

CONSTRUCTION INDUSTRY: PROGRAM PLANNING
VT 014 254 ED 057 215 474
PLANNING FOR SAFETY ON THE JOBSITE.

CONSUMER EDUCATION
VT 013 772 ED 055 172 414
CONSUMER EDUCATION: AN INTERDISCIPLINARY APPROACH.

COOPERATIVE EDUCATION
VT 013 437 ED 054 344 401
A COOPERATIVE VOCATIONAL PATTERN FOR IN-SCHOOL MENTALLY RETARDED YOUTH.
VT 014 074 453
A HANDBOOK OF COOPERATIVE PROGRAMS FOR OKLAHOMA VOCATIONAL AND TECHNICAL EDUCATION.

COOPERATIVE PROGRAMS
VT 013 924 ED 055 208 434
A COMPARATIVE ANALYSIS OF SELECTED STUDENT CHARACTERISTICS AND VOCATIONAL COOPERATIVE PROGRAMS.

COORDINATORS
VT 014 249 ED 057 212 474
YOUTH RESOURCES MANUAL FOR COORDINATORS.

CORE CURRICULUM
VT 013 768 ED 054 366 413
ASSOCIATE DEGREE EDUCATION FOR NURSING--CURRENT ISSUES, 1971.
VT 014 171 ED 056 220 468
THE DETERMINATION OF A TECHNICAL CORE CURRICULUM FOR A TWO YEAR TECHNICAL PROGRAM IN BIO-MEDICAL ELECTRONICS.

SUBJECT AND IDENTIFIER INDEX

PAGE

CORRECTIVE INSTITUTIONS
VT 013 843 428
AN ANALYSIS OF THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS.

COST EFFECTIVENESS
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).
VT 010 884 ED 055 152 385
CONDUCT A COST EFFECTIVENESS STUDY OF POSTGRADUATE MEDICAL EDUCATION PROGRAMS.
VT 013 090 393
A BENEFIT-COST ANALYSIS OF PROJECT CROSSROADS.
VT 013 728 ED 055 162 409
INVESTMENT PLANNING IN VOCATIONAL-TECHNICAL EDUCATION. A PILOT STUDY.
VT 013 741 ED 054 363 410
COST-BENEFIT ANALYSIS: THEORY AND APPLICATION TO MANPOWER TRAINING PROGRAMS. A BIBLIOGRAPHY.
VT 013 791 ED 055 179 420
A COMPARISON AND COST ANALYSIS OF TWO APPROACHES TO THE PROVISION OF OCCUPATIONAL INFORMATION.
VT 013 822 ED 055 190 425
THE EFFECTIVENESS OF VOCATIONAL AND TECHNICAL PROGRAMS: A NATIONAL FOLLOW-UP SURVEY.
VT 014 020 ED 056 189 450
A FOLLOW-UP OF THE FINANCIAL ASSETS AND LIABILITIES OF MENTALLY RETARDED YOUTH AS RELATED TO THE COST OF VOCATIONAL TRAINING IN FOUR PUBLIC SCHOOL SYSTEMS.
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.

COUNSELOR ATTITUDES
VT 014 230 ED 057 209 473
SCHOOL GUIDANCE COUNSELORS' PERCEPTIONS OF POSTSECONDARY VOCATIONAL AND TECHNICAL EDUCATION AND FACTORS THAT CONTRIBUTE TO THESE PERCEPTIONS.

COUNSELOR TRAINING
VT 010 901 ED 054 322 386
PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS IN REHABILITATION COUNSELING.

CULTURALLY DISADVANTAGED
VT 010 199 ED 054 295 377
JOB HORIZONS FOR WOMEN AND GIRLS IN THE DISTRICT OF COLUMBIA.
VT 010 508 ED 054 298 378
TEENAGE EMPLOYMENT: A STUDY OF LOW INCOME YOUTH IN HOUSTON, TEXAS.

PAGE

VT 010 797 ED 054 306 380
UNIVERSITY MANPOWER RESEARCH SEMINAR FOR THE STIMULATION OF PROFESSIONAL RESEARCH INTEREST.
VT 013 103 ED 054 334 393
PREVOCATIONAL EXPLORATORY PROGRAMS IN MANPOWER DEVELOPMENT AND TRAINING.
VT 014 331 ED 057 230 478
ESOPUS PREP. A RESIDENTIAL SCHOOL FOR SERIOUS DISADVANTAGED YOUTH.

CURRICULUM DESIGN
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 352 396
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK).
VT 013 783 ED 055 175 417
AN ANALYSIS OF SELECTED CURRICULUM ATTRIBUTES WITH RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION IN ETHIOPIA.

CURRICULUM DEVELOPMENT
VT 012 875 ED 057 179 392
INDUSTRIAL ARTS CURRICULUM IMPROVEMENTS: A CHANGE AGENT'S GUIDE.
VT 013 641 ED 055 158 405
BROWARD COUNTY HOME ECONOMICS CURRICULUM DEVELOPMENT PROJECT, JULY 1, 1967 TO JULY 1, 1970.
VT 013 772 ED 055 172 414
CONSUMER EDUCATION: AN INTERDISCIPLINARY APPROACH.
VT 013 783 ED 055 175 417
AN ANALYSIS OF SELECTED CURRICULUM ATTRIBUTES WITH RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION IN ETHIOPIA.
VT 013 809 ED 055 185 423
NEW INDUSTRIAL ARTS FOR THE SENIOR HIGH SCHOOL.
VT 013 816 ED 054 378 424
THE CLUSTER CONCEPT PROGRAM AS AN APPROACH TO VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL.
VT 013 917 433
EVALUATION OF CURRICULAR REQUIREMENTS FOR THE TWO-YEAR SECRETARIAL PROGRAM AT NEW MEXICO STATE UNIVERSITY, 1965-1969.
VT 013 972 ED 055 224 443
A MODEL FOR EDUCATIONAL PROFICIENCY.
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.
VT 014 069 451
DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 075 ED 055 235 453
FUNCTIONS OF INDUSTRY APPROACH TO CURRICULUM FOR VOCATIONAL EDUCATION.
VT 014 088 ED 054 389 455
A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY CURRICULUM PROJECT: A FINAL EVALUATION OF THE INDUSTRIAL ARTS CURRICULUM PROJECT (IACP), 1965-1971.
VT 014 149 ED 056 211 465
A STUDY TO DETERMINE RELATIONSHIPS BETWEEN VOCATIONAL EDUCATION CURRICULAR EVOLUTION AND SOME ASPECTS OF OCCUPATIONAL EVOLUTION.
VT 014 360 ED 057 239 479
NEW CONCEPTS IN INDUSTRIAL ARTS.

CURRICULUM EVALUATION
VT 013 834 ED 055 192 426
EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION CURRICULUM AT PERU STATE COLLEGE.
VT 014 318 477
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.

CURRICULUM GUIDES
VT 010 928 ED 054 326 387
THE DEVELOPMENT OF A SYLLABUS FOR INSTRUCTION OF COMMUNICATIVE SKILLS IN A REHABILITATION CENTER FOR THE BLIND. FINAL REPORT.
VT 010 963 ED 054 328 389
GOALS AND BASIC UNITS OF INSTRUCTION FOR TREATMENT MEDIA COURSES FOR THE PREPARATION OF OCCUPATIONAL THERAPISTS.

CURRICULUM PLANNING
VT 013 829 ED 055 191 426
A SKILLED NEEDS SURVEY WITH IMPLICATIONS FOR VOCATIONAL-TECHNICAL EDUCATION WITHIN THE IOWA WESTERN COMMUNITY COLLEGE DISTRICT AREA XIII.
VT 013 845 ED 055 198 428
EPDA (EDUCATION PROFESSIONS DEVELOPMENT ACT) INSTITUTE LEADERSHIP DEVELOPMENT IN CURRICULUM PLANNING. FINAL REPORT.

CYBERNETICS
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.

DATA ANALYSIS
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.
VT 014 466 484
ANALYSIS OF MDTA INSTITUTIONAL AND OJT DATA TAPES FOR 1968.

PAGE

DATA BASES
VT 010 796 ED 054 305 380
CONCEPTS AND MEASUREMENTS FOR MANPOWER AND OCCUPATIONAL ANALYSIS.

DATA TAPES
VT 014 466 484
ANALYSIS OF MDTA INSTITUTIONAL AND OJT DATA TAPES FOR 1968.

DAY CARE SERVICES
VT 013 411 ED 054 342 400
NEIGHBORHOOD-BASED CHILD CARE SERVICES FOR THE INNER CITY: A SERVICE MODEL, A STAFFING PLAN AND A PROGRAM IMPLEMENTATION STRATEGY.

DECISION MAKING
VT 013 232 ED 050 293 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME I.
VT 013 233 ED 050 294 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME 2.
VT 013 774 415
THE USE OF ANALYTICAL TECHNIQUES IN THE MANAGEMENT OF PROGRAMS OF HEALTH MANPOWER EDUCATION.
VT 013 959 ED 055 217 440
FACTORS ASSOCIATED WITH PARTICIPATION BY MICHIGAN SCHOOL SUPERINTENDENTS IN PROGRAMS AUTHORIZED UNDER THE PROVISIONS OF THE VOCATIONAL EDUCATION ACT OF 1963.
VT 013 968 ED 055 222 442
VARIABLES RELATED TO THE EDUCATIONAL-VOCATIONAL DECISION-MAKING OF HIGH SCHOOL SENIORS.
VT 013 996 ED 055 228 447
PROCEEDINGS OF NORTH AMERICAN CONFERENCE ON LABOR STATISTIC.

DECISION MAKING SKILLS
VT 014 168 ED 056 219 467
A DIAGNOSTIC WORK SAMPLE INSTRUMENT FOR ASSESSING AUTOMOTIVE TRADE COMPETENCE.

DELINQUENT REHABILITATION
VT 013 088 ED 055 155 392
PROJECT CROSSROADS. FINAL REPORT.
VT 013 089 393
PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION. A PROGRAM EVALUATION.
VT 013 090 393
A BENEFIT-COST ANALYSIS OF PROJECT CROSSROADS.

SUBJECT AND IDENTIFIER INDEX

PAGE

DEMOGRAPHY
VT 013 460 ED 054 346 401
PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE TECHNICIAN GRADUATES: SOME DEMOGRAPHIC VARIABLES.

DEMONSTRATION PROGRAMS
VT 013 235 ED 050 296 395
THE PLAN FOR IMPLEMENTATION OF AN EXEMPLARY OCCUPATIONAL EDUCATION PROGRAM IN A RURAL COMMUNITY.
VT 014 295 476
MANPOWER DEVELOPMENT COUNCIL: THE DEVELOPMENT OF A COMPREHENSIVE SYSTEM OF HUMAN RESOURCE DEVELOPMENT FOR IOWA.

DEMONSTRATION PROJECTS
VT 010 827 ED 055 151 381
BASIC OCCUPATIONAL LANGUAGE TRAINING (BOLT), FINAL REPORT.
VT 010 932 ED 056 159 387
AN EVALUATION OF REHABILITATION SERVICES AND THE ROLE OF INDUSTRY IN THE COMMUNITY ADJUSTMENT OF PSYCHIATRIC PATIENTS FOLLOWING HOSPITALIZATION. FINAL REPORT.
VT 013 088 ED 055 155 392
PROJECT CROSSROADS. FINAL REPORT.
VT 013 089 393
PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION. A PROGRAM EVALUATION.
VT 013 090 393
A BENEFIT-COST ANALYSIS OF PROJECT CROSSROADS.

DEPRESSED AREAS (GEOGRAPHIC)
VT 013 717 ED 054 360 407
JOBS FOR AMERICA. ANNUAL REPORT FISCAL 1970.

DEVELOPING NATIONS
VT 002 713 376
HUMAN RESOURCES DEVELOPMENT PLANNING.
VT 013 572 403
JOBS AND AGRICULTURAL DEVELOPMENT; A STUDY OF THE EFFECTS OF A NEW AGRICULTURAL TECHNOLOGY ON EMPLOYMENT IN POOR NATIONS.
VT 013 704 405
THE EMIGRATION OF HIGHLY-SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES.
VT 013 744 411
REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER.

DIETITIANS
VT 013 273 ED 055 156 395
GUIDELINES FOR DIETITIANS AND PUBLIC HEALTH NUTRITIONISTS IN HOME HEALTH SERVICES.

DIRECTORIES
VT 013 706 ED 054 356 406
AGENCY TRAINING CENTERS FOR GOVERNMENT EMPLOYEES.
VT 013 764 413
SELECTED TRAINING PROGRAMS FOR PHYSICIAN SUPPORT PERSONNEL.
VT 013 826 425
INDUSTRIAL ARTS: MUSEUM RESOURCES. A DIRECTORY OF SELECTED CENTERS.
VT 014 132 463
EDUCATION FOR NURSING--THE DIPLOMA WAY.
VT 014 248 474
ASSOCIATE DEGREE EDUCATION FOR NURSING. INFORMATION ABOUT STATE-APPROVED ASSOCIATE DEGREE PROGRAMS IN NURSING.

DISADVANTAGED GROUPS
VT 013 412 ED 054 343 400
EVALUATION OF THE IMPACT OF SELECTED URBAN CONCENTRATED EMPLOYMENT PROGRAMS.
VT 013 765 413
NEW CAREERS.
VT 013 818 ED 056 169 425
ADMINISTRATORS' WORKSHOP FOR PROGRAM IMPLEMENTATION: VOCATIONAL EDUCATION OPPORTUNITIES FOR DISADVANTAGED AND HANDICAPPED PERSONS.
VT 014 103 ED 056 201 458
UPDATING THE PROCESS AND CONTENT OF TEACHER EDUCATION CURRICULUMS TO REACH DISADVANTAGED YOUTH IN METROPOLITAN AREAS. FINAL REPORT, VOLUME IX.
VT 014 311 ED 056 241 477
THE WORK SAMPLE: REALITY-BASED ASSESSMENT OF VOCATIONAL POTENTIAL.

DISADVANTAGED YOUTH
VT 013 768 ED 054 366 413
ASSOCIATE DEGREE EDUCATION FOR NURSING--CURRENT ISSUES, 1971.
VT 013 921 ED 055 207 434
MODIFYING DISADVANTAGED STUDENTS' PERCEPTIONS OF OFFICE WORK.
VT 013 993 446
STATLER FOUNDATION PROJECT REPORT, JULY 1970.
VT 014 020 ED 056 189 450
A FOLLOW-UP OF THE FINANCIAL ASSETS AND LIABILITIES OF MENTALLY RETARDED YOUTH AS RELATED TO THE COST OF VOCATIONAL TRAINING IN FOUR PUBLIC SCHOOL SYSTEMS.
VT 014 022 ED 055 232 451
THE EFFECT ON SELF CONCEPT OF THE CHATTANOOGA NEIGHBORHOOD YOUTH CORPS AND OF EDUCATION, VOCATIONAL ASPIRATION, AND SEX ROLE.
VT 014 098 ED 055 239 457
AN EVALUATION OF OKLAHOMA'S EXEMPLARY VOCATIONAL EDUCATION AND OCCUPATIONAL ORIENTATION PROGRAM.
VT 014 104 ED 055 241 458
IMPROVING PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VI.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 156 ED 056 213 465
STUDENT HEALTH OPPORTUNITIES PROGRAM: A SUMMER YOUTH EMPLOYMENT PROGRAM.
VT 014 249 ED 057 212 474
YOUTH RESOURCES MANUAL FOR COORDINATORS.
VT 014 305 476
PROJECT BUILD: PREPARING DISADVANTAGED YOUTH FOR APPRENTICABLE CONSTRUCTION TRADES.

DISCRIMINATORY ATTITUDES (SOCIAL)
VT 014 093 ED 056 198 456
PRIVATE HOUSEHOLD EMPLOYMENT IN THE UNITED STATES; AN EXPLORATORY PROJECT.

DISTRIBUTIVE EDUCATION
VT 014 021 ED 055 231 450
THE KNOWLEDGE AND OPINIONS OF BUSINESS EDUCATORS TOWARD VOCATIONAL EDUCATION WITH SPECIAL EMPHASIS TOWARD DISTRIBUTIVE EDUCATION.

DIVISION OF MANPOWER INTELLIGENCE
VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.

DOCTORAL THESES
VT 013 796 ED 055 183 421
AN INVESTIGATION OF THE VOCATIONAL BEHAVIOR OF SELECTED WOMEN VOCATIONAL EDUCATION STUDENTS.
VT 013 934 ED 055 212 437
AN ANALYSIS OF THE IMPACT OF THE VOCATIONAL EDUCATION ACT OF 1963 ON BUSINESS EDUCATION IN THE PUBLIC SECONDARY SCHOOLS OF MISSOURI WITH IMPLICATIONS FOR TEACHER PREPARATION.

DOMESTICS
VT 014 093 ED 056 198 456
PRIVATE HOUSEHOLD EMPLOYMENT IN THE UNITED STATES; AN EXPLORATORY PROJECT.

DRAFTING
VT 012 725 ED 054 331 391
EMPLOYMENT CHARACTERISTICS OF THE PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE GRADUATES.
VT 013 460 ED 054 346 401
PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE TECHNICIAN GRADUATES: SOME DEMOGRAPHIC VARIABLES.
VT 014 452 483
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.

DRAFTSMEN
VT 014 452 483
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.

PAGE

DRIVER EDUCATION
VT 013 886 ED 055 202 431
A MODEL (FORMULA) FOR DERIVING A HAZARD INDEX OF RAIL-HIGHWAY GRADE CROSSINGS.
VT 013 887 ED 055 203 431
A LICENSING PROGRAM FOR OPERATORS OF TWO-WHEELED MOTOR VEHICLES.
VT 014 401 482
SPECIAL STUDY--YOUTH AND TRAFFIC SAFETY EDUCATION.

DROPOUT CHARACTERISTICS
VT 013 933 ED 055 211 436
A PREDICTIVE MODEL FOR THE IDENTIFICATION OF POTENTIAL DROPOUTS FROM VOCATIONAL TRAINING IN A COMPREHENSIVE REHABILITATION CENTER.

DROPOUT IDENTIFICATION
VT 013 933 ED 055 211 436
A PREDICTIVE MODEL FOR THE IDENTIFICATION OF POTENTIAL DROPOUTS FROM VOCATIONAL TRAINING IN A COMPREHENSIVE REHABILITATION CENTER.

DROPOUT PREVENTION
VT 014 071 ED 056 191 452
THE EVALUATION OF A VOCATIONAL PROGRAM FOR DROPOUT-PRONE JUNIOR HIGH SCHOOL STUDENTS.

DROPOUT REHABILITATION
VT 014 331 ED 057 230 478
ESOPUS PREP. A RESIDENTIAL SCHOOL FOR SERIOUS DISADVANTAGED YOUTH.

DROPOUTS
VT 013 884 430
A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS. PROJECT MINI-SCORE.
VT 013 968 ED 055 222 442
VARIABLES RELATED TO THE EDUCATIONAL-VOCATIONAL DECISION-MAKING OF HIGH SCHOOL SENIORS.

EARNING FACTORS
VT 014 179 468
PART-TIME EXPERIENCE AND THE TRANSITION FROM SCHOOL TO WORK.

ECONOMIC CLIMATE
VT 013 324 396
MANPOWER IN ISRAEL. (FIFTH REPORT).

ECONOMIC DEVELOPMENT
VT 002 713 376
HUMAN RESOURCES DEVELOPMENT PLANNING.
VT 013 717 ED 054 360 407
JOBS FOR AMERICA. ANNUAL REPORT FISCAL 1970.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 085 ED 056 194 455
OCCUPATIONAL AND EDUCATIONAL STRUCTURES OF THE LABOUR FORCE AND LEVELS OF ECONOMIC DEVELOPMENT.

ECONOMIC FACTORS
VT 010 919 ED 054 323 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME I.
VT 010 920 ED 054 324 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME II.
VT 014 275 475
THE EFFECTS OF MINIMUM WAGES ON THE DISTRIBUTION OF CHANGES IN AGGREGATE EMPLOYMENT.

ECONOMIC OPPORTUNITIES
VT 013 492 ED 054 349 402
YOUTH AND WORK: TOWARD A MODEL OF LIFETIME ECONOMIC PROSPECTS.

ECONOMIC PROGRESS
VT 013 763 413
PROJECTIONS: 1980. THE MANPOWER POSTURE OF THE NATION IN THE 1970'S.

ECONOMIC RESEARCH
VT 010 796 ED 054 305 380
CONCEPTS AND MEASUREMENTS FOR MANPOWER AND OCCUPATIONAL ANALYSIS.
VT 013 812 ED 055 186 424
AGGREGATION AND AVERAGING.
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.

ECONOMICALLY DISADVANTAGED
VT 010 783 ED 054 299 378
THE LABOR FORCE PARTICIPATION OF THE URBAN POOR.

EDUCABLE MENTALLY HANDICAPPED
VT 014 020 ED 056 189 450
A FOLLOW-UP OF THE FINANCIAL ASSETS AND LIABILITIES OF MENTALLY RETARDED YOUTH AS RELATED TO THE COST OF VOCATIONAL TRAINING IN FOUR PUBLIC SCHOOL SYSTEMS.

EDUCATION
VT 010 920 ED 054 324 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME II.

EDUCATION PROFESSIONS DEVELOPMENT ACT
VT 013 845 ED 055 198 428
EPDA (EDUCATION PROFESSIONS DEVELOPMENT ACT) INSTITUTE LEADERSHIP DEVELOPMENT IN CURRICULUM PLANNING. FINAL REPORT.

PAGE

EDUCATIONAL ADMINISTRATION
VT 013 794 ED 055 181 421
ADMINISTRATIVE PATTERN FOR PUBLIC POST SECONDARY VOCATIONAL TECHNICAL EDUCATION IN NEBRASKA.
VT 014 023 ED 055 233 451
A VOCATIONAL AND TECHNICAL PURVIEW FOR EDUCATIONAL ADMINISTRATORS.

EDUCATIONAL ATTITUDES
VT 013 461 ED 054 347 401
ASSOCIATE DEGREE TECHNICIANS' JUDGMENTS ON QUALITY OF INSTRUCTION AND COURSE RELEVANCY.
VT 013 802 ED 055 184 422
SELECTED ASPECTS OF VOCATIONAL IMAGE AS PERCEIVED BY A PUBLIC CATEGORIZED BY OCCUPATIONAL LEVELS.

EDUCATIONAL CHANGE
VT 012 875 ED 057 179 392
INDUSTRIAL ARTS CURRICULUM IMPROVEMENTS: A CHANGE AGENT'S GUIDE.
VT 013 723 408
STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS.
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.
VT 014 100 ED 055 240 457
THE DEVELOPMENT OF INDIVIDUALIZED INSTRUCTION IN VOCATIONAL EDUCATION.
VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.
VT 014 166 467
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.

EDUCATIONAL COORDINATION
VT 014 106 ED 055 243 459
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE V.
VT 014 109 ED 055 246 460
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS.

EDUCATIONAL DEVELOPMENT
VT 013 971 ED 055 223 443
COMMUNITY POWER AND SOCIAL CHANGE: A CASE FOR SOCIAL ACTION WITH IMPLICATIONS FOR OCCUPATIONAL EDUCATION.

EDUCATIONAL ECONOMICS
VT 014 085 ED 056 194 455
OCCUPATIONAL AND EDUCATIONAL STRUCTURES OF THE LABOUR FORCE AND LEVELS OF ECONOMIC DEVELOPMENT.

SUBJECT AND IDENTIFIER INDEX

PAGE

EDUCATIONAL EXPERIENCE
VT 013 965 ED 056 178 442
A STUDY OF THE RELATIONSHIP BETWEEN SELECTED EDUCATIONAL EXPERIENCES OF VOCATIONAL AGRICULTURE STUDENTS AND THEIR ENROLLING IN A COLLEGE OF AGRICULTURE.
VT 014 080 ED 055 237 454
A LONGITUDINAL STUDY OF VOCATIONAL DEVELOPMENT: IMPLICATIONS FOR VOCATIONAL EDUCATION AND GUIDANCE.

EDUCATIONAL EXPERIMENTS
VT 014 064 451
EFFECTS OF PROGRAMED VERSUS CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS.

EDUCATIONAL FACILITIES
VT 013 706 ED 054 356 406
AGENCY TRAINING CENTERS FOR GOVERNMENT EMPLOYEES.
VT 014 160 ED 056 215 466
TENNESSEE INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM FOR VOCATIONAL EDUCATION (JULY 1, 1970-JUNE 30, 1971).

EDUCATIONAL FINANCE
VT 013 794 ED 055 181 421
ADMINISTRATIVE PATTERN FOR PUBLIC POST SECONDARY VOCATIONAL TECHNICAL EDUCATION IN NEBRASKA.
VT 013 931 ED 055 210 436
A FISCAL ANALYSIS OF FIXED-AMOUNT FEDERAL GRANTS-IN-AID: THE CASE OF VOCATIONAL EDUCATION.
VT 013 937 ED 055 214 438
A STUDY OF FEDERAL FINANCIAL AID TO PUBLIC VOCATIONAL EDUCATION, 1917-1964.

EDUCATIONAL HISTORY
VT 013 782 ED 055 174 417
ORIGIN AND DEVELOPMENT OF INDUSTRIAL EDUCATION AT ALCORN AGRICULTURAL AND MECHANICAL COLLEGE.
VT 013 797 ED 054 375 422
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION: THEIR HISTORY AND PRESENT POSITION IN TEXAS.
VT 013 964 ED 055 221 441
A HISTORIAL ANALYSIS OF VOCATIONAL EDUCATION: LAND-GRANT COLLEGES TO CALIFORNIA JUNIOR COLLEGES, 1862-1940.

EDUCATIONAL INNOVATION
VT 012 875 ED 057 179 392
INDUSTRIAL ARTS CURRICULUM IMPROVEMENTS: A CHANGE AGENT'S GUIDE.
VT 013 234 ED 050 295 395
CAREER EDUCATION--MORE THAN A NAME.
VT 013 723 408
STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS.
VT 013 793 ED 055 180 421
THE ADOPTION OF EDUCATIONAL INNOVATIONS AMONG EXPERIENCED TEACHERS OF VOCATIONAL AGRICULTURE IN PREDOMINANTLY NEGRO SCHOOLS IN NORTH CAROLINA.
VT 013 795 ED 055 182 421
A STUDY TO DETERMINE THE EFFECT OF THE VOCATIONAL EDUCATION ACT OF 1963 UPON BUSINESS TEACHER EDUCATION PROGRAMS IN SELECTED COLLEGES AND UNIVERSITIES.
VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.
VT 014 226 473
EXEMPLARY PROGRAMS OF THE STATE OF NEW MEXICO. ANNUAL REPORT, 1970-71.

EDUCATIONAL LEGISLATION
VT 008 010 ED 054 293 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY.
VT 013 909 ED 055 205 432
LAWS RELATING TO VOCATIONAL EDUCATION AND AGRICULTURAL EXTENSION WORK.

EDUCATIONAL NEEDS
VT 007 748 376
RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS BY STUDENTS MAJORING IN ELECTRONICS TECHNOLOGY.
VT 013 609 404
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.
VT 013 718 ED 055 159 407
VOCATIONAL EDUCATION AMENDMENTS OF 1968, PUBLIC LAW 90-576. FIFTH REPORT.
VT 013 810 423
OREGON STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION UNDER THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FISCAL YEAR 1971.
VT 013 870 ED 056 171 429
RESEARCH UTILIZATION SPECIALIST; REVIEW AND SYNTHESIS OF SELECTED LITERATURE ON RESEARCH DEVELOPMENT.
VT 013 936 ED 055 213 437
THE STATUS OF AND NEED FOR VOCATIONAL-INDUSTRIAL EDUCATION IN JEFFERSON COUNTY MISSOURI.
VT 013 967 ED 054 384 442
EMPLOYMENT OPPORTUNITIES, TRAINING NEEDS AND VOCATIONAL EDUCATION FOR THE GRAPHIC ARTS IN MISSOURI.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 985 ED 054 388 445
A SURVEY OF TRAINING NEEDS AND INTERNSHIPS FOR NON-TEACHING POSITIONS IN HOME ECONOMICS. FINAL REPORT.
VT 014 005 ED 056 185 448
OCCUPATIONAL MANPOWER AND TRAINING NEEDS; INFORMATION FOR PLANNING TRAINING PROGRAMS FOR THE 1970'S.
VT 014 019 ED 055 230 450
VOCATIONAL EDUCATION PROGRAMS OFFERED IN THE METROPOLITAN PUBLIC HIGH SCHOOLS OF THE UNITED STATES.
VT 014 076 ED 055 236 453
A RATIONALE FOR THE ESTABLISHMENT OF AREA VOCATIONAL EDUCATION PROGRAMS IN MICHIGAN.
VT 014 085 ED 056 194 455
OCCUPATIONAL AND EDUCATIONAL STRUCTURES OF THE LABOUR FORCE AND LEVELS OF ECONOMIC DEVELOPMENT.
VT 014 149 ED 056 211 465
A STUDY TO DETERMINE RELATIONSHIPS BETWEEN VOCATIONAL EDUCATION CURRICULAR EVOLUTION AND SOME ASPECTS OF OCCUPATIONAL EVOLUTION.
VT 014 169 468
PAPERS PRESENTED AT THE NATIONAL WORKSHOP ON COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION, 1971.
VT 014 171 ED 056 220 468
THE DETERMINATION OF A TECHNICAL CORE CURRICULUM FOR A TWO YEAR TECHNICAL PROGRAM IN BIO-MEDICAL ELECTRONICS.
VT 014 305 476
PROJECT BUILD: PREPARING DISADVANTAGED YOUTH FOR APPRENTICABLE CONSTRUCTION TRADES.
VT 014 364 479
EMERGING TECHNOLOGIES...APPLICATION FOR TOMORROW.
VT 014 377 480
EDUCATION IN AGRICULTURE IN CALIFORNIA (OCCUPATIONAL NEEDS AND FUTURE DEMANDS).
VT 014 378 ED 057 241 481
THE DETERMINATION OF PROPER ALLOCATION OF FUNCTIONS AND RESPONSIBILITIES OF INSTITUTIONS PROVIDING EDUCATION IN AGRICULTURE.
VT 014 379 481
SECOND ANNUAL REPORT, 1970-71.

EDUCATIONAL OBJECTIVES
VT 012 103 ED 054 329 390
SUMMER INSTITUTE IN AGRICULTURAL MECHANICS EDUCATION, SOUTHERN REGION, PROCEEDINGS (BLACKSBURG, VIRGINIA, AUGUST 3-7, 1970).
VT 013 463 ED 054 348 402
IMPLEMENTATION OF SELECTED MISSIONS, VOCATIONAL AND APPLIED ARTS EDUCATION PROGRAM. FINAL REPORT.

PAGE

VT 013 563 ED 054 352 403
DETERMINATION OF SUBJECT MATTER UNITS TAUGHT IN WISCONSIN AND THE EXTENT OF CONTRIBUTION MADE TOWARD MEETING THE NATIONAL OBJECTIVES OF VOCATIONAL AGRICULTURE.
VT 013 783 ED 055 175 417
AN ANALYSIS OF SELECTED CURRICULUM ATTRIBUTES WITH RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION IN ETHIOPIA.
VT 013 972 ED 055 224 443
A MODEL FOR EDUCATIONAL PROFICIENCY.
VT 014 076 ED 055 236 453
A RATIONALE FOR THE ESTABLISHMENT OF AREA VOCATIONAL EDUCATION PROGRAMS IN MICHIGAN.

EDUCATIONAL OPPORTUNITIES
VT 013 930 ED 054 382 435
A STUDY OF VOCATIONAL EDUCATION AS A FACTOR IN SELECTING A COMMUNITY FOR A MANUFACTURING PLANT SITE.

EDUCATIONAL PHILOSOPHY
VT 013 234 ED 050 295 395
CAREER EDUCATION--MORE THAN A NAME.
VT 013 712 ED 054 359 407
PRINCIPLES FOR VOCATIONAL EDUCATION--VALIDATION OF STATEMENTS OF BELIEFS SELECTED FROM THE LITERATURE AND RESEARCH.
VT 013 972 ED 055 224 443
A MODEL FOR EDUCATIONAL PROFICIENCY.

EDUCATIONAL PLANNING
VT 002 713 376
HUMAN RESOURCES DEVELOPMENT PLANNING.
VT 013 463 ED 054 348 402
IMPLEMENTATION OF SELECTED MISSIONS, VOCATIONAL AND APPLIED ARTS EDUCATION PROGRAM. FINAL REPORT.
VT 013 728 ED 055 162 409
INVESTMENT PLANNING IN VOCATIONAL-TECHNICAL EDUCATION. A PILOT STUDY.
VT 014 107 ED 055 244 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FINAL REPORT, VOLUME IV.
VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.
VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.

SUBJECT AND IDENTIFIER INDEX

PAGE

EDUCATIONAL POLICY
VT 014 158 ED 057 200 465
EDUCATION IN SWEDEN.

EDUCATIONAL PRINCIPLES
VT 013 712 ED 054 359 407
PRINCIPLES FOR VOCATIONAL EDUCATION—VALIDATION OF STATEMENTS OF BELIEFS SELECTED FROM THE LITERATURE AND RESEARCH.

EDUCATIONAL PROBLEMS
VT 014 358 ED 057 237 479
MAN--SOCIETY--TECHNOLOGY.

EDUCATIONAL PROGRAMS
VT 013 555 ED 054 350 402
NEW DIRECTIONS FOR VOCATIONAL HOME ECONOMICS.
VT 013 706 ED 054 356 406
AGENCY TRAINING CENTERS FOR GOVERNMENT EMPLOYEES.
VT 013 748 ED 055 166 411
A SUMMARY OF THE TYPES OF "PARAPROFESSIONAL TRAINING" PROVIDED BY JUNIOR AND SENIOR COLLEGES AND UNIVERSITIES IN THE AREAS OF HEALTH, EDUCATION, AND WELFARE DURING ACADEMIC YEAR 1970-1971.
VT 013 749 ED 055 167 411
EXPERIMENTS IN MENTAL HEALTH TRAINING. PROJECT SUMMARIES.
VT 013 764 413
SELECTED TRAINING PROGRAMS FOR PHYSICIAN SUPPORT PERSONNEL.
VT 014 076 ED 055 236 453
A RATIONALE FOR THE ESTABLISHMENT OF AREA VOCATIONAL EDUCATION PROGRAMS IN MICHIGAN.
VT 014 158 ED 057 200 465
EDUCATION IN SWEDEN.
VT 014 263 475
TECHNICIANS, TECHNOLOGISTS, AND ENGINEERS FOR NUCLEAR POWER.
VT 014 358 ED 057 237 479
MAN--SOCIETY--TECHNOLOGY.

EDUCATIONAL QUALITY
VT 014 077 ED 056 192 454
CHARACTERISTICS OF QUALITY VOCATIONAL-TECHNICAL EDUCATION PROGRAMS.

EDUCATIONAL RESEARCH
VT 012 730 ED 056 165 391
REVIEW AND SYNTHESIS OF INFORMATION ON OCCUPATIONAL EXPLORATION.
VT 013 558 ED 054 351 403
RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 762 412
RESEARCH, DEVELOPMENTAL AND EXEMPLARY ACTIVITIES IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 816 ED 054 378 424
THE CLUSTER CONCEPT PROGRAM AS AN APPROACH TO VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL.
VT 013 926 ED 054 381 434
ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.
VT 014 102 ED 054 390 458
MICROFICHE COLLECTION OF CLEARINGHOUSE DOCUMENTS REPORTED IN ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.
VT 014 321 478
THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS.

EDUCATIONAL RESEARCHERS
VT 010 797 ED 054 306 380
UNIVERSITY MANPOWER RESEARCH SEMINAR FOR THE STIMULATION OF PROFESSIONAL RESEARCH INTEREST.
VT 013 558 ED 054 351 403
RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 870 ED 056 171 429
RESEARCH UTILIZATION SPECIALIST; REVIEW AND SYNTHESIS OF SELECTED LITERATURE ON RESEARCH DEVELOPMENT.
VT 014 086 455
REVIEWING THE LITERATURE: A HANDBOOK FOR THE VOCATIONAL RESEARCHER.

EDUCATIONAL RESOURCE CENTERS
VT 014 462 484
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE.

EDUCATIONAL RESOURCES
VT 014 462 484
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE.

EDUCATIONAL RESOURCES INFORMATION CENTER
VT 014 159 ED 056 214 466
ERIC AND THE RCU.

EDUCATIONAL RESPONSIBILITY
VT 012 730 ED 056 165 391
REVIEW AND SYNTHESIS OF INFORMATION ON OCCUPATIONAL EXPLORATION.

EDUCATIONAL STATUS COMPARISON
VT 013 782 ED 055 174 417
ORIGIN AND DEVELOPMENT OF INDUSTRIAL EDUCATION AT ALCORN AGRICULTURAL AND MECHANICAL COLLEGE.

SUBJECT AND IDENTIFIER INDEX

PAGE

EDUCATIONAL STRATEGIES
VT 013 723 408
STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS.
VT 013 765 413
NEW CAREERS.
VT 013 994 ED 056 181 446
THE IMPACT OF A RESCHEDULED SCHOOL YEAR ON VOCATIONAL TRAINING CENTERS IN NEW YORK STATE.

EDUCATIONAL SUPPLY
VT 014 005 ED 056 185 448
OCCUPATIONAL MANPOWER AND TRAINING NEEDS; INFORMATION FOR PLANNING TRAINING PROGRAMS FOR THE 1970'S.

EDUCATIONAL TRENDS
VT 013 838 ED 055 195 427
THE CURRENT STATUS AND POSSIBLE TRENDS IN TEACHING INDUSTRIAL ARTS WOOD INFORMATION AT TEACHER EDUCATION INSTITUTIONS.
VT 014 073 452
TRENDS IN VOCATIONAL EDUCATION: ENROLLMENTS, EXPENDITURES, AND TEACHERS.

EDUCATIONALLY DISADVANTAGED
VT 011 052 ED 057 169 390
EFFECT OF BASIC LITERACY TRAINING ON TEST SCORES.

ELECTRICAL SYSTEMS
VT 013 896 ED 055 204 431
TROUBLESHOOTING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION VIA DYNAMIC SIMULATION.

ELECTROMECHANICAL TECHNOLOGY
VT 013 787 ED 055 177 418
THE ROLE OF THE INDEPENDENT INVENTOR IN THE EARLY DEVELOPMENT OF ELECTRICAL TECHNOLOGY.

ELECTRONIC TECHNICIANS
VT 007 748 376
RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS BY STUDENTS MAJORING IN ELECTRONICS TECHNOLOGY.
VT 014 171 ED 056 220 468
THE DETERMINATION OF A TECHNICAL CORE CURRICULUM FOR A TWO YEAR TECHNICAL PROGRAM IN BIO-MEDICAL ELECTRONICS.

ELECTRONICS
VT 010 835 ED 057 161 382
RETENTION OF ELECTRONIC FUNDAMENTALS: DIFFERENCES AMONG TOPICS.
VT 012 725 ED 054 331 391
EMPLOYMENT CHARACTERISTICS OF THE PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE GRADUATES.
VT 013 460 ED 054 346 401
PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE TECHNICIAN GRADUATES: SOME DEMOGRAPHIC VARIABLES.

ELECTROOPTICS
VT 013 823 425
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.

ELEMENTARY SCHOOL STUDENTS
VT 013 775 ED 054 368 415
EFFECTS OF MOVEMENT AND COMMENTARY ON MANIPULATIVE PERFORMANCE.
VT 013 777 ED 054 370 415
COMPARATIVE EFFECTIVENESS OF TWO STRATEGIES OF COMPUTER-ASSISTED INSTRUCTION FOR TEACHING ORTHOGRAPHIC PROJECTIONS.
VT 013 789 ED 054 373 419
THE EFFECTS OF FEEDBACK ON PSYCHOMOTOR PERFORMANCE OF FOURTH AND SIXTH GRADE STUDENTS.

EMOTIONALLY DISTURBED
VT 010 932 ED 056 159 387
AN EVALUATION OF REHABILITATION SERVICES AND THE ROLE OF INDUSTRY IN THE COMMUNITY ADJUSTMENT OF PSYCHIATRIC PATIENTS FOLLOWING HOSPITALIZATION. FINAL REPORT.

EMPLOYEE ATTITUDES
VT 014 266 475
CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD.

EMPLOYEES
VT 014 266 475
CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD.

EMPLOYER ATTITUDES
VT 013 778 ED 057 185 416
COLLEGE-LEVEL EDUCATION IN RETAILING: A COMPARISON OF PERCEPTIONS OF RETAIL EMPLOYMENT EXECUTIVES AND RETAIL EDUCATORS.
VT 013 985 ED 054 388 445
A SURVEY OF TRAINING NEEDS AND INTERNSHIPS FOR NON-TEACHING POSITIONS IN HOME ECONOMICS. FINAL REPORT.

EMPLOYERS
VT 010 939 ED 055 153 388
FEDERAL TRAINING PROGRAMS FOR DISPERSED EMPLOYMENT OCCUPATIONS.
VT 013 814 ED 055 187 424
THE AVAILABILITY OF DATA ON COMPANY TRAINING PROGRAMS: A FEASIBILITY STUDY.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 829 ED 055 191 426
A SKILLED NEEDS SURVEY WITH IMPLICATIONS FOR VOCATIONAL-TECHNICAL EDUCATION WITHIN THE IOWA WESTERN COMMUNITY COLLEGE DISTRICT AREA XIII.

EMPLOYMENT EXPERIENCE
VT 013 822 ED 055 190 425
THE EFFECTIVENESS OF VOCATIONAL AND TECHNICAL PROGRAMS: A NATIONAL FOLLOW-UP SURVEY.
VT 014 451 483
CAREER GRADUATES: A PROFILE OF JOB EXPERIENCE AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES.

EMPLOYMENT LEVEL
VT 010 846 ED 054 315 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM. PHASE II. VALIDATION OF THE SYSTEM FOR GRADES E-4 THROUGH E-7.
VT 014 275 475
THE EFFECTS OF MINIMUM WAGES ON THE DISTRIBUTION OF CHANGES IN AGGREGATE EMPLOYMENT.

EMPLOYMENT PATTERNS
VT 012 725 ED 054 331 391
EMPLOYMENT CHARACTERISTICS OF THE PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE GRADUATES.
VT 013 460 ED 054 346 401
PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE TECHNICIAN GRADUATES: SOME DEMOGRAPHIC VARIABLES.
VT 013 830 426
THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO.
VT 013 884 430
A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS. PROJECT MINI-SCORE.
VT 013 967 ED 054 384 442
EMPLOYMENT OPPORTUNITIES, TRAINING NEEDS AND VOCATIONAL EDUCATION FOR THE GRAPHIC ARTS IN MISSOURI.

EMPLOYMENT PRACTICES
VT 013 368 ED 054 337 397
A GUIDE TO CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT.
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.
VT 014 096 457
A STOCHASTIC MODEL OF DISCRIMINATION IN THE LABOR MARKET.
VT 014 179 468
PART-TIME EXPERIENCE AND THE TRANSITION FROM SCHOOL TO WORK.

PAGE

EMPLOYMENT PROBLEMS
VT 014 179 468
PART-TIME EXPERIENCE AND THE TRANSITION FROM SCHOOL TO WORK.
VT 014 214 471
FOREIGN EXPERIENCE IN PROVIDING WINTER JOBS IN THE CONSTRUCTION INDUSTRY.

EMPLOYMENT PROGRAMS
VT 013 394 ED 054 341 399
ANALYSIS OF WIN PROGRAM AUTOMATED TERMINATION DATA.
VT 013 412 ED 054 343 400
EVALUATION OF THE IMPACT OF SELECTED URBAN CONCENTRATED EMPLOYMENT PROGRAMS.
VT 013 741 ED 054 363 410
COST-BENEFIT ANALYSIS: THEORY AND APPLICATION TO MANPOWER TRAINING PROGRAMS. A BIBLIOGRAPHY.
VT 013 946 438
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM.
VT 014 249 ED 057 212 474
YOUTH RESOURCES MANUAL FOR COORDINATORS.
VT 014 304 476
A PROGRAM FOR THE UTILIZATION OF THE EVANSTON REHABILITATION CENTER FOR MANPOWER TRAINING.

EMPLOYMENT PROJECTIONS
VT 013 763 413
PROJECTIONS: 1980. THE MANPOWER POSTURE OF THE NATION IN THE 1970'S.
VT 013 952 ED 055 216 439
MANPOWER PLANNING: EVOLVING SYSTEMS.
VT 014 005 ED 056 185 448
OCCUPATIONAL MANPOWER AND TRAINING NEEDS; INFORMATION FOR PLANNING TRAINING PROGRAMS FOR THE 1970'S.

EMPLOYMENT QUALIFICATIONS
VT 007 748 376
RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS BY STUDENTS MAJORING IN ELECTRONICS TECHNOLOGY.
VT 013 292 396
THE JOB DESCRIPTION: ACTION TOWARD CAREER DEVELOPMENT.
VT 013 985 ED 054 388 445
A SURVEY OF TRAINING NEEDS AND INTERNSHIPS FOR NON-TEACHING POSITIONS IN HOME ECONOMICS. FINAL REPORT.
VT 014 072 ED 055 234 452
THE CHARACTERISTICS, EDUCATION AND EARNINGS OF TECHNICIANS.
VT 014 377 480
EDUCATION IN AGRICULTURE IN CALIFORNIA (OCCUPATIONAL NEEDS AND FUTURE DEMANDS).

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 378 ED 057 241 481
THE DETERMINATION OF PROPER ALLOCATION OF FUNCTIONS AND RESPONSIBILITIES OF INSTITUTIONS PROVIDING EDUCATION IN AGRICULTURE.

EMPLOYMENT SERVICES
VT 010 784 ED 054 300 378
PAST AND PRESENT COUNSELING AND PLACEMENT PROCEDURES IN PRIVATE EMPLOYMENT AGENCIES--AN EMPIRICAL STUDY.

EMPLOYMENT STATISTICS
VT 008 010 ED 054 293 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY.
VT 008 011 ED 054 294 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY. APPENDIX.
VT 013 996 ED 055 228 447
PROCEEDINGS OF NORTH AMERICAN CONFERENCE ON LABOR STATISTIC.
VT 014 005 ED 056 185 448
OCCUPATIONAL MANPOWER AND TRAINING NEEDS; INFORMATION FOR PLANNING TRAINING PROGRAMS FOR THE 1970'S.

EMPLOYMENT TRENDS
VT 013 829 ED 055 191 426
A SKILLED NEEDS SURVEY WITH IMPLICATIONS FOR VOCATIONAL-TECHNICAL EDUCATION WITHIN THE IOWA WESTERN COMMUNITY COLLEGE DISTRICT AREA XIII.

ENGINEERING TECHNICIANS
VT 014 263 475
TECHNICIANS, TECHNOLOGISTS, AND ENGINEERS FOR NUCLEAR POWER.

ENGINEERING TECHNOLOGY
VT 014 263 475
TECHNICIANS, TECHNOLOGISTS, AND ENGINEERS FOR NUCLEAR POWER.

ENLISTED MEN
VT 010 835 ED 057 161 382
RETENTION OF ELECTRONIC FUNDAMENTALS: DIFFERENCES AMONG TOPICS.
VT 010 842 ED 054 311 382
INTERIM QUANTITATIVE MANPOWER PROJECTIONS FOR PROPOSED HYDROGRAPHIC SURVEY SHIP SYSTEM (AGS) CANDIDATE CONFIGURATIONS (NAVSHIPS SUBPROJECT S46-27012, TASK 14408).
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.
VT 013 874 429
AEROMEDICAL EVACUATION TECHNICIAN GUIDE.

PAGE

ENROLLMENT TRENDS
VT 014 149 ED 056 211 465
A STUDY TO DETERMINE RELATIONSHIPS BETWEEN VOCATIONAL EDUCATION CURRICULAR EVOLUTION AND SOME ASPECTS OF OCCUPATIONAL EVOLUTION.

ENTRY WORKERS
VT 014 084 ED 056 193 455
THE JOB ATTITUDES OF WORKERS FROM DIFFERENT ETHNIC BACKGROUNDS.

ENVIRONMENTAL EDUCATION
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 352 396
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK).
VT 013 353 397
ENVIRONMENTAL INFORMATION (INFORMATION PACK).

ENVIRONMENTAL TECHNICIANS
VT 013 354 397
TECHNICIAN DESCRIPTIONS (INFORMATION PACK). PROGRAMS OF TRAINING AND EDUCATION IN ENVIRONMENTAL TECHNOLOGY. (POTEET).

ENVIRONMENTAL TECHNOLOGY
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 352 396
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK).
VT 013 353 397
ENVIRONMENTAL INFORMATION (INFORMATION PACK).
VT 013 354 397
TECHNICIAN DESCRIPTIONS (INFORMATION PACK). PROGRAMS OF TRAINING AND EDUCATION IN ENVIRONMENTAL TECHNOLOGY. (POTEET).

EQUAL OPPORTUNITIES (JOBS)
VT 013 738 ED 055 165 410
FOURTH ANNUAL REPORT ON THE OCCUPATIONS, JOB STATUS AND ETHNIC CHARACTERISTICS OF EMPLOYEES IN NEW YORK STATE AGENCIES.

EQUIVALENCY TESTS
VT 013 120 ED 054 335 393
EQUIVALENCY AND PROFICIENCY TESTING. A DESCRIPTIVE COMPILATION OF EXISTING TESTING PROGRAMS IN ALLIED HEALTH AND OTHER HEALTH OCCUPATIONS, WITH AN ANNOTATED BIBLIOGRAPHY.

ETHIOPIA
VT 013 783 ED 055 175 417
AN ANALYSIS OF SELECTED CURRICULUM ATTRIBUTES WITH RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION IN ETHIOPIA.

SUBJECT AND IDENTIFIER INDEX

PAGE

ETHNIC DISTRIBUTION
VT 013 738 ED 055 165 410
FOURTH ANNUAL REPORT ON THE OCCUPATIONS, JOB STATUS AND ETHNIC CHARACTERISTICS OF EMPLOYEES IN NEW YORK STATE AGENCIES.

EUROPEAN COUNTRIES
VT 014 214 471
FOREIGN EXPERIENCE IN PROVIDING WINTER JOBS IN THE CONSTRUCTION INDUSTRY.

EVALUATION
VT 010 787 ED 054 302 379
COMMUNITY ORGANIZATION AND THE MOBILIZATION OF RESOURCES FOR MANPOWER DEVELOPMENT PROGRAMS.

EVALUATION CRITERIA
VT 010 845 ED 054 314 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM: PHASE 1. ANALYSIS OF THE PROMOTION BOARD COMPONENT IN THE WEIGHTED FACTORS SYSTEM.
VT 010 947 ED 055 154 388
SYNTHESIS OF MULTIPLE CRITERIA OF PHYSICIAN PERFORMANCE.

EVALUATION METHODS
VT 010 947 ED 055 154 388
SYNTHESIS OF MULTIPLE CRITERIA OF PHYSICIAN PERFORMANCE.
VT 013 759 ED 054 365 412
TRAINING EVALUATION: A GUIDE TO ITS PLANNING, DEVELOPMENT, AND USE IN AGENCY TRAINING COURSES. TRAINING SYSTEMS AND TECHNOLOGY SERIES 4.

EVALUATION TECHNIQUES
VT 014 360 ED 057 239 479
NEW CONCEPTS IN INDUSTRIAL ARTS.

EXCHANGE PROGRAMS
VT 013 808 ED 054 377 423
THE PROFESSIONAL INTERNSHIP EXCHANGE PROGRAM IN VOCATIONAL EDUCATION, 1970-1971.

EXPECTANCY THEORIES
VT 014 266 475
CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD.

EXPERIMENTAL TEACHING
VT 013 790 ED 055 178 420
EFFECTS OF SMALL GROUP INSTRUCTION ON ACHIEVEMENT OF TECHNICAL INFORMATION BY NINTH GRADE INDUSTRIAL ARTS STUDENTS.

EXTENDED SCHOOL YEAR
VT 013 994 ED 056 181 446
THE IMPACT OF A RESCHEDULED SCHOOL YEAR ON VOCATIONAL TRAINING CENTERS IN NEW YORK STATE.

PAGE

FACTOR ANALYSIS
VT 013 835 ED 055 193 427
AN ANALYSIS OF FACTORS THAT AFFECT JOB SATISFACTION OF PUBLIC HIGH SCHOOL BUSINESS TEACHERS IN OHIO.

FAIR LABOR STANDARDS ACT
VT 013 368 ED 054 337 397
A GUIDE TO CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT.
VT 013 841 ED 055 197 428
WORKING CHILDREN: A REPORT ON CHILD LABOR.

FAMILY BACKGROUND
VT 014 127 ED 055 250 463
ENTRY INTO THE AMERICAN LABOR FORCE.

FARMERS
VT 010 962 ED 054 327 389
POTENTIAL MECHANIZATION IN THE FLUE-CURED TOBACCO INDUSTRY--WITH EMPHASIS ON HUMAN RESOURCE ADJUSTMENT.

FEASIBILITY STUDIES
VT 013 814 ED 055 187 424
THE AVAILABILITY OF DATA ON COMPANY TRAINING PROGRAMS: A FEASIBILITY STUDY.

FEDERAL AID
VT 010 939 ED 055 153 388
FEDERAL TRAINING PROGRAMS FOR DISPERSED EMPLOYMENT OCCUPATIONS.
VT 013 931 ED 055 210 436
A FISCAL ANALYSIS OF FIXED-AMOUNT FEDERAL GRANTS-IN-AID: THE CASE OF VOCATIONAL EDUCATION.
VT 013 937 ED 055 214 438
A STUDY OF FEDERAL FINANCIAL AID TO PUBLIC VOCATIONAL EDUCATION, 1917-1964.
VT 013 959 ED 055 217 440
FACTORS ASSOCIATED WITH PARTICIPATION BY MICHIGAN SCHOOL SUPERINTENDENTS IN PROGRAMS AUTHORIZED UNDER THE PROVISIONS OF THE VOCATIONAL EDUCATION ACT OF 1963.

FEDERAL GOVERNMENT
VT 013 426 ED 055 157 400
A MATTER OF SIMPLE JUSTICE.
VT 013 706 ED 054 356 406
AGENCY TRAINING CENTERS FOR GOVERNMENT EMPLOYEES.

FEDERAL LAWS
VT 013 841 ED 055 197 428
WORKING CHILDREN: A REPORT ON CHILD LABOR.

FEDERAL LEGISLATION
VT 013 368 ED 054 337 397
A GUIDE TO CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 426 ED 055 157 400
A MATTER OF SIMPLE JUSTICE.
VT 013 795 ED 055 182 421
A STUDY TO DETERMINE THE EFFECT OF THE VOCATIONAL EDUCATION ACT OF 1963 UPON BUSINESS TEACHER EDUCATION PROGRAMS IN SELECTED COLLEGES AND UNIVERSITIES.
VT 013 909 ED 055 205 432
LAWS RELATING TO VOCATIONAL EDUCATION AND AGRICULTURAL EXTENSION WORK.
VT 013 934 ED 055 212 437
AN ANALYSIS OF THE IMPACT OF THE VOCATIONAL EDUCATION ACT OF 1963 ON BUSINESS EDUCATION IN THE PUBLIC SECONDARY SCHOOLS OF MISSOURI WITH IMPLICATIONS FOR TEACHER PREPARATION.
VT 013 964 ED 055 221 441
A HISTORIAL ANALYSIS OF VOCATIONAL EDUCATION: LAND-GRANT COLLEGES TO CALIFORNIA JUNIOR COLLEGES, 1862-1940.
VT 014 202 ED 057 204 469
AN APPRAISAL OF THE IMPACT OF FEDERAL FUNDS GRANTED UNDER SECTION 4(A) OF THE VOCATIONAL EDUCATION ACT OF 1963 ON THE OCCUPATIONAL PROGRAMS OFFERED BY THE PUBLIC TWO-YEAR COLLEGES IN NEW YORK STATE.

FEDERAL PROGRAMS
VT 010 787 ED 054 302 379
COMMUNITY ORGANIZATION AND THE MOBILIZATION OF RESOURCES FOR MANPOWER DEVELOPMENT PROGRAMS.
VT 010 939 ED 055 153 388
FEDERAL TRAINING PROGRAMS FOR DISPERSED EMPLOYMENT OCCUPATIONS.
VT 013 103 ED 054 334 393
PREVOCATIONAL EXPLORATORY PROGRAMS IN MANPOWER DEVELOPMENT AND TRAINING.
VT 013 394 ED 054 341 399
ANALYSIS OF WIN PROGRAM AUTOMATED TERMINATION DATA.
VT 013 717 ED 054 360 407
JOBS FOR AMERICA. ANNUAL REPORT FISCAL 1970.
VT 013 815 ED 055 188 424
BREAKTHROUGH IN RURAL MANPOWER SERVICES.
VT 013 931 ED 055 210 436
A FISCAL ANALYSIS OF FIXED-AMOUNT FEDERAL GRANTS-IN-AID: THE CASE OF VOCATIONAL EDUCATION.
VT 014 252 ED 057 214 474
TIPP (TRAINING INCENTIVE PAYMENTS PROGRAM); A REPORT ON FIRST YEAR'S OPERATIONS.

FEDERAL STATE RELATIONSHIP
VT 013 937 ED 055 214 438
A STUDY OF FEDERAL FINANCIAL AID TO PUBLIC VOCATIONAL EDUCATION, 1917-1964.

PAGE

FEEDBACK
VT 013 789 ED 054 373 419
THE EFFECTS OF FEEDBACK ON PSYCHOMOTOR PERFORMANCE OF FOURTH AND SIXTH GRADE STUDENTS.

FEMALES
VT 010 199 ED 054 295 377
JOB HORIZONS FOR WOMEN AND GIRLS IN THE DISTRICT OF COLUMBIA.
VT 010 282 ED 054 296 377
FACTS ABOUT WOMEN'S ABSENTEEISM AND LABOR TURNOVER.
VT 013 426 ED 055 157 400
A MATTER OF SIMPLE JUSTICE.
VT 013 722 ED 055 160 408
WOMEN IN THE WORLD OF WORK.
VT 013 796 ED 055 183 421
AN INVESTIGATION OF THE VOCATIONAL BEHAVIOR OF SELECTED WOMEN VOCATIONAL EDUCATION STUDENTS.

FEMINISM
VT 013 426 ED 055 157 400
A MATTER OF SIMPLE JUSTICE.

FLORIDA
VT 014 222 ED 056 235 472
PERSPECTIVES ON PROGRESS: CAREER EDUCATION IN FLORIDA; STATEWIDE EVALUATION OF VOCATIONAL-TECHNICAL EDUCATION 1970-1971.

FOLLOWUP STUDIES
VT 013 780 ED 055 173 417
AN EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM AT BLACK HILLS STATE COLLEGE BY THE GRADUATES.
VT 014 376 480
USE OF RECRUITMENT MATERIALS BY OHIO TEACHERS OF VOCATIONAL AGRICULTURE.

FOODS INSTRUCTION
VT 013 641 ED 055 158 405
BROWARD COUNTY HOME ECONOMICS CURRICULUM DEVELOPMENT PROJECT, JULY 1, 1967 TO JULY 1, 1970.

FOREIGN COUNTRIES
VT 013 324 396
MANPOWER IN ISRAEL. (FIFTH REPORT).
VT 013 710 ED 054 357 406
A CRITICAL STUDY OF VOCATIONAL-INDUSTRIAL EDUCATION IN TAIWAN.
VT 014 085 ED 056 194 455
OCCUPATIONAL AND EDUCATIONAL STRUCTURES OF THE LABOUR FORCE AND LEVELS OF ECONOMIC DEVELOPMENT.
VT 014 158 ED 057 200 465
EDUCATION IN SWEDEN.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 165 ED 056 217 466
USSR-UNICEF SEMINAR ON PREVOCATIONAL TRAINING, EDUCATION AND VOCATIONAL ORIENTATION WITHIN AND OUTSIDE SCHOOLS (MOSCOW, USSR, OCTOBER 12-31, 1970). WORKING PAPERS.
VT 014 214 471
FOREIGN EXPERIENCE IN PROVIDING WINTER JOBS IN THE CONSTRUCTION INDUSTRY.

FUTURE FARMERS OF AMERICA
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.

GOVERNMENT EMPLOYEES
VT 013 706 ED 054 356 406
AGENCY TRAINING CENTERS FOR GOVERNMENT EMPLOYEES.
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.
VT 013 738 ED 055 165 410
FOURTH ANNUAL REPORT ON THE OCCUPATIONS, JOB STATUS AND ETHNIC CHARACTERISTICS OF EMPLOYEES IN NEW YORK STATE AGENCIES.

GRADE 8
VT 013 788 ED 054 372 419
A COMPARISON OF TWO APPROACHES TO DEVELOPING AN UNDERSTANDING OF INDUSTRIAL ENTERPRISE AT THE EIGHTH GRADE LEVEL.

GRADES (SCHOLASTIC)
VT 014 081 ED 005 238 454
THE RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS OF NINTH GRADE BOYS AND CURRICULUM SELECTION AND SUCCESS IN TENTH GRADE.

GRADUATE STUDY
VT 014 348 478
SELECTED APPROACHES IN VOCATIONAL EDUCATION.

GRADUATE SURVEYS
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.
VT 013 461 ED 054 347 401
ASSOCIATE DEGREE TECHNICIANS' JUDGMENTS ON QUALITY OF INSTRUCTION AND COURSE RELEVANCY.
VT 013 822 ED 055 190 425
THE EFFECTIVENESS OF VOCATIONAL AND TECHNICAL PROGRAMS: A NATIONAL FOLLOW-UP SURVEY.
VT 013 834 ED 055 192 426
EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION CURRICULUM AT PERU STATE COLLEGE.

PAGE

VT 013 917 433
EVALUATION OF CURRICULAR REQUIREMENTS FOR THE TWO-YEAR SECRETARIAL PROGRAM AT NEW MEXICO STATE UNIVERSITY, 1965-1969.
VT 013 974 ED 054 386 444
EVALUATION OF VOCATIONAL HOME ECONOMICS PROGRAMS IN TERMS OF THE EFFECTIVENESS OF FULL-TIME HOMEMAKERS AND HOMEMAKERS WHO ARE ALSO FULL TIME EMPLOYEES. FINAL REPORT.
VT 013 984 ED 054 387 445
SURVEY FOR COMPARISON OF EFFECTIVENESS OF HOME MANAGEMENT WITH RESIDENCY VERSUS HOME MANAGEMENT WITHOUT RESIDENCY LABORATORY, 1966-1968. FINAL REPORT.
VT 014 083 454
IOWA HEALTH OCCUPATIONS EDUCATION; FOLLOW-UP STUDY.
VT 014 451 483
CAREER GRADUATES: A PROFILE OF JOB EXPERIENCE AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES.

GRADUATES
VT 013 884 430
A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS. PROJECT MINI-SCORE.

GROUP NORMS
VT 011 051 ED 057 168 389
DEVELOPMENT OF USTES APTITUDE TEST BATTERY FOR PHOTOGRAPH FINISHER (ANY INDUSTRY) I 976.886.

GUIDANCE COUNSELING
VT 013 806 ED 054 376 422
THE TRANSITION FROM SCHOOL TO WORK; A STUDY OF THE CHILD'S CHANGING PERCEPTION OF WORK FROM THE AGE OF SEVEN.

GUIDANCE PROGRAMS
VT 012 163 390
PRE-VOCATION PROGRAM.

GUIDELINES
VT 013 459 ED 054 345 401
THE USE OF HEALTH AIDES IN MIGRANT HEALTH PROJECTS.
VT 013 733 ED 055 164 410
A HANDBOOK FOR UPGRADING LOW-SKILL WORKERS.
VT 013 767 ED 055 169 413
TOWARD EXCELLENCE IN NURSING EDUCATION: A GUIDE FOR DIPLOMA SCHOOL IMPROVEMENT.
VT 013 818 ED 056 169 425
ADMINISTRATORS' WORKSHOP FOR PROGRAM IMPLEMENTATION: VOCATIONAL EDUCATION OPPORTUNITIES FOR DISADVANTAGED AND HANDICAPPED PERSONS.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 826 425
INDUSTRIAL ARTS: MUSEUM RESOURCES. A DIRECTORY OF SELECTED CENTERS.
VT 013 869 ED 054 380 429
GUIDELINES FOR THE DEVELOPMENT OF STUDENT ORGANIZATIONS ASSOCIATED WITH AGRICULTURAL PROGRAMS AT TWO-YEAR, POST-SECONDARY EDUCATIONAL INSTITUTIONS IN THE UNITED STATES. RESEARCH REPORT.
VT 013 954 ED 056 177 439
VOCATIONAL EDUCATION AND SELF-EVALUATION.
VT 013 957 440
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.
VT 014 099 ED 056 200 457
CAREER MOBILITY: A GUIDE FOR PROGRAM PLANNING IN HEALTH OCCUPATIONS, AND CAREER MOBILITY PROFILES.
VT 014 167 ED 056 218 467
GUIDELINES FOR HEALTH OCCUPATIONS EDUCATION PROGRAMS.

GUIDES
VT 013 726 ED 055 161 408
STATE ADVISORY COUNCILS ON VOCATIONAL EDUCATION; A GUIDE FOR IMPLEMENTING RULES AND REGULATIONS.
VT 013 951 ED 056 716 439
VOCATIONAL EDUCATION FOR HANDICAPPED PERSONS. HANDBOOK FOR PROGRAM IMPLEMENTATION.

HANDICAPPED
VT 013 818 ED 056 169 425
ADMINISTRATORS' WORKSHOP FOR PROGRAM IMPLEMENTATION: VOCATIONAL EDUCATION OPPORTUNITIES FOR DISADVANTAGED AND HANDICAPPED PERSONS.
VT 013 951 ED 056 716 439
VOCATIONAL EDUCATION FOR HANDICAPPED PERSONS. HANDBOOK FOR PROGRAM IMPLEMENTATION.
VT 014 308 476
PROPRIETARY PRODUCTS: PROJECT EARNING POWER.

HANDICAPPED STUDENTS
VT 010 943 388
THE TACOMA PUBLIC SCHOOLS- DIVISION OF VOCATIONAL REHABILITATION. COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS.

HAPTIC PERCEPTION
VT 013 785 ED 057 187 418
EFFECTS OF TWO LEARNING TREATMENTS ON THE UNDERSTANDING OF ORTHOGRAPHIC PROJECTION BY STUDENTS VARYING IN VISUAL-HAPTIC APTITUDE.

PAGE

HARVARD STUDIES OF CAREER DEVELOPMENT
VT 013 232 ED 050 293 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME I.
VT 013 233 ED 050 294 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME 2.

HEALTH FACILITIES
VT 013 681 ED 054 355 405
ANNOTATED REFERENCES ON: ENGINEERING MAINTENANCE, SANITATION PUBLIC HEALTH, SANITATION HEALTH CARE FACILITY, HOUSEKEEPING, AND PURCHASING.

HEALTH MANPOWER EDUCATION
VT 013 724 ED 054 361 408
HEALTH PROFESSIONS AND NURSING STUDENT LOAN AND SCHOLARSHIP PROGRAMS. MANUAL OF INFORMATION, POLICIES, AND PROCEDURES.

HEALTH OCCUPATIONS
VT 013 120 ED 054 335 393
EQUIVALENCY AND PROFICIENCY TESTING. A DESCRIPTIVE COMPILATION OF EXISTING TESTING PROGRAMS IN ALLIED HEALTH AND OTHER HEALTH OCCUPATIONS, WITH AN ANNOTATED BIBLIOGRAPHY.
VT 013 354 397
TECHNICIAN DESCRIPTIONS (INFORMATION PACK). PROGRAMS OF TRAINING AND EDUCATION IN ENVIRONMENTAL TECHNOLOGY. (POTEET).
VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.

HEALTH OCCUPATIONS EDUCATION
VT 013 724 ED 054 361 408
HEALTH PROFESSIONS AND NURSING STUDENT LOAN AND SCHOLARSHIP PROGRAMS. MANUAL OF INFORMATION, POLICIES, AND PROCEDURES.
VT 013 749 ED 055 167 411
EXPERIMENTS IN MENTAL HEALTH TRAINING. PROJECT SUMMARIES.
VT 013 767 ED 055 169 413
TOWARD EXCELLENCE IN NURSING EDUCATION: A GUIDE FOR DIPLOMA SCHOOL IMPROVEMENT.
VT 013 957 440
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.
VT 014 083 454
IOWA HEALTH OCCUPATIONS EDUCATION; FOLLOW-UP STUDY.
VT 014 099 ED 056 200 457
CAREER MOBILITY: A GUIDE FOR PROGRAM PLANNING IN HEALTH OCCUPATIONS, AND CAREER MOBILITY PROFILES.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 132 463
EDUCATION FOR NURSING--THE DIPLOMA WAY.
VT 014 145 ED 056 209 465
JOB DESCRIPTIONS AND ORGANIZATIONAL ANALYSIS FOR HOSPITALS AND RELATED HEALTH SERVICES.
VT 014 167 ED 056 218 467
GUIDELINES FOR HEALTH OCCUPATIONS EDUCATION PROGRAMS.
VT 014 248 474
ASSOCIATE DEGREE EDUCATION FOR NURSING. INFORMATION ABOUT STATE-APPROVED ASSOCIATE DEGREE PROGRAMS IN NURSING.

HEALTH PERSONNEL
VT 013 120 ED 054 335 393
EQUIVALENCY AND PROFICIENCY TESTING. A DESCRIPTIVE COMPILATION OF EXISTING TESTING PROGRAMS IN ALLIED HEALTH AND OTHER HEALTH OCCUPATIONS, WITH AN ANNOTATED BIBLIOGRAPHY.

HEALTH PROGRAMS
VT 013 273 ED 055 156 395
GUIDELINES FOR DIETITIANS AND PUBLIC HEALTH NUTRITIONISTS IN HOME HEALTH SERVICES.

HEALTH SERVICES
VT 013 765 413
NEW CAREERS.

HIGH SCHOOL CURRICULUM
VT 014 081 ED 005 238 454
THE RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS OF NINTH GRADE BOYS AND CURRICULUM SELECTION AND SUCCESS IN TENTH GRADE.

HIGH SCHOOL GRADUATES
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.

HIGH SCHOOL STUDENTS
VT 013 965 ED 056 178 442
A STUDY OF THE RELATIONSHIP BETWEEN SELECTED EDUCATIONAL EXPERIENCES OF VOCATIONAL AGRICULTURE STUDENTS AND THEIR ENROLLING IN A COLLEGE OF AGRICULTURE.
VT 013 988 ED 056 180 446
OBSERVATION OF CHILDREN IN A HOME ECONOMICS PROGRAM.
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.
VT 014 080 ED 055 237 454
A LONGITUDINAL STUDY OF VOCATIONAL DEVELOPMENT: IMPLICATIONS FOR VOCATIONAL EDUCATION AND GUIDANCE.

PAGE

VT 014 081 ED 005 238 454
THE RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS OF NINTH GRADE BOYS AND CURRICULUM SELECTION AND SUCCESS IN TENTH GRADE.

HIGHER EDUCATION
VT 013 748 ED 055 166 411
A SUMMARY OF THE TYPES OF "PARAPROFESSIONAL TRAINING" PROVIDED BY JUNIOR AND SENIOR COLLEGES AND UNIVERSITIES IN THE AREAS OF HEALTH, EDUCATION, AND WELFARE DURING ACADEMIC YEAR 1970-1971.

HISTORICAL REVIEWS
VT 013 782 ED 055 174 417
ORIGIN AND DEVELOPMENT OF INDUSTRIAL EDUCATION AT ALCORN AGRICULTURAL AND MECHANICAL COLLEGE.
VT 013 787 ED 055 177 418
THE ROLE OF THE INDEPENDENT INVENTOR IN THE EARLY DEVELOPMENT OF ELECTRICAL TECHNOLOGY.

HOME ECONOMICS EDUCATION
VT 013 555 ED 054 350 402
NEW DIRECTIONS FOR VOCATIONAL HOME ECONOMICS.
VT 013 974 ED 054 386 444
EVALUATION OF VOCATIONAL HOME ECONOMICS PROGRAMS IN TERMS OF THE EFFECTIVENESS OF FULL-TIME HOMEMAKERS AND HOMEMAKERS WHO ARE ALSO FULL TIME EMPLOYEES. FINAL REPORT.
VT 013 976 444
THE RELATION BETWEEN NUTRITION KNOWLEDGE AND THE DIETARY INTAKE OF SELECTED WOMEN: A BASIS FOR ADULT EDUCATION PROGRAM DEVELOPMENT.
VT 013 984 ED 054 387 445
SURVEY FOR COMPARISON OF EFFECTIVENESS OF HOME MANAGEMENT WITH RESIDENCY VERSUS HOME MANAGEMENT WITHOUT RESIDENCY LABORATORY, 1966-1968. FINAL REPORT.
VT 013 985 ED 054 388 445
A SURVEY OF TRAINING NEEDS AND INTERNSHIPS FOR NON-TEACHING POSITIONS IN HOME ECONOMICS. FINAL REPORT.

HOME MANAGEMENT
VT 013 984 ED 054 387 445
SURVEY FOR COMPARISON OF EFFECTIVENESS OF HOME MANAGEMENT WITH RESIDENCY VERSUS HOME MANAGEMENT WITHOUT RESIDENCY LABORATORY, 1966-1968. FINAL REPORT.

SUBJECT AND IDENTIFIER INDEX

PAGE

HOMEMAKING EDUCATION
VT 013 641 ED 055 158 405
BROWARD COUNTY HOME ECONOMICS CURRICULUM DEVELOPMENT PROJECT, JULY 1, 1967 TO JULY 1, 1970.
VT 013 988 ED 056 180 446
OBSERVATION OF CHILDREN IN A HOME ECONOMICS PROGRAM.

HOSPITAL PERSONNEL
VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.
VT 014 016 ED 056 187 449
PSYCHOLOGICAL AND ORGANIZATIONAL CORRELATES OF CAREER PATTERNS IN CLINICAL LABORATORY OCCUPATIONS.

HOSPITALS
VT 013 681 ED 054 355 405
ANNOTATED REFERENCES ON: ENGINEERING MAINTENANCE, SANITATION PUBLIC HEALTH, SANITATION HEALTH CARE FACILITY, HOUSEKEEPING, AND PURCHASING.
VT 014 145 ED 056 209 465
JOB DESCRIPTIONS AND ORGANIZATIONAL ANALYSIS FOR HOSPITALS AND RELATED HEALTH SERVICES.
VT 014 156 ED 056 213 465
STUDENT HEALTH OPPORTUNITIES PROGRAM: A SUMMER YOUTH EMPLOYMENT PROGRAM.

HOTELS
VT 013 583 ED 054 353 404
THE LODGING INDUSTRY'S IMAGE; HOW THE ADULTS AND TEENAGERS VIEW HOTELS AND MOTELS AS EMPLOYERS AND OVERALL.

HUMAN CAPITAL
VT 014 085 ED 056 194 455
OCCUPATIONAL AND EDUCATIONAL STRUCTURES OF THE LABOUR FORCE AND LEVELS OF ECONOMIC DEVELOPMENT.

HUMAN DEVELOPMENT
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).

HUMAN EFFECTIVENESS FUNCTION ALLOCATION
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).

HUMAN ENGINEERING
VT 014 254 ED 057 215 474
PLANNING FOR SAFETY ON THE JOBSITE.

HUMAN RESOURCES
VT 014 295 476
MANPOWER DEVELOPMENT COUNCIL: THE DEVELOPMENT OF A COMPREHENSIVE SYSTEM OF HUMAN RESOURCE DEVELOPMENT FOR IOWA.

HYDROGRAPHIC SURVEY SHIP SYSTEM
VT 010 842 ED 054 311 382
INTERIM QUANTITATIVE MANPOWER PROJECTIONS FOR PROPOSED HYDROGRAPHIC SURVEY SHIP SYSTEM (AGS) CANDIDATE CONFIGURATIONS (NAVSHIPS SUBPROJECT S46-27012, TASK 14408).

HYPOTHESIS TESTING
VT 010 845 ED 054 314 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM: PHASE 1. ANALYSIS OF THE PROMOTION BOARD COMPONENT IN THE WEIGHTED FACTORS SYSTEM.

INDUSTRIAL ARTS
VT 013 776 ED 054 369 415
THE EFFECT OF OCCUPATIONAL INFORMATION UPON SECONDARY SCHOOL YOUTH WITH VARYING INTERESTS REGARDING A TEACHING CAREER IN THE FIELD OF INDUSTRIAL ARTS.

ILLUSTRATIONS
VT 014 321 478
THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS.

IMPROVEMENT PROGRAMS
VT 014 252 ED 057 214 474
TIPP (TRAINING INCENTIVE PAYMENTS PROGRAM); A REPORT ON FIRST YEAR'S OPERATIONS.

INCIDENTAL LEARNING
VT 012 297 ED 053 287 390
PHYSICIANS' LOCAL ADVISORY SYSTEM. FINAL REPORT AND APPENDICES.

INCOME
VT 010 920 ED 054 324 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME II.
VT 014 016 ED 056 187 449
PSYCHOLOGICAL AND ORGANIZATIONAL CORRELATES OF CAREER PATTERNS IN CLINICAL LABORATORY OCCUPATIONS.
VT 014 072 ED 055 234 452
THE CHARACTERISTICS, EDUCATION AND EARNINGS OF TECHNICIANS.

INDEXES (LOCATERS)
VT 014 102 ED 054 390 458
MICROFICHE COLLECTION OF CLEARINGHOUSE DOCUMENTS REPORTED IN ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.

SUBJECT AND IDENTIFIER INDEX

PAGE

INDIVIDUAL CHARACTERISTICS
VT 013 209 ED 054 336 394
CAREER THRESHOLDS: A LONGITUDINAL STUDY OF THE EDUCATIONAL AND LABOR MARKET EXPERIENCE OF MALE YOUTH. VOLUME THREE.
VT 014 081 ED 005 238 454
THE RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS OF NINTH GRADE BOYS AND CURRICULUM SELECTION AND SUCCESS IN TENTH GRADE.

INDIVIDUALIZED INSTRUCTION
VT 013 973 ED 055 225 444
THE OCCUPAC PROJECT (A PROJECT TO DEVELOP OCCUPATIONAL INFORMATION LEARNING ACTIVITY PACKAGES FOR GRADES K-9). FINAL REPORT.
VT 014 100 ED 055 240 457
THE DEVELOPMENT OF INDIVIDUALIZED INSTRUCTION IN VOCATIONAL EDUCATION.
VT 014 318 477
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.

INDUSTRIAL ARTS
VT 012 875 ED 057 179 392
INDUSTRIAL ARTS CURRICULUM IMPROVEMENTS: A CHANGE AGENT'S GUIDE.
VT 013 699 405
WORLD OF MANUFACTURING: EVALUATION REPORT OF A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY DEMONSTRATION PROGRAM.
VT 013 780 ED 055 173 417
AN EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM AT BLACK HILLS STATE COLLEGE BY THE GRADUATES.
VT 013 788 ED 054 372 419
A COMPARISON OF TWO APPROACHES TO DEVELOPING AN UNDERSTANDING OF INDUSTRIAL ENTERPRISE AT THE EIGHTH GRADE LEVEL.
VT 013 797 ED 054 375 422
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION: THEIR HISTORY AND PRESENT POSITION IN TEXAS.
VT 013 809 ED 055 185 423
NEW INDUSTRIAL ARTS FOR THE SENIOR HIGH SCHOOL.
VT 013 837 ED 055 194 427
THE FEASIBILITY OF A SYSTEM FOR THE EXCHANGE OF INFORMATION ABOUT LOCALLY PRODUCED INSTRUCTIONAL MATERIALS BETWEEN INDUSTRIAL ARTS PROGRAMS IN HIGHER EDUCATION.
VT 013 838 ED 055 195 427
THE CURRENT STATUS AND POSSIBLE TRENDS IN TEACHING INDUSTRIAL ARTS WOOD INFORMATION AT TEACHER EDUCATION INSTITUTIONS.
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.

PAGE

VT 014 088 ED 054 389 455
A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY CURRICULUM PROJECT: A FINAL EVALUATION OF THE INDUSTRIAL ARTS CURRICULUM PROJECT (IACP), 1965-1971.
VT 014 358 ED 057 237 479
MAN--SOCIETY--TECHNOLOGY.
VT 014 360 ED 057 239 479
NEW CONCEPTS IN INDUSTRIAL ARTS.

INDUSTRIAL ARTS CURRICULUM PROJECT
VT 013 699 405
WORLD OF MANUFACTURING: EVALUATION REPORT OF A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY DEMONSTRATION PROGRAM.
VT 014 088 ED 054 389 455
A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY CURRICULUM PROJECT: A FINAL EVALUATION OF THE INDUSTRIAL ARTS CURRICULUM PROJECT (IACP), 1965-1971.

INDUSTRIAL ARTS TEACHERS
VT 013 834 ED 055 192 426
EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION CURRICULUM AT PERU STATE COLLEGE.

INDUSTRIAL EDUCATION
VT 013 463 ED 054 348 402
IMPLEMENTATION OF SELECTED MISSIONS, VOCATIONAL AND APPLIED ARTS EDUCATION PROGRAM. FINAL REPORT.
VT 013 710 ED 054 357 406
A CRITICAL STUDY OF VOCATIONAL-INDUSTRIAL EDUCATION IN TAIWAN.
VT 013 782 ED 055 174 417
ORIGIN AND DEVELOPMENT OF INDUSTRIAL EDUCATION AT ALCORN AGRICULTURAL AND MECHANICAL COLLEGE.
VT 013 790 ED 055 178 420
EFFECTS OF SMALL GROUP INSTRUCTION ON ACHIEVEMENT OF TECHNICAL INFORMATION BY NINTH GRADE INDUSTRIAL ARTS STUDENTS.
VT 013 834 ED 055 192 426
EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION CURRICULUM AT PERU STATE COLLEGE.
VT 013 970 ED 054 385 443
AN EXPERIMENT COMPARING THE EFFECTIVENESS OF LOW COST INSTRUCTIONAL SIMULATION AGAINST HIGH COST EQUIPMENT UTILIZATION IN TEACHING NUMERICAL CONTROL PRINCIPLES.
VT 014 254 ED 057 215 474
PLANNING FOR SAFETY ON THE JOBSITE.

INDUSTRIAL PERSONNEL
VT 014 075 ED 055 235 453
FUNCTIONS OF INDUSTRY APPROACH TO CURRICULUM FOR VOCATIONAL EDUCATION.

SUBJECT AND IDENTIFIER INDEX

PAGE

INDUSTRIAL RELATIONS
VT 013 996 ED 055 228 447
PROCEEDINGS OF NORTH AMERICAN CONFERENCE ON LABOR STATISTIC.

INDUSTRIAL TECHNOLOGY
VT 014 358 ED 057 237 479
MAN--SOCIETY--TECHNOLOGY.

INDUSTRY
VT 013 930 ED 054 382 435
A STUDY OF VOCATIONAL EDUCATION AS A FACTOR IN SELECTING A COMMUNITY FOR A MANUFACTURING PLANT SITE.
VT 014 092 ED 056 197 456
INDUSTRIAL PSYCHOLOGY IN THE SEVENTIES AND BEYOND.

INFORMATION DISSEMINATION
VT 013 791 ED 055 179 420
A COMPARISON AND COST ANALYSIS OF TWO APPROACHES TO THE PROVISION OF OCCUPATIONAL INFORMATION.
VT 013 837 ED 055 194 427
THE FEASIBILITY OF A SYSTEM FOR THE EXCHANGE OF INFORMATION ABOUT LOCALLY PRODUCED INSTRUCTIONAL MATERIALS BETWEEN INDUSTRIAL ARTS PROGRAMS IN HIGHER EDUCATION.
VT 013 987 ED 055 226 445
GATEKEEPERS IN VOCATIONAL EDUCATION.

INFORMATION NETWORKS
VT 013 920 ED 056 172 433
OPINION LEADERSHIP AND COMMUNICATION LINKAGES AMONG AGRICULTURAL EDUCATORS.

INFORMATION PROCESSING
VT 014 134 ED 055 252 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENT COLLECTIONS: A FINAL REPORT.
VT 014 135 ED 056 208 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENTS COLLECTIONS: A USER AND INSTALLATION HANDBOOK.

INFORMATION RETRIEVAL
VT 014 134 ED 055 252 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENT COLLECTIONS: A FINAL REPORT.
VT 014 135 ED 056 208 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENTS COLLECTIONS: A USER AND INSTALLATION HANDBOOK.

INFORMATION SERVICES
VT 014 011 ED 056 186 448
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS.

PAGE

INFORMATION SOURCES
VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.
VT 014 086 455
REVIEWING THE LITERATURE: A HANDBOOK FOR THE VOCATIONAL RESEARCHER.

INFORMATION SYSTEMS
VT 013 837 ED 055 194 427
THE FEASIBILITY OF A SYSTEM FOR THE EXCHANGE OF INFORMATION ABOUT LOCALLY PRODUCED INSTRUCTIONAL MATERIALS BETWEEN INDUSTRIAL ARTS PROGRAMS IN HIGHER EDUCATION.
VT 013 987 ED 055 226 445
GATEKEEPERS IN VOCATIONAL EDUCATION.
VT 014 011 ED 056 186 448
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS.
VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.
VT 014 159 ED 056 214 466
ERIC AND THE RCU.
VT 014 160 ED 056 215 466
TENNESSEE INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM FOR VOCATIONAL EDUCATION (JULY 1, 1970-JUNE 30, 1971).

INFORMATION UTILIZATION
VT 013 826 425
INDUSTRIAL ARTS: MUSEUM RESOURCES. A DIRECTORY OF SELECTED CENTERS.
VT 013 987 ED 055 226 445
GATEKEEPERS IN VOCATIONAL EDUCATION.
VT 014 134 ED 055 252 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENT COLLECTIONS: A FINAL REPORT.
VT 014 135 ED 056 208 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENTS COLLECTIONS: A USER AND INSTALLATION HANDBOOK.
VT 014 160 ED 056 215 466
TENNESSEE INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM FOR VOCATIONAL EDUCATION (JULY 1, 1970-JUNE 30, 1971).

INFRARED RADIATION
VT 013 823 425
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.

SUBJECT AND IDENTIFIER INDEX

PAGE

INNER CITY
VT 013 411 ED 054 342 400
NEIGHBORHOOD-BASED CHILD CARE SERVICES FOR THE INNER CITY: A SERVICE MODEL, A STAFFING PLAN AND A PROGRAM IMPLEMENTATION STRATEGY.

INPLANT PROGRAMS
VT 013 733 ED 055 164 410
A HANDBOOK FOR UPGRADING LOW-SKILL WORKERS.
VT 013 759 ED 054 365 412
TRAINING EVALUATION: A GUIDE TO ITS PLANNING, DEVELOPMENT, AND USE IN AGENCY TRAINING COURSES. TRAINING SYSTEMS AND TECHNOLOGY SERIES 4.
VT 013 814 ED 055 187 424
THE AVAILABILITY OF DATA ON COMPANY TRAINING PROGRAMS: A FEASIBILITY STUDY.
VT 014 252 ED 057 214 474
TIPP (TRAINING INCENTIVE PAYMENTS PROGRAM); A REPORT ON FIRST YEAR'S OPERATIONS.

INSERVICE EDUCATION
VT 014 100 ED 055 240 457
THE DEVELOPMENT OF INDIVIDUALIZED INSTRUCTION IN VOCATIONAL EDUCATION.

INSERVICE TEACHER EDUCATION
VT 013 808 ED 054 377 423
THE PROFESSIONAL INTERNSHIP EXCHANGE PROGRAM IN VOCATIONAL EDUCATION, 1970-1971.
VT 014 104 ED 055 241 458
IMPROVING PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VI.
VT 014 110 ED 055 247 461
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, VOLUME VII.

INSTITUTES (TRAINING PROGRAMS)
VT 013 757 ED 054 364 412
INDUSTRY-EDUCATION COOPERATIVE PROGRAM FOR PRESERVICE AND INSERVICE VOCATIONAL AND TECHNICAL TEACHER TRAINING. FINAL REPORT.
VT 013 845 ED 055 198 428
EPDA (EDUCATION PROFESSIONS DEVELOPMENT ACT) INSTITUTE LEADERSHIP DEVELOPMENT IN CURRICULUM PLANNING. FINAL REPORT.
VT 014 104 ED 055 241 458
IMPROVING PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VI.

PAGE

VT 014 107 ED 055 244 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FINAL REPORT, VOLUME IV.
VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.
VT 014 110 ED 055 247 461
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, VOLUME VII.
VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.
VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.

INSTITUTIONS
VT 013 883 ED 055 201 430
WORK AND NON-WORK: INSTITUTIONAL PERSPECTIVES.

INSTRUCTIONAL IMPROVEMENT
VT 013 461 ED 054 347 401
ASSOCIATE DEGREE TECHNICIANS' JUDGMENTS ON QUALITY OF INSTRUCTION AND COURSE RELEVANCY.
VT 013 788 ED 054 372 419
A COMPARISON OF TWO APPROACHES TO DEVELOPING AN UNDERSTANDING OF INDUSTRIAL ENTERPRISE AT THE EIGHTH GRADE LEVEL.

INSTRUCTIONAL MATERIALS
VT 010 963 ED 054 328 389
GOALS AND BASIC UNITS OF INSTRUCTION FOR TREATMENT MEDIA COURSES FOR THE PREPARATION OF OCCUPATIONAL THERAPISTS.
VT 013 837 ED 055 194 427
THE FEASIBILITY OF A SYSTEM FOR THE EXCHANGE OF INFORMATION ABOUT LOCALLY PRODUCED INSTRUCTIONAL MATERIALS BETWEEN INDUSTRIAL ARTS PROGRAMS IN HIGHER EDUCATION.
VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.
VT 014 088 ED 054 389 455
A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY CURRICULUM PROJECT: A FINAL EVALUATION OF THE INDUSTRIAL ARTS CURRICULUM PROJECT (IACP), 1965-1971.

SUBJECT AND IDENTIFIER INDEX

PAGE

INSTRUCTIONAL MATERIALS CENTERS
VT 014 462 484
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE.

INSTRUCTIONAL MEDIA
VT 013 792 ED 054 374 420
A COMPARISON OF THE EFFECTIVENESS OF A PROGRAMMED TEXT AND A COMPUTER BASED DISPLAY UNIT MEDIA IN TEACHING FORTRAN IV.

INSTRUCTIONAL PROGRAMS
VT 014 219 472
TECHNICAL TRAINING STUDY.

INTEGRATED CURRICULUM
VT 014 114 ED 056 203 462
CAREER EDUCATION.
VT 014 166 467
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.

INTERAGENCY COOPERATION
VT 013 946 438
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM.

INTERAGENCY COORDINATION
VT 014 295 476
MANPOWER DEVELOPMENT COUNCIL: THE DEVELOPMENT OF A COMPREHENSIVE SYSTEM OF HUMAN RESOURCE DEVELOPMENT FOR IOWA.

INTERCOMMUNICATION
VT 012 297 ED 053 287 390
PHYSICIANS' LOCAL ADVISORY SYSTEM. FINAL REPORT AND APPENDICES.

INTERDISCIPLINARY APPROACH
VT 013 772 ED 055 172 414
CONSUMER EDUCATION: AN INTERDISCIPLINARY APPROACH.

INTEREST TESTS
VT 010 849 ED 054 318 384
AN ANALYSIS OF THE NAVY VOCATIONAL INTEREST INVENTORY AS A PREDICTOR OF CAREER MOTIVATION.
VT 010 850 ED 054 319 385
AREA SCALES OF THE NAVY VOCATIONAL INTEREST INVENTORY AS PREDICTORS OF SCHOOL PERFORMANCE AND RATING ASSIGNMENT.
VT 013 935 ED 056 173 437
THE DIFFERENTIATION OF HIGH SCHOOL STUDENTS IN VOCATIONAL EDUCATION AREAS BY THE OHIO VOCATIONAL INTEREST SURVEY.

INTERNATIONAL PROGRAMS
VT 013 572 403
JOBS AND AGRICULTURAL DEVELOPMENT; A STUDY OF THE EFFECTS OF A NEW AGRICULTURAL TECHNOLOGY ON EMPLOYMENT IN POOR NATIONS.

PAGE

VT 013 744 411
REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER.

INTERVIEWS
VT 010 848 ED 054 317 384
THREE STUDIES OF JOB INVENTORY PROCEDURES: SELECTING DUTY CATEGORIES, INTERVIEWING, AND SAMPLING.

INVENTORS
VT 013 787 ED 055 177 418
THE ROLE OF THE INDEPENDENT INVENTOR IN THE EARLY DEVELOPMENT OF ELECTRICAL TECHNOLOGY.

INVESTMENT
VT 013 728 ED 055 162 409
INVESTMENT PLANNING IN VOCATIONAL-TECHNICAL EDUCATION. A PILOT STUDY.

IOWA
VT 014 295 476
MANPOWER DEVELOPMENT COUNCIL: THE DEVELOPMENT OF A COMPREHENSIVE SYSTEM OF HUMAN RESOURCE DEVELOPMENT FOR IOWA.

ISRAEL
VT 013 324 396
MANPOWER IN ISRAEL. (FIFTH REPORT).

JAPANESE AMERICANS
VT 010 786 ED 054 301 379
SOCIOLOGICAL ASPECTS OF SELF-EMPLOYMENT AND SOCIAL WELFARE AMONG CHINESE, JAPANESE, AND NEGROES IN NORTHERN, URBAN AREAS OF THE UNITED STATES, 1900-1940.

JOB ANALYSIS
VT 010 848 ED 054 317 384
THREE STUDIES OF JOB INVENTORY PROCEDURES: SELECTING DUTY CATEGORIES, INTERVIEWING, AND SAMPLING.
VT 013 354 397
TECHNICIAN DESCRIPTIONS (INFORMATION PACK). PROGRAMS OF TRAINING AND EDUCATION IN ENVIRONMENTAL TECHNOLOGY. (POTEET).
VT 014 072 ED 055 234 452
THE CHARACTERISTICS, EDUCATION AND EARNINGS OF TECHNICIANS.
VT 014 075 ED 055 235 453
FUNCTIONS OF INDUSTRY APPROACH TO CURRICULUM FOR VOCATIONAL EDUCATION.
VT 014 145 ED 056 209 465
JOB DESCRIPTIONS AND ORGANIZATIONAL ANALYSIS FOR HOSPITALS AND RELATED HEALTH SERVICES.
VT 014 311 ED 056 241 477
THE WORK SAMPLE: REALITY-BASED ASSESSMENT OF VOCATIONAL POTENTIAL.

SUBJECT AND IDENTIFIER INDEX

PAGE

JOB APPLICANTS
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.

JOB DEVELOPMENT
VT 013 292 396
THE JOB DESCRIPTION: ACTION TOWARD CAREER DEVELOPMENT.
VT 013 572 403
JOBS AND AGRICULTURAL DEVELOPMENT; A STUDY OF THE EFFECTS OF A NEW AGRICULTURAL TECHNOLOGY ON EMPLOYMENT IN POOR NATIONS.

JOB PLACEMENT
VT 013 088 ED 055 155 392
PROJECT CROSSROADS. FINAL REPORT.
VT 013 089 393
PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION. A PROGRAM EVALUATION.
VT 013 090 393
A BENEFIT-COST ANALYSIS OF PROJECT CROSSROADS.

JOB SATISFACTION
VT 013 835 ED 055 193 427
AN ANALYSIS OF FACTORS THAT AFFECT JOB SATISFACTION OF PUBLIC HIGH SCHOOL BUSINESS TEACHERS IN OHIO.

JOB SKILLS
VT 010 827 ED 055 151 381
BASIC OCCUPATIONAL LANGUAGE TRAINING (BOLT), FINAL REPORT.

JOB TENURE
VT 014 127 ED 055 250 463
ENTRY INTO THE AMERICAN LABOR FORCE.

JOB TRAINING
VT 010 818 ED 054 307 380
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME I: FINAL REPORT.
VT 010 819 ED 054 308 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME II: TECHNICAL APPENDIX A, TABLES.
VT 010 820 ED 054 309 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME III, PART 1 AND PART 2: APPENDICES B 1-5.
VT 014 119 ED 056 204 462
POLICE TRAINING AND PERFORMANCE STUDY.
VT 014 219 472
TECHNICAL TRAINING STUDY.
VT 014 305 476
PROJECT BUILD: PREPARING DISADVANTAGED YOUTH FOR APPRENTICABLE CONSTRUCTION TRADES.
VT 014 364 479
EMERGING TECHNOLOGIES...APPLICATION FOR TOMORROW.

PAGE

JOBS
VT 010 796 ED 054 305 380
CONCEPTS AND MEASUREMENTS FOR MANPOWER AND OCCUPATIONAL ANALYSIS.
VT 013 292 396
THE JOB DESCRIPTION: ACTION TOWARD CAREER DEVELOPMENT.

JUNIOR COLLEGES
VT 013 962 ED 055 219 441
AN ANALYSIS OF THE ADMINISTRATIVE STRUCTURE AND THE ROLE OF THE CHIEF VOCATIONAL-TECHNICAL EDUCATION ADMINISTRATOR IN PUBLIC JUNIOR COLLEGES.
VT 013 964 ED 055 221 441
A HISTORIAL ANALYSIS OF VOCATIONAL EDUCATION: LAND-GRANT COLLEGES TO CALIFORNIA JUNIOR COLLEGES, 1862-1940.

JUNIOR HIGH SCHOOL STUDENTS
VT 014 071 ED 056 191 452
THE EVALUATION OF A VOCATIONAL PROGRAM FOR DROPOUT-PRONE JUNIOR HIGH SCHOOL STUDENTS.

JUNIOR HIGH SCHOOLS
VT 013 699 405
WORLD OF MANUFACTURING: EVALUATION REPORT OF A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY DEMONSTRATION PROGRAM.
VT 014 105 ED 055 242 459
IMPROVING OCCUPATIONAL ORIENTATION PROGRAMS FOR JUNIOR HIGH SCHOOL STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VIII.

KEY INFORMANTS
VT 013 920 ED 056 172 433
OPINION LEADERSHIP AND COMMUNICATION LINKAGES AMONG AGRICULTURAL EDUCATORS.

KNOWLEDGE LEVEL
VT 012 297 ED 053 287 390
PHYSICIANS' LOCAL ADVISORY SYSTEM. FINAL REPORT AND APPENDICES.
VT 014 023 ED 055 233 451
A VOCATIONAL AND TECHNICAL PURVIEW FOR EDUCATIONAL ADMINISTRATORS.

LABOR CONDITIONS
VT 010 864 ED 054 320 385
WEIGHTLIFTING PROVISIONS FOR WOMEN BY STATE.

LABOR ECONOMICS
VT 008 010 ED 054 293 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY.
VT 010 790 ED 054 304 380
URBAN AND REGIONAL DIMENSIONS OF MANPOWER POLICY.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 394 ED 054 341 399
ANALYSIS OF WIN PROGRAM AUTOMATED TERMINATION DATA.
VT 013 812 ED 055 186 424
AGGREGATION AND AVERAGING.

LABOR FORCE
VT 008 010 ED 054 293 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY.
VT 008 011 ED 054 294 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY. APPENDIX.
VT 010 282 ED 054 296 377
FACTS ABOUT WOMEN'S ABSENTEEISM AND LABOR TURNOVER.
VT 010 783 ED 054 299 378
THE LABOR FORCE PARTICIPATION OF THE URBAN POOR.
VT 013 763 413
PROJECTIONS: 1980. THE MANPOWER POSTURE OF THE NATION IN THE 1970'S.

LABOR FORCE ENTRY
VT 014 127 ED 055 250 463
ENTRY INTO THE AMERICAN LABOR FORCE.

LABOR FORCE PARTICIPATION RATES
VT 010 783 ED 054 299 378
THE LABOR FORCE PARTICIPATION OF THE URBAN POOR.

LABOR LAWS
VT 010 864 ED 054 320 385
WEIGHTLIFTING PROVISIONS FOR WOMEN BY STATE.
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.

LABOR MARKET
VT 014 096 457
A STOCHASTIC MODEL OF DISCRIMINATION IN THE LABOR MARKET.

LABOR PROBLEMS
VT 014 313 477
LABOR SUPPLY IN THE CONSTRUCTION INDUSTRY: A CASE STUDY OF UPSTATE NEW YORK.

LABOR SUPPLY
VT 010 282 ED 054 296 377
FACTS ABOUT WOMEN'S ABSENTEEISM AND LABOR TURNOVER.
VT 013 952 ED 055 216 439
MANPOWER PLANNING: EVOLVING SYSTEMS.

LABOR TURNOVER
VT 010 282 ED 054 296 377
FACTS ABOUT WOMEN'S ABSENTEEISM AND LABOR TURNOVER.

PAGE

LABORATORIES
VT 014 016 ED 056 187 449
PSYCHOLOGICAL AND ORGANIZATIONAL CORRELATES OF CAREER PATTERNS IN CLINICAL LABORATORY OCCUPATIONS.

LABORATORY EXPERIMENTS
VT 014 394 481
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.

LAND GRANT UNIVERSITIES
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.

LANGUAGE DEVELOPMENT
VT 010 827 ED 055 151 381
BASIC OCCUPATIONAL LANGUAGE TRAINING (BOLT), FINAL REPORT.

LAW ENFORCEMENT
VT 013 770 ED 055 170 414
A BIBLIOGRAPHY ON POLICE ADMINISTRATION.
VT 013 948 438
A STUDY OF LAW ENFORCEMENT TRAINING PROGRAMS.
VT 014 119 ED 056 204 462
POLICE TRAINING AND PERFORMANCE STUDY.

LEADER PARTICIPATION
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.

LEADERSHIP
VT 013 920 ED 056 172 433
OPINION LEADERSHIP AND COMMUNICATION LINKAGES AMONG AGRICULTURAL EDUCATORS.

LEADERSHIP TRAINING
VT 013 845 ED 055 198 428
EPDA (EDUCATION PROFESSIONS DEVELOPMENT ACT) INSTITUTE LEADERSHIP DEVELOPMENT IN CURRICULUM PLANNING. FINAL REPORT.
VT 013 995 ED 056 182 447
PRINCIPLES AND PRACTICES FOR FIRST-LINE SUPERVISORS IN REHABILITATION.
VT 014 169 468
PAPERS PRESENTED AT THE NATIONAL WORKSHOP ON COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION, 1971.

SUBJECT AND IDENTIFIER INDEX

PAGE

LEARNING ACTIVITIES
VT 013 785 ED 057 187 418
EFFECTS OF TWO LEARNING TREATMENTS ON THE UNDERSTANDING OF ORTHOGRAPHIC PROJECTION BY STUDENTS VARYING IN VISUAL-HAPTIC APTITUDE.
VT 013 973 ED 055 225 444
THE OCCUPAC PROJECT (A PROJECT TO DEVELOP OCCUPATIONAL INFORMATION LEARNING ACTIVITY PACKAGES FOR GRADES K-9). FINAL REPORT.

LEARNING CHARACTERISTICS
VT 014 348 478
SELECTED APPROACHES IN VOCATIONAL EDUCATION.

LEARNING LABORATORIES
VT 013 984 ED 054 387 445
SURVEY FOR COMPARISON OF EFFECTIVENESS OF HOME MANAGEMENT WITH RESIDENCY VERSUS HOME MANAGEMENT WITHOUT RESIDENCY LABORATORY, 1966-1968. FINAL REPORT.
VT 014 462 484
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE.

LEARNING THEORIES
VT 013 785 ED 057 187 418
EFFECTS OF TWO LEARNING TREATMENTS ON THE UNDERSTANDING OF ORTHOGRAPHIC PROJECTION BY STUDENTS VARYING IN VISUAL-HAPTIC APTITUDE.

LEISURE TIME
VT 013 883 ED 055 201 430
WORK AND NON-WORK: INSTITUTIONAL PERSPECTIVES.

LIBRARIES
VT 013 769 ED 054 367 414
GUIDE FOR THE DEVELOPMENT OF LIBRARIES FOR SCHOOLS OF NURSING. THIRD EDITION.

LIBRARY PLANNING
VT 013 769 ED 054 367 414
GUIDE FOR THE DEVELOPMENT OF LIBRARIES FOR SCHOOLS OF NURSING. THIRD EDITION.

LITERACY EDUCATION
VT 011 052 ED 057 169 390
EFFECT OF BASIC LITERACY TRAINING ON TEST SCORES.

LITERATURE REVIEWS
VT 014 086 455
REVIEWING THE LITERATURE: A HANDBOOK FOR THE VOCATIONAL RESEARCHER.

PAGE

LOCAL GOVERNMENT
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.

LONGITUDINAL STUDIES
VT 014 080 ED 055 237 454
A LONGITUDINAL STUDY OF VOCATIONAL DEVELOPMENT: IMPLICATIONS FOR VOCATIONAL EDUCATION AND GUIDANCE.

LOW ABILITY STUDENTS
VT 014 064 451
EFFECTS OF PROGRAMED VERSUS CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS.

LOW APTITUDE JOBS
VT 010 847 ED 054 316 384
A METHOD FOR DETERMINING JOB TYPES FOR LOW APTITUDE AIRMEN.

LOW INCOME GROUPS
VT 010 818 ED 054 307 380
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME I: FINAL REPORT.
VT 010 819 ED 054 308 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME II: TECHNICAL APPENDIX A, TABLES.

MACHINE TOOLS
VT 014 394 481
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.

MALES
VT 013 209 ED 054 336 394
CAREER THRESHOLDS: A LONGITUDINAL STUDY OF THE EDUCATIONAL AND LABOR MARKET EXPERIENCE OF MALE YOUTH. VOLUME THREE.
VT 013 437 ED 054 344 401
A COOPERATIVE VOCATIONAL PATTERN FOR IN-SCHOOL MENTALLY RETARDED YOUTH.

MANAGEMENT
VT 013 774 415
THE USE OF ANALYTICAL TECHNIQUES IN THE MANAGEMENT OF PROGRAMS OF HEALTH MANPOWER EDUCATION.

MANAGEMENT EDUCATION
VT 013 774 4[illegible]
THE USE OF ANALYTICAL TECHNIQUES IN THE MANAGEMENT OF PROGRAMS OF HEALTH MANPOWER EDUCATION.
VT 013 778 ED 057 185 416
COLLEGE-LEVEL EDUCATION IN RETAILING: A COMPARISON OF PERCEPTIONS OF RETAIL EMPLOYMENT EXECUTIVES AND RETAIL EDUCATORS.

SUBJECT AND IDENTIFIER INDEX

PAGE

MANAGERIAL OCCUPATIONS
VT 014 075 ED 055 235 453
FUNCTIONS OF INDUSTRY APPROACH TO CURRICULUM FOR VOCATIONAL EDUCATION.

MANPOWER DEVELOPMENT
VT 009 637 ED 056 208 377
INVENTORY OF MANPOWER RESEARCH PROJECTS IN INDIANA. REPORT NO. 4.
VT 010 787 ED 054 302 379
COMMUNITY ORGANIZATION AND THE MOBILIZATION OF RESOURCES FOR MANPOWER DEVELOPMENT PROGRAMS.
VT 010 788 ED 054 303 379
HOUSTON'S OUT-OF-SCHOOL NEIGHBORHOOD YOUTH CORPS: A COMPARATIVE OBSERVATIONAL STUDY OF THE NYC'S IMPACT ON THE WORK ATTITUDES AND JOB FUTURES OF POVERTY YOUTHS.
VT 010 790 ED 054 304 380
URBAN AND REGIONAL DIMENSIONS OF MANPOWER POLICY.
VT 010 797 ED 054 306 380
UNIVERSITY MANPOWER RESEARCH SEMINAR FOR THE STIMULATION OF PROFESSIONAL RESEARCH INTEREST.
VT 013 088 ED 055 155 392
PROJECT CROSSROADS. FINAL REPORT.
VT 013 089 393
PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION. A PROGRAM EVALUATION.
VT 013 090 393
A BENEFIT-COST ANALYSIS OF PROJECT CROSSROADS.
VT 013 412 ED 054 343 400
EVALUATION OF THE IMPACT OF SELECTED URBAN CONCENTRATED EMPLOYMENT PROGRAMS.
VT 013 459 ED 054 345 401
THE USE OF HEALTH AIDES IN MIGRANT HEALTH PROJECTS.
VT 013 744 411
REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER.
VT 013 749 ED 055 167 411
EXPERIMENTS IN MENTAL HEALTH TRAINING. PROJECT SUMMARIES.
VT 013 815 ED 055 188 424
BREAKTHROUGH IN RURAL MANPOWER SERVICES.
VT 013 996 ED 055 228 447
PROCEEDINGS OF NORTH AMERICAN CONFERENCE ON LABOR STATISTIC.
VT 014 165 ED 056 217 466
USSR-UNICEF SEMINAR ON PREVOCATIONAL TRAINING, EDUCATION AND VOCATIONAL ORIENTATION WITHIN AND OUTSIDE SCHOOLS (MOSCOW, USSR, OCTOBER 12-31, 1970). WORKING PAPERS.
VT 014 252 ED 057 214 474
TIPP (TRAINING INCENTIVE PAYMENTS PROGRAM); A REPORT ON FIRST YEAR'S OPERATIONS.

PAGE

VT 014 295 476
MANPOWER DEVELOPMENT COUNCIL: THE DEVELOPMENT OF A COMPREHENSIVE SYSTEM OF HUMAN RESOURCE DEVELOPMENT FOR IOWA.
VT 014 304 476
A PROGRAM FOR THE UTILIZATION OF THE EVANSTON REHABILITATION CENTER FOR MANPOWER TRAINING.
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.
VT 014 466 484
ANALYSIS OF MDTA INSTITUTIONAL AND OJT DATA TAPES FOR 1968.

MANPOWER DEVELOPMENT AND TRAINING ACT PROGRAMS
VT 013 815 ED 055 188 424
BREAKTHROUGH IN RURAL MANPOWER SERVICES.

MANPOWER NEEDS
VT 009 637 ED 056 208 377
INVENTORY OF MANPOWER RESEARCH PROJECTS IN INDIANA. REPORT NO. 4.
VT 010 438 ED 054 297 377
MANPOWER REQUIREMENTS IN OCCUPATIONS FOR WHICH VOCATIONAL EDUCATION PREPARES WORKERS.
VT 010 842 ED 054 311 382
INTERIM QUANTITATIVE MANPOWER PROJECTIONS FOR PROPOSED HYDROGRAPHIC SURVEY SHIP SYSTEM (AGS) CANDIDATE CONFIGURATIONS (NAVSHIPS SUBPROJECT S46-27012, TASK 14408).
VT 010 844 ED 054 313 383
PERSONNEL IMPLICATIONS OF NEW TECHNOLOGICAL DEVELOPMENTS: UNDERSEA TECHNOLOGIES.
VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.
VT 013 829 ED 055 191 426
A SKILLED NEEDS SURVEY WITH IMPLICATIONS FOR VOCATIONAL-TECHNICAL EDUCATION WITHIN THE IOWA WESTERN COMMUNITY COLLEGE DISTRICT AREA XIII.
VT 013 952 ED 055 216 439
MANPOWER PLANNING: EVOLVING SYSTEMS.
VT 014 005 ED 056 185 448
OCCUPATIONAL MANPOWER AND TRAINING NEEDS; INFORMATION FOR PLANNING TRAINING PROGRAMS FOR THE 1970'S.
VT 014 377 480
EDUCATION IN AGRICULTURE IN CALIFORNIA (OCCUPATIONAL NEEDS AND FUTURE DEMANDS).
VT 014 378 ED 057 241 481
THE DETERMINATION OF PROPER ALLOCATION OF FUNCTIONS AND RESPONSIBILITIES OF INSTITUTIONS PROVIDING EDUCATION IN AGRICULTURE.

SUBJECT AND IDENTIFIER INDEX

PAGE

MANPOWER PLANNING
VT 013 952 ED 055 216 439
MANPOWER PLANNING: EVOLVING SYSTEMS.

MANPOWER POLICY
VT 010 790 ED 054 304 380
URBAN AND REGIONAL DIMENSIONS OF MANPOWER POLICY.

MANPOWER UTILIZATION
VT 013 324 396
MANPOWER IN ISRAEL. (FIFTH REPORT).
VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.
VT 013 459 ED 054 345 401
THE USE OF HEALTH AIDES IN MIGRANT HEALTH PROJECTS.
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.
VT 013 914 ED 055 206 432
MATHEMATICAL MODELS FOR MANPOWER AND PERSONNEL PLANNING, RESEARCH REPORT.

MANUALS
VT 013 733 ED 055 164 410
A HANDBOOK FOR UPGRADING LOW-SKILL WORKERS.
VT 013 874 429
AEROMEDICAL EVACUATION TECHNICIAN GUIDE.
VT 013 887 ED 055 203 431
A LICENSING PROGRAM FOR OPERATORS OF TWO-WHEELED MOTOR VEHICLES.
VT 014 133 ED 057 199 464
MANUAL FOR THE MINNESOTA IMPORTANCE QUESTIONNAIRE. MINNESOTA STUDIES IN VOCATIONAL REHABILITATION.
VT 014 249 ED 057 212 474
YOUTH RESOURCES MANUAL FOR COORDINATORS.
VT 014 311 ED 056 241 477
THE WORK SAMPLE: REALITY-BASED ASSESSMENT OF VOCATIONAL POTENTIAL.

MANUFACTURING
VT 013 699 405
WORLD OF MANUFACTURING: EVALUATION REPORT OF A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY DEMONSTRATION PROGRAM.
VT 014 308 476
PROPRIETARY PRODUCTS: PROJECT EARNING POWER.

MATHEMATICAL CONCEPTS
VT 007 748 376
RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS BY STUDENTS MAJORING IN ELECTRONICS TECHNOLOGY.

MATHEMATICAL MODELS
VT 013 492 ED 054 349 402
YOUTH AND WORK: TOWARD A MODEL OF LIFETIME ECONOMIC PROSPECTS.

PAGE

VT 013 914 ED 055 206 432
MATHEMATICAL MODELS FOR MANPOWER AND PERSONNEL PLANNING, RESEARCH REPORT.

MEASUREMENT
VT 013 812 ED 055 186 424
AGGREGATION AND AVERAGING.

MEASUREMENT INSTRUMENTS
VT 013 878 ED 055 199 429
DEVELOPMENT OF AN INSTRUMENT TO MEASURE THE CHANGE ORIENTATION OF VOCATIONAL TEACHERS.
VT 014 077 ED 056 192 454
CHARACTERISTICS OF QUALITY VOCATIONAL-TECHNICAL EDUCATION PROGRAMS.

MEASUREMENT TECHNIQUES
VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.

MECHANICAL EQUIPMENT
VT 013 896 ED 055 204 431
TROUBLESHOOTING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION VIA DYNAMIC SIMULATION.

MEDICAL ASSISTANTS
VT 013 764 413
SELECTED TRAINING PROGRAMS FOR PHYSICIAN SUPPORT PERSONNEL.
VT 013 874 429
AEROMEDICAL EVACUATION TECHNICIAN GUIDE.

MENTAL HEALTH
VT 013 749 ED 055 167 411
EXPERIMENTS IN MENTAL HEALTH TRAINING. PROJECT SUMMARIES.

METHODOLOGY
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).
VT 010 847 ED 054 316 384
A METHOD FOR DETERMINING JOB TYPES FOR LOW APTITUDE AIRMEN.
VT 013 741 ED 054 363 410
COST-BENEFIT ANALYSIS: THEORY AND APPLICATION TO MANPOWER TRAINING PROGRAMS. A BIBLIOGRAPHY.
VT 014 218 471
A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA.

METROPOLITAN AREAS
VT 014 104 ED 055 241 458
IMPROVING PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VI.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 106 ED 055 243 459
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE V.
VT 014 107 ED 055 244 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FINAL REPORT, VOLUME IV.
VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.
VT 014 109 ED 055 246 460
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS.
VT 014 110 ED 055 247 461
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, VOLUME VII.
VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.

MEXICAN AMERICANS
VT 010 783 ED 054 299 378
THE LABOR FORCE PARTICIPATION OF THE URBAN POOR.
VT 010 919 ED 054 323 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME I.

MIGRANT HEALTH SERVICES
VT 013 459 ED 054 345 401
THE USE OF HEALTH AIDES IN MIGRANT HEALTH PROJECTS.

MIGRANT PROBLEMS
VT 010 921 ED 054 325 387
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME III.

MIGRATION
VT 013 704 405
THE EMIGRATION OF HIGHLY-SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES.

MIGRATION PATTERNS
VT 010 919 ED 054 323 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME I.
VT 010 920 ED 054 324 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME II.

PAGE

VT 010 921 ED 054 325 387
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME III.
VT 013 324 396
MANPOWER IN ISRAEL. (FIFTH REPORT).
VT 013 704 405
THE EMIGRATION OF HIGHLY-SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES.

MILITARY PERSONNEL
VT 010 842 ED 054 311 382
INTERIM QUANTITATIVE MANPOWER PROJECTIONS FOR PROPOSED HYDROGRAPHIC SURVEY SHIP SYSTEM (AGS) CANDIDATE CONFIGURATIONS (NAVSHIPS SUBPROJECT S46-27012, TASK 14408).
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.
VT 010 845 ED 054 314 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM: PHASE 1. ANALYSIS OF THE PROMOTION BOARD COMPONENT IN THE WEIGHTED FACTORS SYSTEM.
VT 010 847 ED 054 316 384
A METHOD FOR DETERMINING JOB TYPES FOR LOW APTITUDE AIRMEN.
VT 010 849 ED 054 318 384
AN ANALYSIS OF THE NAVY VOCATIONAL INTEREST INVENTORY AS A PREDICTOR OF CAREER MOTIVATION.
VT 013 927 435
ANALYSES OF SELECTION AND PERFORMANCE MEASURES FOR CNA SUPPORT PERSONNEL.

MILITARY RESOURCES
VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.

MILITARY TRAINING
VT 013 823 425
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.
VT 013 874 429
AEROMEDICAL EVACUATION TECHNICIAN GUIDE.

MINIMUM WAGE
VT 014 275 475
THE EFFECTS OF MINIMUM WAGES ON THE DISTRIBUTION OF CHANGES IN AGGREGATE EMPLOYMENT.

MINNESOTA IMPORTANCE QUESTIONNAIRE
VT 014 133 ED 057 199 464
MANUAL FOR THE MINNESOTA IMPORTANCE QUESTIONNAIRE. MINNESOTA STUDIES IN VOCATIONAL REHABILITATION.

SUBJECT AND IDENTIFIER INDEX

PAGE

MINORITY GROUPS
VT 013 292 396
THE JOB DESCRIPTION: ACTION TOWARD CAREER DEVELOPMENT.
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.
VT 013 717 ED 054 360 407
JOBS FOR AMERICA. ANNUAL REPORT FISCAL 1970.
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.

MODELS
VT 013 411 ED 054 342 400
NEIGHBORHOOD-BASED CHILD CARE SERVICES FOR THE INNER CITY: A SERVICE MODEL, A STAFFING PLAN AND A PROGRAM IMPLEMENTATION STRATEGY.
VT 013 883 ED 055 201 430
WORK AND NON-WORK: INSTITUTIONAL PERSPECTIVES.
VT 013 886 ED 055 202 431
A MODEL (FORMULA) FOR DERIVING A HAZARD INDEX OF RAIL-HIGHWAY GRADE CROSSINGS.
VT 013 933 ED 055 211 436
A PREDICTIVE MODEL FOR THE IDENTIFICATION OF POTENTIAL DROPOUTS FROM VOCATIONAL TRAINING IN A COMPREHENSIVE REHABILITATION CENTER.
VT 013 972 ED 055 224 443
A MODEL FOR EDUCATIONAL PROFICIENCY.
VT 014 076 ED 055 236 453
A RATIONALE FOR THE ESTABLISHMENT OF AREA VOCATIONAL EDUCATION PROGRAMS IN MICHIGAN.
VT 014 092 ED 056 197 456
INDUSTRIAL PSYCHOLOGY IN THE SEVENTIES AND BEYOND.

MOTIVATION
VT 014 266 475
CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD.

MOTOR VEHICLES
VT 013 882 ED 055 200 430
NHSB THESAURUS OF TRAFFIC AND MOTOR VEHICLE SAFETY TERMS; A SUPPLEMENT TO HIGHWAY SAFETY LITERATURE.
VT 013 887 ED 055 203 431
A LICENSING PROGRAM FOR OPERATORS OF TWO-WHEELED MOTOR VEHICLES.

MULTIMEDIA INSTRUCTION
VT 013 973 ED 055 225 444
THE OCCUPAC PROJECT (A PROJECT TO DEVELOP OCCUPATIONAL INFORMATION LEARNING ACTIVITY PACKAGES FOR GRADES K-9). FINAL REPORT.

PAGE

MUNICIPALITIES
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.

MUSCULAR STRENGTH
VT 013 784 ED 055 176 417
EFFECTS OF AUDIO-VISUAL ORDER OF PRESENTATION AND STRENGTH OF GRIP ON MANIPULATIVE TASK PERFORMANCE.

MUSEUMS
VT 013 826 425
INDUSTRIAL ARTS: MUSEUM RESOURCES. A DIRECTORY OF SELECTED CENTERS.

NATIONAL HIGHWAY SAFETY BUREAU
VT 013 882 ED 055 200 430
NHSB THESAURUS OF TRAFFIC AND MOTOR VEHICLE SAFETY TERMS; A SUPPLEMENT TO HIGHWAY SAFETY LITERATURE.

NATIONAL PROGRAMS
VT 013 718 ED 055 159 407
VOCATIONAL EDUCATION AMENDMENTS OF 1968, PUBLIC LAW 90-576. FIFTH REPORT.

NATIONAL SURVEYS
VT 010 282 ED 054 296 377
FACTS ABOUT WOMEN'S ABSENTEEISM AND LABOR TURNOVER.
VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.
VT 013 748 ED 055 166 411
A SUMMARY OF THE TYPES OF "PARAPROFESSIONAL TRAINING" PROVIDED BY JUNIOR AND SENIOR COLLEGES AND UNIVERSITIES IN THE AREAS OF HEALTH, EDUCATION, AND WELFARE DURING ACADEMIC YEAR 1970-1971.
VT 013 814 ED 055 187 424
THE AVAILABILITY OF DATA ON COMPANY TRAINING PROGRAMS: A FEASIBILITY STUDY.

NATURAL RESOURCES
VT 013 731 ED 054 362 409
AGRICULTURE AND NATURAL RESOURCES POSTSECONDARY PROGRAMS.

NAVY PERSONNEL CAPABILITIES
VT 010 844 ED 054 313 383
PERSONNEL IMPLICATIONS OF NEW TECHNOLOGICAL DEVELOPMENTS: UNDERSEA TECHNOLOGIES.

NEBRASKA
VT 013 829 ED 055 191 426
A SKILLED NEEDS SURVEY WITH IMPLICATIONS FOR VOCATIONAL-TECHNICAL EDUCATION WITHIN THE IOWA WESTERN COMMUNITY COLLEGE DISTRICT AREA XIII.

SUBJECT AND IDENTIFIER INDEX

PAGE

NEGRO COLLEGES
VT 013 782 ED 055 174 417
ORIGIN AND DEVELOPMENT OF INDUSTRIAL EDUCATION AT ALCORN AGRICULTURAL AND MECHANICAL COLLEGE.

NEGRO INSTITUTIONS
VT 013 793 ED 055 180 421
THE ADOPTION OF EDUCATIONAL INNOVATIONS AMONG EXPERIENCED TEACHERS OF VOCATIONAL AGRICULTURE IN PREDOMINANTLY NEGRO SCHOOLS IN NORTH CAROLINA.

NEGROES
VT 010 508 ED 054 298 378
TEENAGE EMPLOYMENT: A STUDY OF LOW INCOME YOUTH IN HOUSTON, TEXAS.
VT 010 783 ED 054 299 378
THE LABOR FORCE PARTICIPATION OF THE URBAN POOR.
VT 010 786 ED 054 301 379
SOCIOLOGICAL ASPECTS OF SELF-EMPLOYMENT AND SOCIAL WELFARE AMONG CHINESE, JAPANESE, AND NEGROES IN NORTHERN, URBAN AREAS OF THE UNITED STATES, 1900-1940.
VT 010 919 ED 054 323 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME I.
VT 014 096 457
A STOCHASTIC MODEL OF DISCRIMINATION IN THE LABOR MARKET.

NEIGHBORHOOD YOUTH CORPS
VT 010 788 ED 054 303 379
HOUSTON'S OUT-OF-SCHOOL NEIGHBORHOOD YOUTH CORPS: A COMPARATIVE OBSERVATIONAL STUDY OF THE NYC'S IMPACT ON THE WORK ATTITUDES AND JOB FUTURES OF POVERTY YOUTHS.
VT 014 022 ED 055 232 451
THE EFFECT ON SELF CONCEPT OF THE CHATTANOOGA NEIGHBORHOOD YOUTH CORPS AND OF EDUCATION, VOCATIONAL ASPIRATION, AND SEX ROLE.

NEW HEALTH CAREER WORKERS
VT 013 957 440
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.

NEW YORK
VT 013 826 425
INDUSTRIAL ARTS: MUSEUM RESOURCES. A DIRECTORY OF SELECTED CENTERS.

NEW YORK CITY
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.
VT 014 331 ED 057 230 478
ESOPUS PREP. A RESIDENTIAL SCHOOL FOR SERIOUS DISADVANTAGED YOUTH.

PAGE

NEW YORK STATE
VT 014 202 ED 057 204 469
AN APPRAISAL OF THE IMPACT OF FEDERAL FUNDS GRANTED UNDER SECTION 4(A) OF THE VOCATIONAL EDUCATION ACT OF 1963 ON THE OCCUPATIONAL PROGRAMS OFFERED BY THE PUBLIC TWO-YEAR COLLEGES IN NEW YORK STATE.

NONCREDIT COURSES
VT 013 779 ED 054 371 416
STATUS OF NON-CREDIT ADULT EDUCATION IN THE COMMUNITY COLLEGES OF THE NORTH CENTRAL ACCREDITING REGION.

NUCLEAR PHYSICS
VT 014 263 475
TECHNICIANS, TECHNOLOGISTS, AND ENGINEERS FOR NUCLEAR POWER.

NUCLEAR POWER
VT 014 263 475
TECHNICIANS, TECHNOLOGISTS, AND ENGINEERS FOR NUCLEAR POWER.

NUMERICAL CONTROL
VT 013 970 ED 054 385 443
AN EXPERIMENT COMPARING THE EFFECTIVENESS OF LOW COST INSTRUCTIONAL SIMULATION AGAINST HIGH COST EQUIPMENT UTILIZATION IN TEACHING NUMERICAL CONTROL PRINCIPLES.

NURSING
VT 013 767 ED 055 169 413
TOWARD EXCELLENCE IN NURSING EDUCATION: A GUIDE FOR DIPLOMA SCHOOL IMPROVEMENT.
VT 013 768 ED 054 366 413
ASSOCIATE DEGREE EDUCATION FOR NURSING--CURRENT ISSUES, 1971.
VT 013 769 ED 054 367 414
GUIDE FOR THE DEVELOPMENT OF LIBRARIES FOR SCHOOLS OF NURSING. THIRD EDITION.
VT 014 132 463
EDUCATION FOR NURSING--THE DIPLOMA WAY.
VT 014 248 474
ASSOCIATE DEGREE EDUCATION FOR NURSING. INFORMATION ABOUT STATE-APPROVED ASSOCIATE DEGREE PROGRAMS IN NURSING.

NUTRITION
VT 013 273 ED 055 156 395
GUIDELINES FOR DIETITIANS AND PUBLIC HEALTH NUTRITIONISTS IN HOME HEALTH SERVICES.

NUTRITION INSTRUCTION
VT 013 976 444
THE RELATION BETWEEN NUTRITION KNOWLEDGE AND THE DIETARY INTAKE OF SELECTED WOMEN: A BASIS FOR ADULT EDUCATION PROGRAM DEVELOPMENT.

SUBJECT AND IDENTIFIER INDEX

PAGE

OCCUPATIONAL INFORMATION
VT 013 776 ED 054 369 415
THE EFFECT OF OCCUPATIONAL INFORMATION UPON SECONDARY SCHOOL YOUTH WITH VARYING INTERESTS REGARDING A TEACHING CAREER IN THE FIELD OF INDUSTRIAL ARTS.

OBJECT MANIPULATION
VT 013 775 ED 054 368 415
EFFECTS OF MOVEMENT AND COMMENTARY ON MANIPULATIVE PERFORMANCE.

OBSERVATION
VT 013 988 ED 056 180 446
OBSERVATION OF CHILDREN IN A HOME ECONOMICS PROGRAM.

OCCUPACS
VT 013 973 ED 055 225 444
THE OCCUPAC PROJECT (A PROJECT TO DEVELOP OCCUPATIONAL INFORMATION LEARNING ACTIVITY PACKAGES FOR GRADES K-9). FINAL REPORT.

OCCUPATIONAL ASPIRATION
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.
VT 014 022 ED 055 232 451
THE EFFECT ON SELF CONCEPT OF THE CHATTANOOGA NEIGHBORHOOD YOUTH CORPS AND OF EDUCATION, VOCATIONAL ASPIRATION, AND SEX ROLE.

OCCUPATIONAL CHOICE
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.
VT 013 711 ED 054 358 406
FACTORS RELATED TO VOCATIONAL CHOICES OF AGRICULTURAL EDUCATION STUDENTS.

OCCUPATIONAL CLUSTERS
VT 014 114 ED 056 203 462
CAREER EDUCATION.

OCCUPATIONAL EXPLORATION
VT 012 730 ED 056 165 391
REVIEW AND SYNTHESIS OF INFORMATION ON OCCUPATIONAL EXPLORATION.
VT 013 103 ED 054 334 393
PREVOCATIONAL EXPLORATORY PROGRAMS IN MANPOWER DEVELOPMENT AND TRAINING.
VT 013 235 ED 050 296 395
THE PLAN FOR IMPLEMENTATION OF AN EXEMPLARY OCCUPATIONAL EDUCATION PROGRAM IN A RURAL COMMUNITY.
VT 013 796 ED 055 183 421
AN INVESTIGATION OF THE VOCATIONAL BEHAVIOR OF SELECTED WOMEN VOCATIONAL EDUCATION STUDENTS.

PAGE

VT 014 071 ED 056 191 452
THE EVALUATION OF A VOCATIONAL PROGRAM FOR DROPOUT-PRONE JUNIOR HIGH SCHOOL STUDENTS.
VT 014 098 ED 055 239 457
AN EVALUATION OF OKLAHOMA'S EXEMPLARY VOCATIONAL EDUCATION AND OCCUPATIONAL ORIENTATION PROGRAM.
VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.
VT 014 114 ED 056 203 462
CAREER EDUCATION.

OCCUPATIONAL GUIDANCE
VT 011 051 ED 057 168 389
DEVELOPMENT OF USTES APTITUDE TEST BATTERY FOR PHOTOGRAPH FINISHER (ANY INDUSTRY) I 976.886.
VT 013 947 ED 055 215 438
OCCUTAPES.
VT 014 165 ED 056 217 466
USSR-UNICEF SEMINAR ON PREVOCATIONAL TRAINING, EDUCATION AND VOCATIONAL ORIENTATION WITHIN AND OUTSIDE SCHOOLS (MOSCOW, USSR, OCTOBER 12-31, 1970). WORKING PAPERS.

OCCUPATIONAL HOME ECONOMICS
VT 013 985 ED 054 388 445
A SURVEY OF TRAINING NEEDS AND INTERNSHIPS FOR NON-TEACHING POSITIONS IN HOME ECONOMICS. FINAL REPORT.

OCCUPATIONAL INFORMATION
VT 010 438 ED 054 297 377
MANPOWER REQUIREMENTS IN OCCUPATIONS FOR WHICH VOCATIONAL EDUCATION PREPARES WORKERS.
VT 010 796 ED 054 305 380
CONCEPTS AND MEASUREMENTS FOR MANPOWER AND OCCUPATIONAL ANALYSIS.
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.
VT 013 791 ED 055 179 420
A COMPARISON AND COST ANALYSIS OF TWO APPROACHES TO THE PROVISION OF OCCUPATIONAL INFORMATION.
VT 013 973 ED 055 225 444
THE OCCUPAC PROJECT (A PROJECT TO DEVELOP OCCUPATIONAL INFORMATION LEARNING ACTIVITY PACKAGES FOR GRADES K-9). FINAL REPORT.
VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.
VT 014 098 ED 055 239 457
AN EVALUATION OF OKLAHOMA'S EXEMPLARY VOCATIONAL EDUCATION AND OCCUPATIONAL ORIENTATION PROGRAM.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 145 ED 056 209 465
JOB DESCRIPTIONS AND ORGANIZATIONAL ANALYSIS FOR HOSPITALS AND RELATED HEALTH SERVICES.

OCCUPATIONAL MOBILITY
VT 012 725 ED 054 331 391
EMPLOYMENT CHARACTERISTICS OF THE PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE GRADUATES.
VT 013 460 ED 054 346 401
PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE TECHNICIAN GRADUATES: SOME DEMOGRAPHIC VARIABLES.
VT 014 099 ED 056 200 457
CAREER MOBILITY: A GUIDE FOR PROGRAM PLANNING IN HEALTH OCCUPATIONS, AND CAREER MOBILITY PROFILES.
VT 014 127 ED 055 250 463
ENTRY INTO THE AMERICAN LABOR FORCE.

OCCUPATIONAL STRUCTURE
VT 014 085 ED 056 194 455
OCCUPATIONAL AND EDUCATIONAL STRUCTURES OF THE LABOUR FORCE AND LEVELS OF ECONOMIC DEVELOPMENT.

OCCUPATIONAL SURVEYS
VT 013 829 ED 055 191 426
A SKILLED NEEDS SURVEY WITH IMPLICATIONS FOR VOCATIONAL-TECHNICAL EDUCATION WITHIN THE IOWA WESTERN COMMUNITY COLLEGE DISTRICT AREA XIII.

OCCUPATIONAL THERAPISTS
VT 010 963 ED 054 328 389
GOALS AND BASIC UNITS OF INSTRUCTION FOR TREATMENT MEDIA COURSES FOR THE PREPARATION OF OCCUPATIONAL THERAPISTS.

OCCUPATIONAL THERAPY
VT 010 963 ED 054 328 389
GOALS AND BASIC UNITS OF INSTRUCTION FOR TREATMENT MEDIA COURSES FOR THE PREPARATION OF OCCUPATIONAL THERAPISTS.

OCCUPATIONS
VT 010 920 ED 054 324 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME II.

OCCUTAPES
VT 013 947 ED 055 215 438
OCCUTAPES.

OCEANOLOGY
VT 010 844 ED 054 313 383
PERSONNEL IMPLICATIONS OF NEW TECHNOLOGICAL DEVELOPMENTS: UNDERSEA TECHNOLOGIES.

PAGE

OFF FARM AGRICULTURAL OCCUPATIONS
VT 014 069 451
DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE.

OFFICE OCCUPATIONS EDUCATION
VT 013 917 433
EVALUATION OF CURRICULAR REQUIREMENTS FOR THE TWO-YEAR SECRETARIAL PROGRAM AT NEW MEXICO STATE UNIVERSITY, 1965-1969.
VT 013 921 ED 055 207 434
MODIFYING DISADVANTAGED STUDENTS' PERCEPTIONS OF OFFICE WORK.

OHIO VOCATIONAL INTEREST SURVEY
VT 013 935 ED 056 173 437
THE DIFFERENTIATION OF HIGH SCHOOL STUDENTS IN VOCATIONAL EDUCATION AREAS BY THE OHIO VOCATIONAL INTEREST SURVEY.

ON THE JOB TRAINING
VT 010 939 ED 055 153 388
FEDERAL TRAINING PROGRAMS FOR DISPERSED EMPLOYMENT OCCUPATIONS.

OPERATIONS RESEARCH
VT 014 219 472
TECHNICAL TRAINING STUDY.

OPINIONS
VT 013 381 ED 054 340 398
A FACTOR ANALYSIS OF PROFESSIONAL EDUCATION COMPETENCIES AND SELECTED COMMUNITY COLLEGE INSTRUCTORS.
VT 013 920 ED 056 172 433
OPINION LEADERSHIP AND COMMUNICATION LINKAGES AMONG AGRICULTURAL EDUCATORS.
VT 014 021 ED 055 231 450
THE KNOWLEDGE AND OPINIONS OF BUSINESS EDUCATORS TOWARD VOCATIONAL EDUCATION WITH SPECIAL EMPHASIS TOWARD DISTRIBUTIVE EDUCATION.

ORTHOGONAL PROJECTION
VT 013 785 ED 057 187 418
EFFECTS OF TWO LEARNING TREATMENTS ON THE UNDERSTANDING OF ORTHOGRAPHIC PROJECTION BY STUDENTS VARYING IN VISUAL-HAPTIC APTITUDE.

OUT OF SCHOOL YOUTH
VT 010 788 ED 054 303 379
HOUSTON'S OUT-OF-SCHOOL NEIGHBORHOOD YOUTH CORPS: A COMPARATIVE OBSERVATIONAL STUDY OF THE NYC'S IMPACT ON THE WORK ATTITUDES AND JOB FUTURES OF POVERTY YOUTHS.

SUBJECT AND IDENTIFIER INDEX

PAGE

PARENT ATTITUDES
VT 013 960 ED 055 218 440
ATTITUDES OF SLUM DWELLERS AND SUBURBANITES TOWARD BLUE-COLLAR OCCUPATIONS AND VOCATIONAL EDUCATION.

PARENT CHILD RELATIONSHIP
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.

PARTICIPANT INVOLVEMENT
VT 013 845 ED 055 198 428
EPDA (EDUCATION PROFESSIONS DEVELOPMENT ACT) INSTITUTE LEADERSHIP DEVELOPMENT IN CURRICULUM PLANNING. FINAL REPORT.

PERCEPTION
VT 013 802 ED 055 184 422
SELECTED ASPECTS OF VOCATIONAL IMAGE AS PERCEIVED BY A PUBLIC CATEGORIZED BY OCCUPATIONAL LEVELS.
VT 013 921 ED 055 207 434
MODIFYING DISADVANTAGED STUDENTS' PERCEPTIONS OF OFFICE WORK.

PERCEPTUAL DEVELOPMENT
VT 013 806 ED 054 376 422
THE TRANSITION FROM SCHOOL TO WORK; A STUDY OF THE CHILD'S CHANGING PERCEPTION OF WORK FROM THE AGE OF SEVEN.

PERFORMANCE CRITERIA
VT 010 947 ED 055 154 388
SYNTHESIS OF MULTIPLE CRITERIA OF PHYSICIAN PERFORMANCE.
VT 013 896 ED 055 204 431
TROUBLESHOOTING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION VIA DYNAMIC SIMULATION.
VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.

PERFORMANCE FACTORS
VT 014 266 475
CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD.

PERFORMANCE MEASURES
VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.

PERFORMANCE TESTS
VT 013 927 435
ANALYSES OF SELECTION AND PERFORMANCE MEASURES FOR CNA SUPPORT PERSONNEL.

PAGE

PERSONNEL EVALUATION
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.
VT 010 844 ED 054 313 383
PERSONNEL IMPLICATIONS OF NEW TECHNOLOGICAL DEVELOPMENTS: UNDERSEA TECHNOLOGIES.
VT 013 927 435
ANALYSES OF SELECTION AND PERFORMANCE MEASURES FOR CNA SUPPORT PERSONNEL.

PERSONNEL MANAGEMENT
VT 013 914 ED 055 206 432
MATHEMATICAL MODELS FOR MANPOWER AND PERSONNEL PLANNING, RESEARCH REPORT.

PERSONNEL SELECTION
VT 013 927 435
ANALYSES OF SELECTION AND PERFORMANCE MEASURES FOR CNA SUPPORT PERSONNEL.

PHOTOGRAPH FINISHERS
VT 011 051 ED 057 168 389
DEVELOPMENT OF USTES APTITUDE TEST BATTERY FOR PHOTOGRAPH FINISHER (ANY INDUSTRY) I 976.886.

PHOTOGRAPHY
VT 011 051 ED 057 168 389
DEVELOPMENT OF USTES APTITUDE TEST BATTERY FOR PHOTOGRAPH FINISHER (ANY INDUSTRY) I 976.886.

PHYSICIANS
VT 010 884 ED 055 152 385
CONDUCT A COST EFFECTIVENESS STUDY OF POSTGRADUATE MEDICAL EDUCATION PROGRAMS.
VT 010 947 ED 055 154 388
SYNTHESIS OF MULTIPLE CRITERIA OF PHYSICIAN PERFORMANCE.
VT 012 297 ED 053 287 390
PHYSICIANS' LOCAL ADVISORY SYSTEM. FINAL REPORT AND APPENDICES.

PILOT PROJECTS
VT 010 508 ED 054 298 378
TEENAGE EMPLOYMENT: A STUDY OF LOW INCOME YOUTH IN HOUSTON, TEXAS.
VT 013 816 ED 054 378 424
THE CLUSTER CONCEPT PROGRAM AS AN APPROACH TO VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL.
VT 013 993 446
STATLER FOUNDATION PROJECT REPORT, JULY 1970.

PLANNING
VT 013 952 ED 055 216 439
MANPOWER PLANNING: EVOLVING SYSTEMS.

SUBJECT AND IDENTIFIER INDEX

PAGE

POLICE
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.

POLICE ACTION
VT 013 770 ED 055 170 414
A BIBLIOGRAPHY ON POLICE ADMINISTRATION.

POLICY
VT 013 726 ED 055 161 408
STATE ADVISORY COUNCILS ON VOCATIONAL EDUCATION; A GUIDE FOR IMPLEMENTING RULES AND REGULATIONS.

POPULATION TRENDS
VT 013 763 413
PROJECTIONS: 1980. THE MANPOWER POSTURE OF THE NATION IN THE 1970'S.

POST SECONDARY EDUCATION
VT 013 794 ED 055 181 421
ADMINISTRATIVE PATTERN FOR PUBLIC POST SECONDARY VOCATIONAL TECHNICAL EDUCATION IN NEBRASKA.
VT 013 869 ED 054 380 429
GUIDELINES FOR THE DEVELOPMENT OF STUDENT ORGANIZATIONS ASSOCIATED WITH AGRICULTURAL PROGRAMS AT TWO-YEAR, POST-SECONDARY EDUCATIONAL INSTITUTIONS IN THE UNITED STATES. RESEARCH REPORT.
VT 014 166 467
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.
VT 014 230 ED 057 209 473
SCHOOL GUIDANCE COUNSELORS' PERCEPTIONS OF POSTSECONDARY VOCATIONAL AND TECHNICAL EDUCATION AND FACTORS THAT CONTRIBUTE TO THESE PERCEPTIONS.
VT 014 448 482
AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT.

POTENTIAL DROPOUTS
VT 014 071 ED 056 191 452
THE EVALUATION OF A VOCATIONAL PROGRAM FOR DROPOUT-PRONE JUNIOR HIGH SCHOOL STUDENTS.

POWER MECHANICS
VT 013 786 ED 057 188 418
THE EFFECT OF INSTRUCTIONAL OBJECTIVES AND GENERAL OBJECTIVES ON STUDENT SELF-EVALUATION OF PSYCHOMOTOR PERFORMANCE IN POWER MECHANICS.

POWER STRUCTURE
VT 013 971 ED 055 223 443
COMMUNITY POWER AND SOCIAL CHANGE: A CASE FOR SOCIAL ACTION WITH IMPLICATIONS FOR OCCUPATIONAL EDUCATION.

PAGE

PRACTICAL NURSING
VT 013 769 ED 054 367 414
GUIDE FOR THE DEVELOPMENT OF LIBRARIES FOR SCHOOLS OF NURSING. THIRD EDITION.
VT 013 796 ED 055 183 421
AN INVESTIGATION OF THE VOCATIONAL BEHAVIOR OF SELECTED WOMEN VOCATIONAL EDUCATION STUDENTS.

PREDICTIVE ABILITY (TESTING)
VT 010 849 ED 054 318 384
AN ANALYSIS OF THE NAVY VOCATIONAL INTEREST INVENTORY AS A PREDICTOR OF CAREER MOTIVATION.
VT 010 850 ED 054 319 385
AREA SCALES OF THE NAVY VOCATIONAL INTEREST INVENTORY AS PREDICTORS OF SCHOOL PERFORMANCE AND RATING ASSIGNMENT.

PREDICTIVE MEASUREMENT
VT 013 886 ED 055 202 431
A MODEL (FORMULA) FOR DERIVING A HAZARD INDEX OF RAIL-HIGHWAY GRADE CROSSINGS.

PREDICTOR VARIABLES
VT 013 929 ED 055 209 435
A STUDY OF RELATIONSHIPS BETWEEN STUDENT SCORES ON VARIOUS PREDICTOR MEASURES AND VOCATIONAL SUCCESS OF STUDENTS WHO WERE FOLLOWED UP ONE AND FIVE YEARS FOLLOWING TRAINING IN SELECTED PRIVATE TRADE, TECHNICAL, AND BUSINESS SCHOOLS.

PRESCHOOL CHILDREN
VT 013 988 ED 056 180 446
OBSERVATION OF CHILDREN IN A HOME ECONOMICS PROGRAM.

PRESCHOOL PROGRAMS
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.

PREVOCATIONAL EDUCATION
VT 010 943 388
THE TACOMA PUBLIC SCHOOLS- DIVISION OF VOCATIONAL REHABILITATION. COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS.
VT 012 163 390
PRE-VOCATION PROGRAM.
VT 012 730 ED 056 165 391
REVIEW AND SYNTHESIS OF INFORMATION ON OCCUPATIONAL EXPLORATION.

PRINTING
VT 013 967 ED 054 384 442
EMPLOYMENT OPPORTUNITIES, TRAINING NEEDS AND VOCATIONAL EDUCATION FOR THE GRAPHIC ARTS IN MISSOURI.

SUBJECT AND IDENTIFIER INDEX

PAGE

PRISONERS
VT 013 843 428
AN ANALYSIS OF THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS.

PRIVATE AGENCIES
VT 010 784 ED 054 300 378
PAST AND PRESENT COUNSELING AND PLACEMENT PROCEDURES IN PRIVATE EMPLOYMENT AGENCIES--AN EMPIRICAL STUDY.

PRIVATE EMPLOYMENT AGENCY ABUSE
VT 010 784 ED 054 300 378
PAST AND PRESENT COUNSELING AND PLACEMENT PROCEDURES IN PRIVATE EMPLOYMENT AGENCIES--AN EMPIRICAL STUDY.

PROBATIONARY PERIOD
VT 013 088 ED 055 155 392
PROJECT CROSSROADS. FINAL REPORT.

PRODUCTION TECHNICIANS
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

PROFESSIONAL ASSOCIATIONS
VT 010 901 ED 054 322 386
PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS IN REHABILITATION COUNSELING.

PROFESSIONAL CONTINUING EDUCATION
VT 014 106 ED 055 243 459
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE V.
VT 014 107 ED 055 244 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FINAL REPORT, VOLUME IV.
VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.

PROFESSIONAL EDUCATION
VT 010 963 ED 054 328 389
GOALS AND BASIC UNITS OF INSTRUCTION FOR TREATMENT MEDIA COURSES FOR THE PREPARATION OF OCCUPATIONAL THERAPISTS.
VT 014 110 ED 055 247 461
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, VOLUME VII.
VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.

PROFESSIONAL PERSONNEL
VT 013 704 405
THE EMIGRATION OF HIGHLY-SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES.
VT 013 724 ED 054 361 408
HEALTH PROFESSIONS AND NURSING STUDENT LOAN AND SCHOLARSHIP PROGRAMS. MANUAL OF INFORMATION, POLICIES, AND PROCEDURES.
VT 014 011 ED 056 186 448
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS.

PROFICIENCY TESTS
VT 013 120 ED 054 335 393
EQUIVALENCY AND PROFICIENCY TESTING. A DESCRIPTIVE COMPILATION OF EXISTING TESTING PROGRAMS IN ALLIED HEALTH AND OTHER HEALTH OCCUPATIONS, WITH AN ANNOTATED BIBLIOGRAPHY.

PROGRAM ADMINISTRATION
VT 013 273 ED 055 156 395
GUIDELINES FOR DIETITIANS AND PUBLIC HEALTH NUTRITIONISTS IN HOME HEALTH SERVICES.
VT 013 723 408
STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS.
VT 013 772 ED 055 172 414
CONSUMER EDUCATION: AN INTERDISCIPLINARY APPROACH.
VT 013 779 ED 054 371 416
STATUS OF NON-CREDIT ADULT EDUCATION IN THE COMMUNITY COLLEGES OF THE NORTH CENTRAL ACCREDITING REGION.
VT 013 795 ED 055 182 421
A STUDY TO DETERMINE THE EFFECT OF THE VOCATIONAL EDUCATION ACT OF 1963 UPON BUSINESS TEACHER EDUCATION PROGRAMS IN SELECTED COLLEGES AND UNIVERSITIES.
VT 013 810 423
OREGON STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION UNDER THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FISCAL YEAR 1971.
VT 014 254 ED 057 215 474
PLANNING FOR SAFETY ON THE JOBSITE.

SUBJECT AND IDENTIFIER INDEX

PAGE

PROGRAM COORDINATION
VT 014 074 453
A HANDBOOK OF COOPERATIVE PROGRAMS FOR OKLAHOMA VOCATIONAL AND TECHNICAL EDUCATION.

PROGRAM DESCRIPTIONS
VT 010 943 388
THE TACOMA PUBLIC SCHOOLS- DIVISION OF VOCATIONAL REHABILITATION. COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS.
VT 013 234 ED 050 295 395
CAREER EDUCATION--MORE THAN A NAME.
VT 013 235 ED 050 296 395
THE PLAN FOR IMPLEMENTATION OF AN EXEMPLARY OCCUPATIONAL EDUCATION PROGRAM IN A RURAL COMMUNITY.
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 352 396
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK).
VT 013 762 412
RESEARCH, DEVELOPMENTAL AND EXEMPLARY ACTIVITIES IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 765 413
NEW CAREERS.
VT 013 797 ED 054 375 422
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION: THEIR HISTORY AND PRESENT POSITION IN TEXAS.
VT 013 808 ED 054 377 423
THE PROFESSIONAL INTERNSHIP EXCHANGE PROGRAM IN VOCATIONAL EDUCATION, 1970-1971.
VT 013 815 ED 055 188 424
BREAKTHROUGH IN RURAL MANPOWER SERVICES.
VT 014 214 471
FOREIGN EXPERIENCE IN PROVIDING WINTER JOBS IN THE CONSTRUCTION INDUSTRY.
VT 014 226 473
EXEMPLARY PROGRAMS OF THE STATE OF NEW MEXICO. ANNUAL REPORT, 1970-71.
VT 014 360 ED 057 239 479
NEW CONCEPTS IN INDUSTRIAL ARTS.
VT 014 448 482
AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT.

PROGRAM DEVELOPMENT
VT 012 163 390
PRE-VOCATION PROGRAM.
VT 013 411 ED 054 342 400
NEIGHBORHOOD-BASED CHILD CARE SERVICES FOR THE INNER CITY: A SERVICE MODEL, A STAFFING PLAN AND A PROGRAM IMPLEMENTATION STRATEGY.
VT 013 716 407
COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE V: PLANNING.

PAGE

VT 013 723 408
STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS.
VT 013 731 ED 054 362 409
AGRICULTURE AND NATURAL RESOURCES POSTSECONDARY PROGRAMS.
VT 013 767 ED 055 169 413
TOWARD EXCELLENCE IN NURSING EDUCATION: A GUIDE FOR DIPLOMA SCHOOL IMPROVEMENT.
VT 013 772 ED 055 172 414
CONSUMER EDUCATION: AN INTERDISCIPLINARY APPROACH.
VT 013 818 ED 056 169 425
ADMINISTRATORS' WORKSHOP FOR PROGRAM IMPLEMENTATION: VOCATIONAL EDUCATION OPPORTUNITIES FOR DISADVANTAGED AND HANDICAPPED PERSONS.
VT 013 869 ED 054 380 429
GUIDELINES FOR THE DEVELOPMENT OF STUDENT ORGANIZATIONS ASSOCIATED WITH AGRICULTURAL PROGRAMS AT TWO-YEAR, POST-SECONDARY EDUCATIONAL INSTITUTIONS IN THE UNITED STATES. RESEARCH REPORT.
VT 013 887 ED 055 203 431
A LICENSING PROGRAM FOR OPERATORS OF TWO-WHEELED MOTOR VEHICLES.
VT 013 919 433
AGRICULTURAL EDUCATION IN "LIFE 2000." A REPORT OF A TASK FORCE ON LONG RANGE PLANNING.
VT 013 951 ED 056 716 439
VOCATIONAL EDUCATION FOR HANDICAPPED PERSONS. HANDBOOK FOR PROGRAM IMPLEMENTATION.
VT 013 957 440
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.
VT 013 964 ED 055 221 441
A HISTORIAL ANALYSIS OF VOCATIONAL EDUCATION: LAND-GRANT COLLEGES TO CALIFORNIA JUNIOR COLLEGES, 1862-1940.
VT 013 976 444
THE RELATION BETWEEN NUTRITION KNOWLEDGE AND THE DIETARY INTAKE OF SELECTED WOMEN: A BASIS FOR ADULT EDUCATION PROGRAM DEVELOPMENT.
VT 013 994 ED 056 181 446
THE IMPACT OF A RESCHEDULED SCHOOL YEAR ON VOCATIONAL TRAINING CENTERS IN NEW YORK STATE.
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.
VT 014 099 ED 056 200 457
CAREER MOBILITY: A GUIDE FOR PROGRAM PLANNING IN HEALTH OCCUPATIONS, AND CAREER MOBILITY PROFILES.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 103 ED 056 201 458
UPDATING THE PROCESS AND CONTENT OF TEACHER EDUCATION CURRICULUMS TO REACH DISADVANTAGED YOUTH IN METROPOLITAN AREAS. FINAL REPORT, VOLUME IX.
VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.
VT 014 134 ED 055 252 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENT COLLECTIONS: A FINAL REPORT.
VT 014 135 ED 056 208 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENTS COLLECTIONS: A USER AND INSTALLATION HANDBOOK.
VT 014 167 ED 056 218 467
GUIDELINES FOR HEALTH OCCUPATIONS EDUCATION PROGRAMS.
VT 014 169 468
PAPERS PRESENTED AT THE NATIONAL WORKSHOP ON COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION, 1971.
VT 014 202 ED 057 204 469
AN APPRAISAL OF THE IMPACT OF FEDERAL FUNDS GRANTED UNDER SECTION 4(A) OF THE VOCATIONAL EDUCATION ACT OF 1963 ON THE OCCUPATIONAL PROGRAMS OFFERED BY THE PUBLIC TWO-YEAR COLLEGES IN NEW YORK STATE.

PROGRAM EFFECTIVENESS
VT 012 930 ED 054 333 392
ASSESSMENT OF THE CURRENT STATUS OF REGIONAL OCCUPATIONAL CENTERS AND REGIONAL OCCUPATIONAL PROGRAMS.
VT 013 385 ED 056 166 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SEATTLE. SUMMARY, 1971.
VT 013 386 ED 056 167 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SAN FRANCISCO. SUMMARY, 1971.
VT 013 387 ED 056 168 399
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DENVER. SUMMARY, 1971.
VT 013 931 ED 055 210 436
A FISCAL ANALYSIS OF FIXED-AMOUNT FEDERAL GRANTS-IN-AID: THE CASE OF VOCATIONAL EDUCATION.
VT 013 932 ED 054 383 436
VOCATIONAL EDUCATION IN SELECTED HIGH SCHOOLS.
VT 013 974 ED 054 386 444
EVALUATION OF VOCATIONAL HOME ECONOMICS PROGRAMS IN TERMS OF THE EFFECTIVENESS OF FULL-TIME HOMEMAKERS AND HOMEMAKERS WHO ARE ALSO FULL TIME EMPLOYEES. FINAL REPORT.

PAGE

VT 014 205 ED 056 228 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, NEW YORK. SUMMARY, 1971.
VT 014 206 ED 056 229 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, PHILADELPHIA. SUMMARY, 1971.
VT 014 207 ED 056 230 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, ATLANTA. SUMMARY 1971.
VT 014 208 ED 056 231 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DALLAS. SUMMARY, 1971.
VT 014 209 ED 056 232 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, CHICAGO. SUMMARY, 1971.
VT 014 210 ED 056 233 471
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, BOSTON. SUMMARY, 1971.
VT 014 228 ED 056 239 473
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, KANSAS CITY. SUMMARY, 1971.
VT 014 466 484
ANALYSIS OF MDTA INSTITUTIONAL AND OJT DATA TAPES FOR 1968.

PROGRAM EVALUATION
VT 010 788 ED 054 303 379
HOUSTON'S OUT-OF-SCHOOL NEIGHBORHOOD YOUTH CORPS: A COMPARATIVE OBSERVATIONAL STUDY OF THE NYC'S IMPACT ON THE WORK ATTITUDES AND JOB FUTURES OF POVERTY YOUTHS.
VT 012 492 391
FIRST ANNUAL REPORT OF THE STATE ADVISORY COUNCIL FOR VOCATIONAL EDUCATION IN COLORADO.
VT 012 493 391
1970 ANNUAL EVALUATION REPORT TO THE STATE BOARD FOR VOCATIONAL AND TECHNICAL EDUCATION.
VT 012 496 391
ANNUAL REPORT.
VT 013 089 393
PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION. A PROGRAM EVALUATION.
VT 013 394 ED 054 341 399
ANALYSIS OF WIN PROGRAM AUTOMATED TERMINATION DATA.
VT 013 412 ED 054 343 400
EVALUATION OF THE IMPACT OF SELECTED URBAN CONCENTRATED EMPLOYMENT PROGRAMS.
VT 013 463 ED 054 348 402
IMPLEMENTATION OF SELECTED MISSIONS, VOCATIONAL AND APPLIED ARTS EDUCATION PROGRAM. FINAL REPORT.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 699 405
WORLD OF MANUFACTURING: EVALUATION REPORT OF A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY DEMONSTRATION PROGRAM.
VT 013 710 ED 054 357 406
A CRITICAL STUDY OF VOCATIONAL-INDUSTRIAL EDUCATION IN TAIWAN.
VT 013 728 ED 055 162 409
INVESTMENT PLANNING IN VOCATIONAL-TECHNICAL EDUCATION. A PILOT STUDY.
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.
VT 013 741 ED 054 363 410
COST-BENEFIT ANALYSIS: THEORY AND APPLICATION TO MANPOWER TRAINING PROGRAMS. A BIBLIOGRAPHY.
VT 013 759 ED 054 365 412
TRAINING EVALUATION: A GUIDE TO ITS PLANNING, DEVELOPMENT, AND USE IN AGENCY TRAINING COURSES. TRAINING SYSTEMS AND TECHNOLOGY SERIES 4.
VT 013 762 412
RESEARCH, DEVELOPMENTAL AND EXEMPLARY ACTIVITIES IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 780 ED 055 173 417
AN EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM AT BLACK HILLS STATE COLLEGE BY THE GRADUATES.
VT 013 822 ED 055 190 425
THE EFFECTIVENESS OF VOCATIONAL AND TECHNICAL PROGRAMS: A NATIONAL FOLLOW-UP SURVEY.
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.
VT 013 843 428
AN ANALYSIS OF THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS.
VT 013 917 433
EVALUATION OF CURRICULAR REQUIREMENTS FOR THE TWO-YEAR SECRETARIAL PROGRAM AT NEW MEXICO STATE UNIVERSITY, 1965-1969.
VT 013 924 ED 055 208 434
A COMPARATIVE ANALYSIS OF SELECTED STUDENT CHARACTERISTICS AND VOCATIONAL COOPERATIVE PROGRAMS.
VT 013 932 ED 054 383 436
VOCATIONAL EDUCATION IN SELECTED HIGH SCHOOLS.
VT 013 934 ED 055 212 437
AN ANALYSIS OF THE IMPACT OF THE VOCATIONAL EDUCATION ACT OF 1963 ON BUSINESS EDUCATION IN THE PUBLIC SECONDARY SCHOOLS OF MISSOURI WITH IMPLICATIONS FOR TEACHER PREPARATION.

PAGE

VT 013 946 438
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM.
VT 013 948 438
A STUDY OF LAW ENFORCEMENT TRAINING PROGRAMS.
VT 013 954 ED 056 177 439
VOCATIONAL EDUCATION AND SELF-EVALUATION.
VT 013 967 ED 054 384 442
EMPLOYMENT OPPORTUNITIES, TRAINING NEEDS AND VOCATIONAL EDUCATION FOR THE GRAPHIC ARTS IN MISSOURI.
VT 013 974 ED 054 386 444
EVALUATION OF VOCATIONAL HOME ECONOMICS PROGRAMS IN TERMS OF THE EFFECTIVENESS OF FULL-TIME HOMEMAKERS AND HOMEMAKERS WHO ARE ALSO FULL TIME EMPLOYEES. FINAL REPORT.
VT 013 984 ED 054 387 445
SURVEY FOR COMPARISON OF EFFECTIVENESS OF HOME MANAGEMENT WITH RESIDENCY VERSUS HOME MANAGEMENT WITHOUT RESIDENCY LABORATORY, 1966-1968. FINAL REPORT.
VT 014 020 ED 056 189 450
A FOLLOW-UP OF THE FINANCIAL ASSETS AND LIABILITIES OF MENTALLY RETARDED YOUTH AS RELATED TO THE COST OF VOCATIONAL TRAINING IN FOUR PUBLIC SCHOOL SYSTEMS.
VT 014 021 ED 055 231 450
THE KNOWLEDGE AND OPINIONS OF BUSINESS EDUCATORS TOWARD VOCATIONAL EDUCATION WITH SPECIAL EMPHASIS TOWARD DISTRIBUTIVE EDUCATION.
VT 014 071 ED 056 191 452
THE EVALUATION OF A VOCATIONAL PROGRAM FOR DROPOUT-PRONE JUNIOR HIGH SCHOOL STUDENTS.
VT 014 073 452
TRENDS IN VOCATIONAL EDUCATION: ENROLLMENTS, EXPENDITURES, AND TEACHERS.
VT 014 077 ED 056 192 454
CHARACTERISTICS OF QUALITY VOCATIONAL-TECHNICAL EDUCATION PROGRAMS.
VT 014 083 454
IOWA HEALTH OCCUPATIONS EDUCATION: FOLLOW-UP STUDY.
VT 014 088 ED 054 389 455
A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY CURRICULUM PROJECT: A FINAL EVALUATION OF THE INDUSTRIAL ARTS CURRICULUM PROJECT (IACP), 1965-1971.
VT 014 098 ED 055 239 457
AN EVALUATION OF OKLAHOMA'S EXEMPLARY VOCATIONAL EDUCATION AND OCCUPATIONAL ORIENTATION PROGRAM.
VT 014 119 ED 056 204 462
POLICE TRAINING AND PERFORMANCE STUDY.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 218 471
A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA.
VT 014 222 ED 056 235 472
PERSPECTIVES ON PROGRESS: CAREER EDUCATION IN FLORIDA; STATEWIDE EVALUATION OF VOCATIONAL-TECHNICAL EDUCATION 1970-1971.
VT 014 226 473
EXEMPLARY PROGRAMS OF THE STATE OF NEW MEXICO. ANNUAL REPORT, 1970-71.
VT 014 377 480
EDUCATION IN AGRICULTURE IN CALIFORNIA (OCCUPATIONAL NEEDS AND FUTURE DEMANDS).
VT 014 378 ED 057 241 481
THE DETERMINATION OF PROPER ALLOCATION OF FUNCTIONS AND RESPONSIBILITIES OF INSTITUTIONS PROVIDING EDUCATION IN AGRICULTURE.
VT 014 379 481
SECOND ANNUAL REPORT, 1970-71.
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.
VT 014 421 482
FALL MOUNTAIN LONG-RANGE PLANNING PROJECT.
VT 014 466 484
ANALYSIS OF MDTA INSTITUTIONAL AND OJT DATA TAPES FOR 1968.

PROGRAM GUIDES
VT 010 897 ED 054 321 386
NEW APPROACHES IN THE USE OF VOLUNTEER SERVICES. VOLUNTEER SERVICES PROJECT 1115. FINAL REPORT.
VT 013 947 ED 055 215 438
OCCUTAPES.
VT 014 074 453
A HANDBOOK OF COOPERATIVE PROGRAMS FOR OKLAHOMA VOCATIONAL AND TECHNICAL EDUCATION.

PROGRAM IMPROVEMENT
VT 010 788 ED 054 303 379
HOUSTON'S OUT-OF-SCHOOL NEIGHBORHOOD YOUTH CORPS: A COMPARATIVE OBSERVATIONAL STUDY OF THE NYC'S IMPACT ON THE WORK ATTITUDES AND JOB FUTURES OF POVERTY YOUTHS.
VT 013 385 ED 056 166 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SEATTLE. SUMMARY, 1971.
VT 013 386 ED 056 167 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SAN FRANCISCO. SUMMARY, 1971.
VT 013 387 ED 056 168 399
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DENVER. SUMMARY, 1971.

PAGE

VT 013 463 ED 054 348 402
IMPLEMENTATION OF SELECTED MISSIONS, VOCATIONAL AND APPLIED ARTS EDUCATION PROGRAM. FINAL REPORT.
VT 013 767 ED 055 169 413
TOWARD EXCELLENCE IN NURSING EDUCATION: A GUIDE FOR DIPLOMA SCHOOL IMPROVEMENT.
VT 013 838 ED 055 195 427
THE CURRENT STATUS AND POSSIBLE TRENDS IN TEACHING INDUSTRIAL ARTS WOOD INFORMATION AT TEACHER EDUCATION INSTITUTIONS.
VT 013 948 438
A STUDY OF LAW ENFORCEMENT TRAINING PROGRAMS.
VT 014 019 ED 055 230 450
VOCATIONAL EDUCATION PROGRAMS OFFERED IN THE METROPOLITAN PUBLIC HIGH SCHOOLS OF THE UNITED STATES.
VT 014 206 ED 056 229 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, PHILADELPHIA. SUMMARY, 1971.
VT 014 207 ED 056 230 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, ATLANTA. SUMMARY 1971.
VT 014 208 ED 056 231 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DALLAS. SUMMARY, 1971.
VT 014 209 ED 056 232 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, CHICAGO. SUMMARY, 1971.
VT 014 210 ED 056 233 471
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, BOSTON. SUMMARY, 1971.
VT 014 228 ED 056 239 473
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, KANSAS CITY. SUMMARY, 1971.

PROGRAM PLANNING
VT 013 716 407
COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE V: PLANNING.
VT 013 810 423
OREGON STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION UNDER THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FISCAL YEAR 1971.
VT 014 069 451
DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE.
VT 014 099 ED 056 200 457
CAREER MOBILITY: A GUIDE FOR PROGRAM PLANNING IN HEALTH OCCUPATIONS, AND CAREER MOBILITY PROFILES.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 105 ED 055 242 459
IMPROVING OCCUPATIONAL ORIENTATION PROGRAMS FOR JUNIOR HIGH SCHOOL STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VIII.
VT 014 167 ED 056 218 467
GUIDELINES FOR HEALTH OCCUPATIONS EDUCATION PROGRAMS.
VT 014 364 479
EMERGING TECHNOLOGIES...APPLICATION FOR TOMORROW.
VT 014 421 482
FALL MOUNTAIN LONG-RANGE PLANNING PROJECT.
VT 014 452 483
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

PROGRAMED INSTRUCTION
VT 014 318 477
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.

PROGRAMED TEXTS
VT 010 884 ED 055 152 385
CONDUCT A COST EFFECTIVENESS STUDY OF POSTGRADUATE MEDICAL EDUCATION PROGRAMS.
VT 013 792 ED 054 374 420
A COMPARISON OF THE EFFECTIVENESS OF A PROGRAMMED TEXT AND A COMPUTER BASED DISPLAY UNIT MEDIA IN TEACHING FORTRAN IV.

PROJECT CROSSROADS
VT 013 088 ED 055 155 392
PROJECT CROSSROADS. FINAL REPORT.

PROMOTION (OCCUPATIONAL)
VT 010 845 ED 054 314 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM: PHASE 1. ANALYSIS OF THE PROMOTION BOARD COMPONENT IN THE WEIGHTED FACTORS SYSTEM.
VT 010 846 ED 054 315 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM. PHASE II. VALIDATION OF THE SYSTEM FOR GRADES E-4 THROUGH E-7.
VT 013 733 ED 055 164 410
A HANDBOOK FOR UPGRADING LOW-SKILL WORKERS.

PSYCHIATRIC SERVICES
VT 010 932 ED 056 159 387
AN EVALUATION OF REHABILITATION SERVICES AND THE ROLE OF INDUSTRY IN THE COMMUNITY ADJUSTMENT OF PSYCHIATRIC PATIENTS FOLLOWING HOSPITALIZATION. FINAL REPORT.

PAGE

PSYCHOLOGICAL NEEDS
VT 013 722 ED 055 160 408
WOMEN IN THE WORLD OF WORK.

PSYCHOLOGICAL TESTS
VT 014 133 ED 057 199 464
MANUAL FOR THE MINNESOTA IMPORTANCE QUESTIONNAIRE. MINNESOTA STUDIES IN VOCATIONAL REHABILITATION.

PSYCHOLOGY
VT 014 092 ED 056 197 456
INDUSTRIAL PSYCHOLOGY IN THE SEVENTIES AND BEYOND.

PSYCHOMOTOR SKILLS
VT 013 786 ED 057 188 418
THE EFFECT OF INSTRUCTIONAL OBJECTIVES AND GENERAL OBJECTIVES ON STUDENT SELF-EVALUATION OF PSYCHOMOTOR PERFORMANCE IN POWER MECHANICS.
VT 013 789 ED 054 373 419
THE EFFECTS OF FEEDBACK ON PSYCHOMOTOR PERFORMANCE OF FOURTH AND SIXTH GRADE STUDENTS.

PUBLIC FACILITIES
VT 013 583 ED 054 353 404
THE LODGING INDUSTRY'S IMAGE; HOW THE ADULTS AND TEENAGERS VIEW HOTELS AND MOTELS AS EMPLOYERS AND OVERALL.

PUBLIC HEALTH
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 352 396
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK).
VT 013 681 ED 054 355 405
ANNOTATED REFERENCES ON: ENGINEERING MAINTENANCE, SANITATION PUBLIC HEALTH, SANITATION HEALTH CARE FACILITY, HOUSEKEEPING, AND PURCHASING.

PUBLIC OPINION
VT 013 583 ED 054 353 404
THE LODGING INDUSTRY'S IMAGE; HOW THE ADULTS AND TEENAGERS VIEW HOTELS AND MOTELS AS EMPLOYERS AND OVERALL.
VT 013 802 ED 055 184 422
SELECTED ASPECTS OF VOCATIONAL IMAGE AS PERCEIVED BY A PUBLIC CATEGORIZED BY OCCUPATIONAL LEVELS.

PUBLIC POLICY
VT 008 010 ED 054 293 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY.
VT 013 324 396
MANPOWER IN ISRAEL. (FIFTH REPORT).

SUBJECT AND IDENTIFIER INDEX

PAGE

PUBLIC SCHOOLS
VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.

PUERTO RICANS
VT 010 783 ED 054 299 378
THE LABOR FORCE PARTICIPATION OF THE URBAN POOR.
VT 010 827 ED 055 151 381
BASIC OCCUPATIONAL LANGUAGE TRAINING (BOLT), FINAL REPORT.

QUALITY CONTROL
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

QUESTIONNAIRES
VT 013 814 ED 055 187 424
THE AVAILABILITY OF DATA ON COMPANY TRAINING PROGRAMS: A FEASIBILITY STUDY.

RACIAL DIFFERENCES
VT 014 084 ED 056 193 455
THE JOB ATTITUDES OF WORKERS FROM DIFFERENT ETHNIC BACKGROUNDS.
VT 014 127 ED 055 250 463
ENTRY INTO THE AMERICAN LABOR FORCE.

RACIAL DISCRIMINATION
VT 014 096 457
A STOCHASTIC MODEL OF DISCRIMINATION IN THE LABOR MARKET.

RADIATION
VT 013 823 425
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.

RATING SCALES
VT 014 077 ED 056 192 454
CHARACTERISTICS OF QUALITY VOCATIONAL-TECHNICAL EDUCATION PROGRAMS.
VT 014 125 ED 056 206 463
AN ATTITUDINAL SURVEY CONCERNING THE RESPONSIBILITIES OF THE INTERMEDIATE-LEVEL DIRECTOR OF VOCATIONAL EDUCATION IN CALIFORNIA.

RECALL (PSYCHOLOGICAL)
VT 014 321 478
THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS.

RECORDS (FORMS)
VT 010 820 ED 054 309 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME III, PART 1 AND PART 2: APPENDICES B 1-5.

PAGE

RECRUITMENT
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.
VT 014 376 480
USE OF RECRUITMENT MATERIALS BY OHIO TEACHERS OF VOCATIONAL AGRICULTURE.

REFERENCE MATERIALS
VT 013 353 397
ENVIRONMENTAL INFORMATION (INFORMATION PACK).
VT 013 681 ED 054 355 405
ANNOTATED REFERENCES ON: ENGINEERING MAINTENANCE, SANITATION PUBLIC HEALTH, SANITATION HEALTH CARE FACILITY, HOUSEKEEPING, AND PURCHASING.
VT 013 770 ED 055 170 414
A BIBLIOGRAPHY ON POLICE ADMINISTRATION.
VT 014 086 455
REVIEWING THE LITERATURE: A HANDBOOK FOR THE VOCATIONAL RESEARCHER.

REGIONAL PLANNING
VT 013 717 ED 054 360 407
JOBS FOR AMERICA. ANNUAL REPORT FISCAL 1970.
VT 014 295 476
MANPOWER DEVELOPMENT COUNCIL: THE DEVELOPMENT OF A COMPREHENSIVE SYSTEM OF HUMAN RESOURCE DEVELOPMENT FOR IOWA.

REGIONAL PROGRAMS
VT 010 790 ED 054 304 380
URBAN AND REGIONAL DIMENSIONS OF MANPOWER POLICY.
VT 012 930 ED 054 333 392
ASSESSMENT OF THE CURRENT STATUS OF REGIONAL OCCUPATIONAL CENTERS AND REGIONAL OCCUPATIONAL PROGRAMS.

REGIONAL SCHOOLS
VT 012 930 ED 054 333 392
ASSESSMENT OF THE CURRENT STATUS OF REGIONAL OCCUPATIONAL CENTERS AND REGIONAL OCCUPATIONAL PROGRAMS.

REHABILITATION COUNSELING
VT 010 901 ED 054 322 386
PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS IN REHABILITATION COUNSELING.

REHABILITATION PROGRAMS
VT 010 928 ED 054 326 387
THE DEVELOPMENT OF A SYLLABUS FOR INSTRUCTION OF COMMUNICATIVE SKILLS IN A REHABILITATION CENTER FOR THE BLIND. FINAL REPORT.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 933 ED 055 211 436
A PREDICTIVE MODEL FOR THE IDENTIFICATION OF POTENTIAL DROPOUTS FROM VOCATIONAL TRAINING IN A COMPREHENSIVE REHABILITATION CENTER.
VT 014 304 476
A PROGRAM FOR THE UTILIZATION OF THE EVANSTON REHABILITATION CENTER FOR MANPOWER TRAINING.
VT 014 308 476
PROPRIETARY PRODUCTS: PROJECT EARNING POWER.

RELEVANCE (EDUCATION)
VT 013 563 ED 054 352 403
DETERMINATION OF SUBJECT MATTER UNITS TAUGHT IN WISCONSIN AND THE EXTENT OF CONTRIBUTION MADE TOWARD MEETING THE NATIONAL OBJECTIVES OF VOCATIONAL AGRICULTURE.
VT 013 809 ED 055 185 423
NEW INDUSTRIAL ARTS FOR THE SENIOR HIGH SCHOOL.
VT 014 149 ED 056 211 465
A STUDY TO DETERMINE RELATIONSHIPS BETWEEN VOCATIONAL EDUCATION CURRICULAR EVOLUTION AND SOME ASPECTS OF OCCUPATIONAL EVOLUTION.

REMEDIAL INSTRUCTION
VT 014 331 ED 057 230 478
ESOPUS PREP. A RESIDENTIAL SCHOOL FOR SERIOUS DISADVANTAGED YOUTH.

REPORTS
VT 013 718 ED 055 159 407
VOCATIONAL EDUCATION AMENDMENTS OF 1968, PUBLIC LAW 90-576. FIFTH REPORT.

RESEARCH COORDINATING UNITS
VT 013 762 412
RESEARCH, DEVELOPMENTAL AND EXEMPLARY ACTIVITIES IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 014 159 ED 056 214 466
ERIC AND THE RCU.

RESEARCH LIBRARIES
VT 014 160 ED 056 215 466
TENNESSEE INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM FOR VOCATIONAL EDUCATION (JULY 1, 1970-JUNE 30, 1971).

RESEARCH METHODOLOGY
VT 002 713 376
HUMAN RESOURCES DEVELOPMENT PLANNING.
VT 013 933 ED 055 211 436
A PREDICTIVE MODEL FOR THE IDENTIFICATION OF POTENTIAL DROPOUTS FROM VOCATIONAL TRAINING IN A COMPREHENSIVE REHABILITATION CENTER.

PAGE

VT 014 086 455
REVIEWING THE LITERATURE: A HANDBOOK FOR THE VOCATIONAL RESEARCHER.
VT 014 092 ED 056 197 456
INDUSTRIAL PSYCHOLOGY IN THE SEVENTIES AND BEYOND.

RESEARCH NEEDS
VT 013 558 ED 054 351 403
RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 996 ED 055 228 447
PROCEEDINGS OF NORTH AMERICAN CONFERENCE ON LABOR STATISTIC.
VT 014 092 ED 056 197 456
INDUSTRIAL PSYCHOLOGY IN THE SEVENTIES AND BEYOND.
VT 014 263 475
TECHNICIANS, TECHNOLOGISTS, AND ENGINEERS FOR NUCLEAR POWER.

RESEARCH PROBLEMS
VT 013 558 ED 054 351 403
RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION.

RESEARCH PROJECTS
VT 009 637 ED 056 208 377
INVENTORY OF MANPOWER RESEARCH PROJECTS IN INDIANA. REPORT NO. 4.
VT 014 088 ED 054 389 455
A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY CURRICULUM PROJECT: A FINAL EVALUATION OF THE INDUSTRIAL ARTS CURRICULUM PROJECT (IACP), 1965-1971.

RESEARCH TOOLS
VT 014 159 ED 056 214 466
ERIC AND THE RCU.

RESEARCH UTILIZATION
VT 013 870 ED 056 171 429
RESEARCH UTILIZATION SPECIALIST; REVIEW AND SYNTHESIS OF SELECTED LITERATURE ON RESEARCH DEVELOPMENT.
VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.
VT 014 159 ED 056 214 466
ERIC AND THE RCU.

RESIDENTIAL SCHOOLS
VT 014 331 ED 057 230 478
ESOPUS PREP. A RESIDENTIAL SCHOOL FOR SERIOUS DISADVANTAGED YOUTH.

RESOURCE ALLOCATIONS
VT 002 713 376
HUMAN RESOURCES DEVELOPMENT PLANNING.
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).

SUBJECT AND IDENTIFIER INDEX

PAGE

RESOURCE CENTERS
VT 013 826 425
INDUSTRIAL ARTS: MUSEUM RESOURCES. A DIRECTORY OF SELECTED CENTERS.

RESOURCE GUIDES
VT 010 199 ED 054 295 377
JOB HORIZONS FOR WOMEN AND GIRLS IN THE DISTRICT OF COLUMBIA.

RESOURCE MATERIALS
VT 013 353 397
ENVIRONMENTAL INFORMATION (INFORMATION PACK).
VT 014 376 480
USE OF RECRUITMENT MATERIALS BY OHIO TEACHERS OF VOCATIONAL AGRICULTURE.

RETAILING
VT 013 778 ED 057 185 416
COLLEGE-LEVEL EDUCATION IN RETAILING: A COMPARISON OF PERCEPTIONS OF RETAIL EMPLOYMENT EXECUTIVES AND RETAIL EDUCATORS.

RETENTION STUDIES
VT 010 835 ED 057 161 382
RETENTION OF ELECTRONIC FUNDAMENTALS: DIFFERENCES AMONG TOPICS.

ROLE PERCEPTION
VT 013 963 ED 055 220 441
AN EXAMINATION OF SELECTED SALIENT CORRELATES OF NEBRASKA SCHOOL ADMINISTRATORS AS RELATED TO VOCATIONAL EDUCATION.
VT 013 974 ED 054 386 444
EVALUATION OF VOCATIONAL HOME ECONOMICS PROGRAMS IN TERMS OF THE EFFECTIVENESS OF FULL-TIME HOMEMAKERS AND HOMEMAKERS WHO ARE ALSO FULL TIME EMPLOYEES. FINAL REPORT.
VT 014 125 ED 056 206 463
AN ATTITUDINAL SURVEY CONCERNING THE RESPONSIBILITIES OF THE INTERMEDIATE-LEVEL DIRECTOR OF VOCATIONAL EDUCATION IN CALIFORNIA.

RURAL AREAS
VT 013 815 ED 055 188 424
BREAKTHROUGH IN RURAL MANPOWER SERVICES.

RURAL DEVELOPMENT
VT 010 790 ED 054 304 380
URBAN AND REGIONAL DIMENSIONS OF MANPOWER POLICY.

RURAL ECONOMICS
VT 010 790 ED 054 304 380
URBAN AND REGIONAL DIMENSIONS OF MANPOWER POLICY.

PAGE

RURAL EXTENSION
VT 013 909 ED 055 205 432
LAWS RELATING TO VOCATIONAL EDUCATION AND AGRICULTURAL EXTENSION WORK.

RURAL SCHOOL SYSTEMS
VT 013 235 ED 050 296 395
THE PLAN FOR IMPLEMENTATION OF AN EXEMPLARY OCCUPATIONAL EDUCATION PROGRAM IN A RURAL COMMUNITY.

RURAL URBAN DIFFERENCES
VT 014 304 476
A PROGRAM FOR THE UTILIZATION OF THE EVANSTON REHABILITATION CENTER FOR MANPOWER TRAINING.

RUSSIA
VT 014 165 ED 056 217 466
USSR-UNICEF SEMINAR ON PREVOCATIONAL TRAINING, EDUCATION AND VOCATIONAL ORIENTATION WITHIN AND OUTSIDE SCHOOLS (MOSCOW, USSR, OCTOBER 12-31, 1970). WORKING PAPERS.

SECONDARY SCHOOL STUDENTS
VT 013 776 ED 054 369 415
THE EFFECT OF OCCUPATIONAL INFORMATION UPON SECONDARY SCHOOL YOUTH WITH VARYING INTERESTS REGARDING A TEACHING CAREER IN THE FIELD OF INDUSTRIAL ARTS.

STUDENT ATTITUDES
VT 013 776 ED 054 369 415
THE EFFECT OF OCCUPATIONAL INFORMATION UPON SECONDARY SCHOOL YOUTH WITH VARYING INTERESTS REGARDING A TEACHING CAREER IN THE FIELD OF INDUSTRIAL ARTS.

SAFETY
VT 014 254 ED 057 215 474
PLANNING FOR SAFETY ON THE JOBSITE.

SAFETY EDUCATION
VT 014 394 481
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.

SAFETY EQUIPMENT
VT 014 000 ED 055 229 447
AGRICULTURAL TRACTOR SAFETY ON PUBLIC ROADS AND FARMS.

SAMPLING
VT 010 848 ED 054 317 384
THREE STUDIES OF JOB INVENTORY PROCEDURES: SELECTING DUTY CATEGORIES, INTERVIEWING, AND SAMPLING.

SUBJECT AND IDENTIFIER INDEX

PAGE

SCHOLARSHIPS
VT 013 724 ED 054 361 408
HEALTH PROFESSIONS AND NURSING STUDENT LOAN AND SCHOLARSHIP PROGRAMS. MANUAL OF INFORMATION, POLICIES, AND PROCEDURES.

SCHOOL COMMUNITY PROGRAMS
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.

SCHOOL DISTRICTS
VT 014 421 482
FALL MOUNTAIN LONG-RANGE PLANNING PROJECT.

SCHOOL INDUSTRY RELATIONSHIP
VT 013 757 ED 054 364 412
INDUSTRY-EDUCATION COOPERATIVE PROGRAM FOR PRESERVICE AND INSERVICE VOCATIONAL AND TECHNICAL TEACHER TRAINING. FINAL REPORT.
VT 013 808 ED 054 377 423
THE PROFESSIONAL INTERNSHIP EXCHANGE PROGRAM IN VOCATIONAL EDUCATION, 1970-1971.
VT 013 930 ED 054 382 435
A STUDY OF VOCATIONAL EDUCATION AS A FACTOR IN SELECTING A COMMUNITY FOR A MANUFACTURING PLANT SITE.

SCIENTIFIC PERSONNEL
VT 013 787 ED 055 177 418
THE ROLE OF THE INDEPENDENT INVENTOR IN THE EARLY DEVELOPMENT OF ELECTRICAL TECHNOLOGY.

SCREENING TESTS
VT 014 311 ED 056 241 477
THE WORK SAMPLE: REALITY-BASED ASSESSMENT OF VOCATIONAL POTENTIAL.

SEASONAL EMPLOYMENT
VT 014 214 471
FOREIGN EXPERIENCE IN PROVIDING WINTER JOBS IN THE CONSTRUCTION INDUSTRY.
VT 014 313 477
LABOR SUPPLY IN THE CONSTRUCTION INDUSTRY: A CASE STUDY OF UPSTATE NEW YORK.

SECOND LANGUAGE LEARNING
VT 010 827 ED 055 151 381
BASIC OCCUPATIONAL LANGUAGE TRAINING (BOLT), FINAL REPORT.

SECONDARY EDUCATION
VT 013 783 ED 055 175 417
AN ANALYSIS OF SELECTED CURRICULUM ATTRIBUTES WITH RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION IN ETHIOPIA.
VT 013 932 ED 054 383 436
VOCATIONAL EDUCATION IN SELECTED HIGH SCHOOLS.
VT 013 934 ED 055 212 437
AN ANALYSIS OF THE IMPACT OF THE VOCATIONAL EDUCATION ACT OF 1963 ON BUSINESS EDUCATION IN THE PUBLIC SECONDARY SCHOOLS OF MISSOURI WITH IMPLICATIONS FOR TEACHER PREPARATION.
VT 014 166 467
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.

SECONDARY SCHOOL COUNSELORS
VT 014 230 ED 057 209 473
SCHOOL GUIDANCE COUNSELORS' PERCEPTIONS OF POSTSECONDARY VOCATIONAL AND TECHNICAL EDUCATION AND FACTORS THAT CONTRIBUTE TO THESE PERCEPTIONS.

SECONDARY SCHOOL STUDENTS
VT 013 993 446
STATLER FOUNDATION PROJECT REPORT, JULY 1970.

SECONDARY SCHOOL TEACHERS
VT 013 609 404
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.

SECONDARY SCHOOLS
VT 014 019 ED 055 230 450
VOCATIONAL EDUCATION PROGRAMS OFFERED IN THE METROPOLITAN PUBLIC HIGH SCHOOLS OF THE UNITED STATES.

SELF CONCEPT
VT 014 022 ED 055 232 451
THE EFFECT ON SELF CONCEPT OF THE CHATTANOOGA NEIGHBORHOOD YOUTH CORPS AND OF EDUCATION, VOCATIONAL ASPIRATION, AND SEX ROLE.

SELF EVALUATION
VT 013 786 ED 057 188 418
THE EFFECT OF INSTRUCTIONAL OBJECTIVES AND GENERAL OBJECTIVES ON STUDENT SELF-EVALUATION OF PSYCHOMOTOR PERFORMANCE IN POWER MECHANICS.
VT 013 954 ED 056 177 439
VOCATIONAL EDUCATION AND SELF-EVALUATION.

SEMINARS
VT 010 797 ED 054 306 380
UNIVERSITY MANPOWER RESEARCH SEMINAR FOR THE STIMULATION OF PROFESSIONAL RESEARCH INTEREST.
VT 014 165 ED 056 217 466
USSR-UNICEF SEMINAR ON PREVOCATIONAL TRAINING, EDUCATION AND VOCATIONAL ORIENTATION WITHIN AND OUTSIDE SCHOOLS (MOSCOW, USSR, OCTOBER 12-31, 1970). WORKING PAPERS.

SUBJECT AND IDENTIFIER INDEX

PAGE

SENIOR HIGH SCHOOLS
VT 013 809 ED 055 185 423
NEW INDUSTRIAL ARTS FOR THE SENIOR HIGH SCHOOL.

SENIORS
VT 013 968 ED 055 222 442
VARIABLES RELATED TO THE EDUCATIONAL-VOCATIONAL DECISION-MAKING OF HIGH SCHOOL SENIORS.

SERVICE OCCUPATIONS
VT 014 075 ED 055 235 453
FUNCTIONS OF INDUSTRY APPROACH TO CURRICULUM FOR VOCATIONAL EDUCATION.

SEX (CHARACTERISTICS)
VT 014 022 ED 055 232 451
THE EFFECT ON SELF CONCEPT OF THE CHATTANOOGA NEIGHBORHOOD YOUTH CORPS AND OF EDUCATION, VOCATIONAL ASPIRATION, AND SEX ROLE.

SEX DISCRIMINATION
VT 013 426 ED 055 157 400
A MATTER OF SIMPLE JUSTICE.

SHELTERED WORKSHOPS
VT 014 308 476
PROPRIETARY PRODUCTS: PROJECT EARNING POWER.

SIMULATION
VT 013 896 ED 055 204 431
TROUBLESHOOTING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION VIA DYNAMIC SIMULATION.
VT 013 970 ED 054 385 443
AN EXPERIMENT COMPARING THE EFFECTIVENESS OF LOW COST INSTRUCTIONAL SIMULATION AGAINST HIGH COST EQUIPMENT UTILIZATION IN TEACHING NUMERICAL CONTROL PRINCIPLES.
VT 014 394 481
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.

SITE SELECTION
VT 013 930 ED 054 382 435
A STUDY OF VOCATIONAL EDUCATION AS A FACTOR IN SELECTING A COMMUNITY FOR A MANUFACTURING PLANT SITE.

SKILL DEVELOPMENT
VT 013 641 ED 055 158 405
BROWARD COUNTY HOME ECONOMICS CURRICULUM DEVELOPMENT PROJECT, JULY 1, 1967 TO JULY 1, 1970.
VT 014 114 ED 056 203 442
CAREER EDUCATION.

SKILLED WORKERS
VT 013 704 405
THE EMIGRATION OF HIGHLY-SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES.

SMALL BUSINESSES
VT 010 786 ED 054 301 379
SOCIOLOGICAL ASPECTS OF SELF-EMPLOYMENT AND SOCIAL WELFARE AMONG CHINESE, JAPANESE, AND NEGROES IN NORTHERN, URBAN AREAS OF THE UNITED STATES, 1900-1940.

SMALL GROUP INSTRUCTION
VT 013 790 ED 055 178 420
EFFECTS OF SMALL GROUP INSTRUCTION ON ACHIEVEMENT OF TECHNICAL INFORMATION BY NINTH GRADE INDUSTRIAL ARTS STUDENTS.

SOCIAL CHANGE
VT 013 883 ED 055 201 430
WORK AND NON-WORK: INSTITUTIONAL PERSPECTIVES.
VT 013 971 ED 055 223 443
COMMUNITY POWER AND SOCIAL CHANGE: A CASE FOR SOCIAL ACTION WITH IMPLICATIONS FOR OCCUPATIONAL EDUCATION.

SOCIAL FACTORS
VT 010 784 ED 054 300 378
PAST AND PRESENT COUNSELING AND PLACEMENT PROCEDURES IN PRIVATE EMPLOYMENT AGENCIES--AN EMPIRICAL STUDY.

SOCIAL PROBLEMS
VT 013 555 ED 054 350 402
NEW DIRECTIONS FOR VOCATIONAL HOME ECONOMICS.

SOCIAL SECURITY ADMINISTRATION
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.

SOCIAL WORK
VT 014 448 482
AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT.

SOCIAL WORKERS
VT 014 448 482
AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT.

SOCIOECONOMIC BACKGROUND
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.

SUBJECT AND IDENTIFIER INDEX

PAGE

SOCIOECONOMIC INFLUENCES
VT 010 786 ED 054 301 379
SOCIOLOGICAL ASPECTS OF SELF-EMPLOYMENT AND SOCIAL WELFARE AMONG CHINESE, JAPANESE, AND NEGROES IN NORTHERN, URBAN AREAS OF THE UNITED STATES, 1900-1940.

SOCIOECONOMIC STATUS
VT 013 209 ED 054 336 394
CAREER THRESHOLDS: A LONGITUDINAL STUDY OF THE EDUCATIONAL AND LABOR MARKET EXPERIENCE OF MALE YOUTH. VOLUME THREE.
VT 014 084 ED 056 193 455
THE JOB ATTITUDES OF WORKERS FROM DIFFERENT ETHNIC BACKGROUNDS.
VT 014 093 ED 056 198 456
PRIVATE HOUSEHOLD EMPLOYMENT IN THE UNITED STATES; AN EXPLORATORY PROJECT.

SOUTH CAROLINA
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.

SPECIALISTS
VT 013 870 ED 056 171 429
RESEARCH UTILIZATION SPECIALIST; REVIEW AND SYNTHESIS OF SELECTED LITERATURE ON RESEARCH DEVELOPMENT.

SPEECHES
VT 014 169 468
PAPERS PRESENTED AT THE NATIONAL WORKSHOP ON COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION, 1971.

STANDARDS
VT 013 726 ED 055 161 408
STATE ADVISORY COUNCILS ON VOCATIONAL EDUCATION; A GUIDE FOR IMPLEMENTING RULES AND REGULATIONS.

STATE ADVISORY COUNCILS
VT 013 726 ED 055 161 408
STATE ADVISORY COUNCILS ON VOCATIONAL EDUCATION; A GUIDE FOR IMPLEMENTING RULES AND REGULATIONS.

STATE COLLEGES
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.

STATE PROGRAMS
VT 012 492 391
FIRST ANNUAL REPORT OF THE STATE ADVISORY COUNCIL FOR VOCATIONAL EDUCATION IN COLORADO.
VT 012 493 391
1970 ANNUAL EVALUATION REPORT TO THE STATE BOARD FOR VOCATIONAL AND TECHNICAL EDUCATION.
VT 012 496 391
ANNUAL REPORT.
VT 013 738 ED 055 165 410
FOURTH ANNUAL REPORT ON THE OCCUPATIONS, JOB STATUS AND ETHNIC CHARACTERISTICS OF EMPLOYEES IN NEW YORK STATE AGENCIES.
VT 013 810 423
OREGON STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION UNDER THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FISCAL YEAR 1971.
VT 013 948 438
A STUDY OF LAW ENFORCEMENT TRAINING PROGRAMS.
VT 014 218 471
A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA.
VT 014 448 482
AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT.

STATE STANDARDS
VT 010 864 ED 054 320 385
WEIGHTLIFTING PROVISIONS FOR WOMEN BY STATE.

STATE SURVEYS
VT 013 738 ED 055 165 410
FOURTH ANNUAL REPORT ON THE OCCUPATIONS, JOB STATUS AND ETHNIC CHARACTERISTICS OF EMPLOYEES IN NEW YORK STATE AGENCIES.
VT 013 830 426
THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO.
VT 013 948 438
A STUDY OF LAW ENFORCEMENT TRAINING PROGRAMS.
VT 014 222 ED 056 235 472
PERSPECTIVES ON PROGRESS: CAREER EDUCATION IN FLORIDA; STATEWIDE EVALUATION OF VOCATIONAL-TECHNICAL EDUCATION 1970-1971.
VT 014 452 483
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

STATEWIDE PLANNING
VT 013 794 ED 055 181 421
ADMINISTRATIVE PATTERN FOR PUBLIC POST SECONDARY VOCATIONAL TECHNICAL EDUCATION IN NEBRASKA.

STATISTICAL ANALYSIS
VT 010 818 ED 054 307 380
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME I: FINAL REPORT.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 010 819 ED 054 308 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME II: TECHNICAL APPENDIX A, TABLES.
VT 010 820 ED 054 309 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME III, PART 1 AND PART 2: APPENDICES B 1-5.
VT 010 846 ED 054 315 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM. PHASE II. VALIDATION OF THE SYSTEM FOR GRADES E-4 THROUGH E-7.
VT 010 849 ED 054 318 384
AN ANALYSIS OF THE NAVY VOCATIONAL INTEREST INVENTORY AS A PREDICTOR OF CAREER MOTIVATION.
VT 010 850 ED 054 319 385
AREA SCALES OF THE NAVY VOCATIONAL INTEREST INVENTORY AS PREDICTORS OF SCHOOL PERFORMANCE AND RATING ASSIGNMENT.
VT 010 947 ED 055 154 388
SYNTHESIS OF MULTIPLE CRITERIA OF PHYSICIAN PERFORMANCE.
VT 013 394 ED 054 341 399
ANALYSIS OF WIN PROGRAM AUTOMATED TERMINATION DATA.
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.

STATISTICAL DATA
VT 008 011 ED 054 294 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY. APPENDIX.
VT 013 812 ED 055 186 424
AGGREGATION AND AVERAGING.

STATISTICS
VT 008 011 ED 054 294 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY. APPENDIX.

STUDENT ATTITUDES
VT 013 960 ED 055 218 440
ATTITUDES OF SLUM DWELLERS AND SUBURBANITES TOWARD BLUE-COLLAR OCCUPATIONS AND VOCATIONAL EDUCATION.

STUDENT CHARACTERISTICS
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.
VT 013 924 ED 055 208 434
A COMPARATIVE ANALYSIS OF SELECTED STUDENT CHARACTERISTICS AND VOCATIONAL COOPERATIVE PROGRAMS.

PAGE

VT 013 929 ED 055 209 435
A STUDY OF RELATIONSHIPS BETWEEN STUDENT SCORES ON VARIOUS PREDICTOR MEASURES AND VOCATIONAL SUCCESS OF STUDENTS WHO WERE FOLLOWED UP ONE AND FIVE YEARS FOLLOWING TRAINING IN SELECTED PRIVATE TRADE, TECHNICAL, AND BUSINESS SCHOOLS.

STUDENT ENROLLMENT
VT 013 209 ED 054 336 394
CAREER THRESHOLDS: A LONGITUDINAL STUDY OF THE EDUCATIONAL AND LABOR MARKET EXPERIENCE OF MALE YOUTH. VOLUME THREE.

STUDENT EVALUATION
VT 010 835 ED 057 161 382
RETENTION OF ELECTRONIC FUNDAMENTALS: DIFFERENCES AMONG TOPICS.

STUDENT IMPROVEMENT
VT 014 462 484
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE.

STUDENT INTERESTS
VT 013 935 ED 056 173 437
THE DIFFERENTIATION OF HIGH SCHOOL STUDENTS IN VOCATIONAL EDUCATION AREAS BY THE OHIO VOCATIONAL INTEREST SURVEY.

STUDENT LOAN PROGRAMS
VT 013 724 ED 054 361 408
HEALTH PROFESSIONS AND NURSING STUDENT LOAN AND SCHOLARSHIP PROGRAMS. MANUAL OF INFORMATION, POLICIES, AND PROCEDURES.

STUDENT MOTIVATION
VT 013 993 446
STATLER FOUNDATION PROJECT REPORT, JULY 1970.

STUDENT NEEDS
VT 013 385 ED 056 166 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SEATTLE. SUMMARY, 1971.
VT 013 386 ED 056 167 398
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SAN FRANCISCO. SUMMARY, 1971.
VT 013 387 ED 056 168 399
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DENVER. SUMMARY, 1971.
VT 013 924 ED 055 208 434
A COMPARATIVE ANALYSIS OF SELECTED STUDENT CHARACTERISTICS AND VOCATIONAL COOPERATIVE PROGRAMS.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 936 ED 055 213 437
THE STATUS OF AND NEED FOR VOCATIONAL-INDUSTRIAL EDUCATION IN JEFFERSON COUNTY MISSOURI.
VT 014 202 ED 057 204 469
AN APPRAISAL OF THE IMPACT OF FEDERAL FUNDS GRANTED UNDER SECTION 4(A) OF THE VOCATIONAL EDUCATION ACT OF 1963 ON THE OCCUPATIONAL PROGRAMS OFFERED BY THE PUBLIC TWO-YEAR COLLEGES IN NEW YORK STATE.
VT 014 205 ED 056 228 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, NEW YORK. SUMMARY, 1971.
VT 014 206 ED 056 229 469
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, PHILADELPHIA. SUMMARY, 1971.
VT 014 207 ED 056 230 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, ATLANTA. SUMMARY 1971.
VT 014 208 ED 056 231 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DALLAS. SUMMARY, 1971.
VT 014 209 ED 056 232 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, CHICAGO. SUMMARY, 1971.
VT 014 210 ED 056 233 471
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, BOSTON. SUMMARY, 1971.
VT 014 228 ED 056 239 473
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, KANSAS CITY. SUMMARY, 1971.

SUBPROFESSIONALS
VT 013 459 ED 054 345 401
THE USE OF HEALTH AIDES IN MIGRANT HEALTH PROJECTS.
VT 013 724 ED 054 361 408
HEALTH PROFESSIONS AND NURSING STUDENT LOAN AND SCHOLARSHIP PROGRAMS. MANUAL OF INFORMATION, POLICIES, AND PROCEDURES.
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.
VT 013 748 ED 055 166 411
A SUMMARY OF THE TYPES OF "PARAPROFESSIONAL TRAINING" PROVIDED BY JUNIOR AND SENIOR COLLEGES AND UNIVERSITIES IN THE AREAS OF HEALTH, EDUCATION, AND WELFARE DURING ACADEMIC YEAR 1970-1971.
VT 013 957 440
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.

SUCCESS FACTORS
VT 013 929 ED 055 209 435
A STUDY OF RELATIONSHIPS BETWEEN STUDENT SCORES ON VARIOUS PREDICTOR MEASURES AND VOCATIONAL SUCCESS OF STUDENTS WHO WERE FOLLOWED UP ONE AND FIVE YEARS FOLLOWING TRAINING IN SELECTED PRIVATE TRADE, TECHNICAL, AND BUSINESS SCHOOLS.
VT 014 081 ED 005 238 454
THE RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS OF NINTH GRADE BOYS AND CURRICULUM SELECTION AND SUCCESS IN TENTH GRADE.

SUMMER PROGRAMS
VT 014 156 ED 056 213 465
STUDENT HEALTH OPPORTUNITIES PROGRAM: A SUMMER YOUTH EMPLOYMENT PROGRAM.

SUPERINTENDENTS
VT 013 959 ED 055 217 440
FACTORS ASSOCIATED WITH PARTICIPATION BY MICHIGAN SCHOOL SUPERINTENDENTS IN PROGRAMS AUTHORIZED UNDER THE PROVISIONS OF THE VOCATIONAL EDUCATION ACT OF 1963.

SUPERVISORS
VT 013 995 ED 056 182 447
PRINCIPLES AND PRACTICES FOR FIRST-LINE SUPERVISORS IN REHABILITATION.

SUPERVISORY TRAINING
VT 013 995 ED 056 182 447
PRINCIPLES AND PRACTICES FOR FIRST-LINE SUPERVISORS IN REHABILITATION.

SURVEYS
VT 008 011 ED 054 294 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY. APPENDIX.
VT 010 842 ED 054 311 382
INTERIM QUANTITATIVE MANPOWER PROJECTIONS FOR PROPOSED HYDROGRAPHIC SURVEY SHIP SYSTEM (AGS) CANDIDATE CONFIGURATIONS (NAVSHIPS SUBPROJECT S46-27012, TASK 14408).
VT 010 847 ED 054 316 384
A METHOD FOR DETERMINING JOB TYPES FOR LOW APTITUDE AIRMEN.
VT 013 583 ED 054 353 404
THE LODGING INDUSTRY'S IMAGE; HOW THE ADULTS AND TEENAGERS VIEW HOTELS AND MOTELS AS EMPLOYERS AND OVERALL.

SWEDEN
VT 014 166 467
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.

SUBJECT AND IDENTIFIER INDEX

PAGE

SYNTHESIS
VT 013 870 ED 056 171 429
RESEARCH UTILIZATION SPECIALIST; REVIEW AND SYNTHESIS OF SELECTED LITERATURE ON RESEARCH DEVELOPMENT.

SYSTEMS APPROACH
VT 013 759 ED 054 365 412
TRAINING EVALUATION: A GUIDE TO ITS PLANNING, DEVELOPMENT, AND USE IN AGENCY TRAINING COURSES. TRAINING SYSTEMS AND TECHNOLOGY SERIES 4.
VT 014 218 471
A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA.
VT 014 219 472
TECHNICAL TRAINING STUDY.

TABLES (DATA)
VT 010 819 ED 054 308 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME II: TECHNICAL APPENDIX A, TABLES.
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.
VT 014 073 452
TRENDS IN VOCATIONAL EDUCATION: ENROLLMENTS, EXPENDITURES, AND TEACHERS.

TAIWAN
VT 013 710 ED 054 357 406
A CRITICAL STUDY OF VOCATIONAL-INDUSTRIAL EDUCATION IN TAIWAN.

TASK ANALYSIS
VT 010 847 ED 054 316 384
A METHOD FOR DETERMINING JOB TYPES FOR LOW APTITUDE AIRMEN.

TASK PERFORMANCE
VT 011 051 ED 057 168 389
DEVELOPMENT OF USTES APTITUDE TEST BATTERY FOR PHOTOGRAPH FINISHER (ANY INDUSTRY) I 976.886.
VT 013 775 ED 054 368 415
EFFECTS OF MOVEMENT AND COMMENTARY ON MANIPULATIVE PERFORMANCE.
VT 013 777 ED 054 370 415
COMPARATIVE EFFECTIVENESS OF TWO STRATEGIES OF COMPUTER-ASSISTED INSTRUCTION FOR TEACHING ORTHOGRAPHIC PROJECTIONS.
VT 013 784 ED 055 176 417
EFFECTS OF AUDIO-VISUAL ORDER OF PRESENTATION AND STRENGTH OF GRIP ON MANIPULATIVE TASK PERFORMANCE.
VT 013 789 ED 054 373 419
THE EFFECTS OF FEEDBACK ON PSYCHOMOTOR PERFORMANCE OF FOURTH AND SIXTH GRADE STUDENTS.

PAGE

TEACHER ATTITUDES
VT 013 381 ED 054 340 398
A FACTOR ANALYSIS OF PROFESSIONAL EDUCATION COMPETENCIES AND SELECTED COMMUNITY COLLEGE INSTRUCTORS.
VT 013 778 ED 057 185 416
COLLEGE-LEVEL EDUCATION IN RETAILING: A COMPARISON OF PERCEPTIONS OF RETAIL EMPLOYMENT EXECUTIVES AND RETAIL EDUCATORS.
VT 013 835 ED 055 193 427
AN ANALYSIS OF FACTORS THAT AFFECT JOB SATISFACTION OF PUBLIC HIGH SCHOOL BUSINESS TEACHERS IN OHIO.
VT 013 878 ED 055 199 429
DEVELOPMENT OF AN INSTRUMENT TO MEASURE THE CHANGE ORIENTATION OF VOCATIONAL TEACHERS.
VT 013 960 ED 055 218 440
ATTITUDES OF SLUM DWELLERS AND SUBURBANITES TOWARD BLUE-COLLAR OCCUPATIONS AND VOCATIONAL EDUCATION.
VT 014 318 477
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.
VT 014 376 480
USE OF RECRUITMENT MATERIALS BY OHIO TEACHERS OF VOCATIONAL AGRICULTURE.

TEACHER EDUCATION
VT 012 103 ED 054 329 390
SUMMER INSTITUTE IN AGRICULTURAL MECHANICS EDUCATION, SOUTHERN REGION, PROCEEDINGS (BLACKSBURG, VIRGINIA, AUGUST 3-7, 1970).
VT 013 609 404
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.
VT 013 757 ED 054 364 412
INDUSTRY-EDUCATION COOPERATIVE PROGRAM FOR PRESERVICE AND INSERVICE VOCATIONAL AND TECHNICAL TEACHER TRAINING. FINAL REPORT.
VT 013 780 ED 055 173 417
AN EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM AT BLACK HILLS STATE COLLEGE BY THE GRADUATES.
VT 013 919 433
AGRICULTURAL EDUCATION IN "LIFE 2000." A REPORT OF A TASK FORCE ON LONG RANGE PLANNING.
VT 013 934 ED 055 212 437
AN ANALYSIS OF THE IMPACT OF THE VOCATIONAL EDUCATION ACT OF 1963 ON BUSINESS EDUCATION IN THE PUBLIC SECONDARY SCHOOLS OF MISSOURI WITH IMPLICATIONS FOR TEACHER PREPARATION.
VT 013 976 444
THE RELATION BETWEEN NUTRITION KNOWLEDGE AND THE DIETARY INTAKE OF SELECTED WOMEN: A BASIS FOR ADULT EDUCATION PROGRAM DEVELOPMENT.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 103 ED 056 201 458
UPDATING THE PROCESS AND CONTENT OF TEACHER EDUCATION CURRICULUMS TO REACH DISADVANTAGED YOUTH IN METROPOLITAN AREAS. FINAL REPORT, VOLUME IX.

TEACHER EDUCATION CURRICULUM
VT 013 609 404
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.
VT 013 780 ED 055 173 417
AN EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM AT BLACK HILLS STATE COLLEGE BY THE GRADUATES.
VT 013 795 ED 055 182 421
A STUDY TO DETERMINE THE EFFECT OF THE VOCATIONAL EDUCATION ACT OF 1963 UPON BUSINESS TEACHER EDUCATION PROGRAMS IN SELECTED COLLEGES AND UNIVERSITIES.
VT 013 834 ED 055 192 426
EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION CURRICULUM AT PERU STATE COLLEGE.
VT 013 838 ED 055 195 427
THE CURRENT STATUS AND POSSIBLE TRENDS IN TEACHING INDUSTRIAL ARTS WOOD INFORMATION AT TEACHER EDUCATION INSTITUTIONS.
VT 014 103 ED 056 201 458
UPDATING THE PROCESS AND CONTENT OF TEACHER EDUCATION CURRICULUMS TO REACH DISADVANTAGED YOUTH IN METROPOLITAN AREAS. FINAL REPORT, VOLUME IX.

TEACHER EVALUATION
VT 013 954 ED 056 177 439
VOCATIONAL EDUCATION AND SELF-EVALUATION.

TEACHER INFLUENCE
VT 013 711 ED 054 358 406
FACTORS RELATED TO VOCATIONAL CHOICES OF AGRICULTURAL EDUCATION STUDENTS.

TEACHER QUALIFICATIONS
VT 013 381 ED 054 340 398
A FACTOR ANALYSIS OF PROFESSIONAL EDUCATION COMPETENCIES AND SELECTED COMMUNITY COLLEGE INSTRUCTORS.

TEACHER ROLE
VT 013 954 ED 056 177 439
VOCATIONAL EDUCATION AND SELF-EVALUATION.

TEACHING
VT 014 348 478
SELECTED APPROACHES IN VOCATIONAL EDUCATION.

PAGE

TEACHING METHODS
VT 010 884 ED 055 152 385
CONDUCT A COST EFFECTIVENESS STUDY OF POSTGRADUATE MEDICAL EDUCATION PROGRAMS.
VT 013 775 ED 054 368 415
EFFECTS OF MOVEMENT AND COMMENTARY ON MANIPULATIVE PERFORMANCE.
VT 013 777 ED 054 370 415
COMPARATIVE EFFECTIVENESS OF TWO STRATEGIES OF COMPUTER-ASSISTED INSTRUCTION FOR TEACHING ORTHOGRAPHIC PROJECTIONS.
VT 013 788 ED 054 372 419
A COMPARISON OF TWO APPROACHES TO DEVELOPING AN UNDERSTANDING OF INDUSTRIAL ENTERPRISE AT THE EIGHTH GRADE LEVEL.
VT 013 790 ED 055 178 420
EFFECTS OF SMALL GROUP INSTRUCTION ON ACHIEVEMENT OF TECHNICAL INFORMATION BY NINTH GRADE INDUSTRIAL ARTS STUDENTS.
VT 013 970 ED 054 385 443
AN EXPERIMENT COMPARING THE EFFECTIVENESS OF LOW COST INSTRUCTIONAL SIMULATION AGAINST HIGH COST EQUIPMENT UTILIZATION IN TEACHING NUMERICAL CONTROL PRINCIPLES.
VT 014 064 451
EFFECTS OF PROGRAMED VERSUS CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS.

TEACHING TECHNIQUES
VT 013 775 ED 054 368 415
EFFECTS OF MOVEMENT AND COMMENTARY ON MANIPULATIVE PERFORMANCE.
VT 013 784 ED 055 176 417
EFFECTS OF AUDIO-VISUAL ORDER OF PRESENTATION AND STRENGTH OF GRIP ON MANIPULATIVE TASK PERFORMANCE.
VT 013 786 ED 057 188 418
THE EFFECT OF INSTRUCTIONAL OBJECTIVES AND GENERAL OBJECTIVES ON STUDENT SELF-EVALUATION OF PSYCHOMOTOR PERFORMANCE IN POWER MECHANICS.
VT 013 792 ED 054 374 420
A COMPARISON OF THE EFFECTIVENESS OF A PROGRAMMED TEXT AND A COMPUTER BASED DISPLAY UNIT MEDIA IN TEACHING FORTRAN IV.

TECHNICAL EDUCATION
VT 013 731 ED 054 362 409
AGRICULTURE AND NATURAL RESOURCES POSTSECONDARY PROGRAMS.
VT 013 748 ED 055 166 411
A SUMMARY OF THE TYPES OF "PARAPROFESSIONAL TRAINING" PROVIDED BY JUNIOR AND SENIOR COLLEGES AND UNIVERSITIES IN THE AREAS OF HEALTH, EDUCATION, AND WELFARE DURING ACADEMIC YEAR 1970-1971.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 926 ED 054 381 434
ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.
VT 013 936 ED 055 213 437
THE STATUS OF AND NEED FOR VOCATIONAL-INDUSTRIAL EDUCATION IN JEFFERSON COUNTY MISSOURI.
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.
VT 014 072 ED 055 234 452
THE CHARACTERISTICS, EDUCATION AND EARNINGS OF TECHNICIANS.
VT 014 102 ED 054 390 458
MICROFICHE COLLECTION OF CLEARINGHOUSE DOCUMENTS REPORTED IN ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.
VT 014 171 ED 056 220 468
THE DETERMINATION OF A TECHNICAL CORE CURRICULUM FOR A TWO YEAR TECHNICAL PROGRAM IN BIO-MEDICAL ELECTRONICS.
VT 014 219 472
TECHNICAL TRAINING STUDY.
VT 014 364 479
EMERGING TECHNOLOGIES...APPLICATION FOR TOMORROW.

TECHNICAL OCCUPATIONS
VT 014 072 ED 055 234 452
THE CHARACTERISTICS, EDUCATION AND EARNINGS OF TECHNICIANS.

TECHNIQUES
VT 013 774 415
THE USE OF ANALYTICAL TECHNIQUES IN THE MANAGEMENT OF PROGRAMS OF HEALTH MANPOWER EDUCATION.

TECHNOLOGICAL ADVANCEMENT
VT 010 844 ED 054 313 383
PERSONNEL IMPLICATIONS OF NEW TECHNOLOGICAL DEVELOPMENTS: UNDERSEA TECHNOLOGIES.
VT 010 962 ED 054 327 389
POTENTIAL MECHANIZATION IN THE FLUE-CURED TOBACCO INDUSTRY--WITH EMPHASIS ON HUMAN RESOURCE ADJUSTMENT.
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.

TECHNOLOGY
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 353 397
ENVIRONMENTAL INFORMATION (INFORMATION PACK).

PAGE

VT 013 572 403
JOBS AND AGRICULTURAL DEVELOPMENT; A STUDY OF THE EFFECTS OF A NEW AGRICULTURAL TECHNOLOGY ON EMPLOYMENT IN POOR NATIONS.
VT 013 809 ED 055 185 423
NEW INDUSTRIAL ARTS FOR THE SENIOR HIGH SCHOOL.

TELEPHONE COMMUNICATIONS SYSTEMS
VT 013 787 ED 055 177 418
THE ROLE OF THE INDEPENDENT INVENTOR IN THE EARLY DEVELOPMENT OF ELECTRICAL TECHNOLOGY.

TEST RELIABILITY
VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.

TEST RESULTS
VT 011 052 ED 057 169 390
EFFECT OF BASIC LITERACY TRAINING ON TEST SCORES.

TEST VALIDITY
VT 013 878 ED 055 199 429
DEVELOPMENT OF AN INSTRUMENT TO MEASURE THE CHANGE ORIENTATION OF VOCATIONAL TEACHERS.
VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.
VT 013 935 ED 056 173 437
THE DIFFERENTIATION OF HIGH SCHOOL STUDENTS IN VOCATIONAL EDUCATION AREAS BY THE OHIO VOCATIONAL INTEREST SURVEY.

TESTING
VT 014 133 ED 057 199 464
MANUAL FOR THE MINNESOTA IMPORTANCE QUESTIONNAIRE. MINNESOTA STUDIES IN VOCATIONAL REHABILITATION.

TESTING PROGRAMS
VT 013 120 ED 054 335 393
EQUIVALENCY AND PROFICIENCY TESTING. A DESCRIPTIVE COMPILATION OF EXISTING TESTING PROGRAMS IN ALLIED HEALTH AND OTHER HEALTH OCCUPATIONS, WITH AN ANNOTATED BIBLIOGRAPHY.

TESTS
VT 011 052 ED 057 169 390
EFFECT OF BASIC LITERACY TRAINING ON TEST SCORES.

TEXAS
VT 013 797 ED 054 375 422
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION: THEIR HISTORY AND PRESENT POSITION IN TEXAS.

SUBJECT AND IDENTIFIER INDEX

PAGE

UNITED STATES AIR FORCE
VT 010 848 ED 054 317 384
THREE STUDIES OF JOB INVENTORY PROCEDURES: SELECTING DUTY CATEGORIES, INTERVIEWING, AND SAMPLING.

UNITS OF STUDY (SUBJECT FIELDS)
VT 013 563 ED 054 352 403
DETERMINATION OF SUBJECT MATTER UNITS TAUGHT IN WISCONSIN AND THE EXTENT OF CONTRIBUTION MADE TOWARD MEETING THE NATIONAL OBJECTIVES OF VOCATIONAL AGRICULTURE.

UNSKILLED WORKERS
VT 010 818 ED 054 307 380
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME I: FINAL REPORT.
VT 010 819 ED 054 308 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME II: TECHNICAL APPENDIX A, TABLES.
VT 010 820 ED 054 309 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME III, PART 1 AND PART 2: APPENDICES B 1-5.
VT 013 733 ED 055 164 410
A HANDBOOK FOR UPGRADING LOW-SKILL WORKERS.

URBAN AREAS
VT 013 412 ED 054 343 400
EVALUATION OF THE IMPACT OF SELECTED URBAN CONCENTRATED EMPLOYMENT PROGRAMS.
VT 014 011 ED 056 186 448
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS.
VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.

URBAN SCHOOLS
VT 014 098 ED 055 239 457
AN EVALUATION OF OKLAHOMA'S EXEMPLARY VOCATIONAL EDUCATION AND OCCUPATIONAL ORIENTATION PROGRAM.

URBAN YOUTH
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.

VALIDITY
VT 010 846 ED 054 315 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM. PHASE II. VALIDATION OF THE SYSTEM FOR GRADES E-4 THROUGH E-7.

PAGE

VIDEO TAPE RECORDINGS
VT 013 789 ED 054 373 419
THE EFFECTS OF FEEDBACK ON PSYCHOMOTOR PERFORMANCE OF FOURTH AND SIXTH GRADE STUDENTS.
VT 013 791 ED 055 179 420
A COMPARISON AND COST ANALYSIS OF TWO APPROACHES TO THE PROVISION OF OCCUPATIONAL INFORMATION.
VT 013 947 ED 055 215 438
OCCUTAPES.

VISUAL PERCEPTION
VT 013 823 425
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.

VISUALIZATION
VT 013 785 ED 057 187 418
EFFECTS OF TWO LEARNING TREATMENTS ON THE UNDERSTANDING OF ORTHOGRAPHIC PROJECTION BY STUDENTS VARYING IN VISUAL-HAPTIC APTITUDE.

VOCATIONAL AGRICULTURE
VT 013 563 ED 054 352 403
DETERMINATION OF SUBJECT MATTER UNITS TAUGHT IN WISCONSIN AND THE EXTENT OF CONTRIBUTION MADE TOWARD MEETING THE NATIONAL OBJECTIVES OF VOCATIONAL AGRICULTURE.
VT 013 830 426
THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO.
VT 013 919 433
AGRICULTURAL EDUCATION IN "LIFE 2000." A REPORT OF A TASK FORCE ON LONG RANGE PLANNING.
VT 013 965 ED 056 178 442
A STUDY OF THE RELATIONSHIP BETWEEN SELECTED EDUCATIONAL EXPERIENCES OF VOCATIONAL AGRICULTURE STUDENTS AND THEIR ENROLLING IN A COLLEGE OF AGRICULTURE.
VT 014 069 451
DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE.
VT 014 318 477
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.
VT 014 376 480
USE OF RECRUITMENT MATERIALS BY OHIO TEACHERS OF VOCATIONAL AGRICULTURE.
VT 014 377 480
EDUCATION IN AGRICULTURE IN CALIFORNIA (OCCUPATIONAL NEEDS AND FUTURE DEMANDS).
VT 014 378 ED 057 241 481
THE DETERMINATION OF PROPER ALLOCATION OF FUNCTIONS AND RESPONSIBILITIES OF INSTITUTIONS PROVIDING EDUCATION IN AGRICULTURE.

SUBJECT AND IDENTIFIER INDEX

PAGE

TEXTBOOKS
VT 014 321 478
THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS.

THESAURI
VT 013 882 ED 055 200 430
NHSB THESAURUS OF TRAFFIC AND MOTOR VEHICLE SAFETY TERMS; A SUPPLEMENT TO HIGHWAY SAFETY LITERATURE.

TOBACCO
VT 010 962 ED 054 327 389
POTENTIAL MECHANIZATION IN THE FLUE-CURED TOBACCO INDUSTRY--WITH EMPHASIS ON HUMAN RESOURCE ADJUSTMENT.

TRACTORS
VT 014 000 ED 055 229 447
AGRICULTURAL TRACTOR SAFETY ON PUBLIC ROADS AND FARMS.

TRADE AND INDUSTRIAL EDUCATION
VT 013 757 ED 054 364 412
INDUSTRY-EDUCATION COOPERATIVE PROGRAM FOR PRESERVICE AND INSERVICE VOCATIONAL AND TECHNICAL TEACHER TRAINING. FINAL REPORT.
VT 013 936 ED 055 213 437
THE STATUS OF AND NEED FOR VOCATIONAL-INDUSTRIAL EDUCATION IN JEFFERSON COUNTY MISSOURI.
VT 014 168 ED 056 219 467
A DIAGNOSTIC WORK SAMPLE INSTRUMENT FOR ASSESSING AUTOMOTIVE TRADE COMPETENCE.
VT 014 466 484
ANALYSIS OF MDTA INSTITUTIONAL AND OJT DATA TAPES FOR 1968.

TRAFFIC ACCIDENTS
VT 013 886 ED 055 202 431
A MODEL (FORMULA) FOR DERIVING A HAZARD INDEX OF RAIL-HIGHWAY GRADE CROSSINGS.

TRAFFIC SAFETY
VT 013 716 407
COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE V: PLANNING.
VT 013 882 ED 055 200 430
NHSB THESAURUS OF TRAFFIC AND MOTOR VEHICLE SAFETY TERMS; A SUPPLEMENT TO HIGHWAY SAFETY LITERATURE.
VT 013 886 ED 055 202 431
A MODEL (FORMULA) FOR DERIVING A HAZARD INDEX OF RAIL-HIGHWAY GRADE CROSSINGS.
VT 013 887 ED 055 203 431
A LICENSING PROGRAM FOR OPERATORS OF TWO-WHEELED MOTOR VEHICLES.
VT 014 000 ED 055 229 447
AGRICULTURAL TRACTOR SAFETY ON PUBLIC ROADS AND FARMS.
VT 014 401 482
SPECIAL STUDY--YOUTH AND TRAFFIC SAFETY EDUCATION.

TRAINABLE MENTALLY HANDICAPPED
VT 013 437 ED 054 344 401
A COOPERATIVE VOCATIONAL PATTERN FOR IN-SCHOOL MENTALLY RETARDED YOUTH.

TRAINING
VT 010 438 ED 054 297 377
MANPOWER REQUIREMENTS IN OCCUPATIONS FOR WHICH VOCATIONAL EDUCATION PREPARES WORKERS.
VT 010 835 ED 057 161 382
RETENTION OF ELECTRONIC FUNDAMENTALS: DIFFERENCES AMONG TOPICS.

TRAINING INCENTIVE PAYMENTS PROGRAM
VT 014 252 ED 057 214 474
TIPP (TRAINING INCENTIVE PAYMENTS PROGRAM); A REPORT ON FIRST YEAR'S OPERATIONS.

TRAINING TECHNIQUES
VT 013 823 425
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.

TREND ANALYSIS
VT 014 073 452
TRENDS IN VOCATIONAL EDUCATION: ENROLLMENTS, EXPENDITURES, AND TEACHERS.

TROUBLESHOOTING
VT 013 896 ED 055 204 431
TROUBLESHOOTING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION VIA DYNAMIC SIMULATION.

TYPEWRITING
VT 014 064 451
EFFECTS OF PROGRAMED VERSUS CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS.

UNDEREMPLOYED
VT 014 252 ED 057 214 474
TIPP (TRAINING INCENTIVE PAYMENTS PROGRAM); A REPORT ON FIRST YEAR'S OPERATIONS.

UNEMPLOYMENT
VT 010 508 ED 054 298 378
TEENAGE EMPLOYMENT: A STUDY OF LOW INCOME YOUTH IN HOUSTON, TEXAS.
VT 010 797 ED 054 306 380
UNIVERSITY MANPOWER RESEARCH SEMINAR FOR THE STIMULATION OF PROFESSIONAL RESEARCH INTEREST.
VT 014 096 457
A STOCHASTIC MODEL OF DISCRIMINATION IN THE LABOR MARKET.

SUBJECT AND IDENTIFIER INDEX

PAGE

VOCATIONAL AGRICULTURE TEACHERS
VT 012 103 ED 054 329 390
SUMMER INSTITUTE IN AGRICULTURAL MECHANICS EDUCATION, SOUTHERN REGION, PROCEEDINGS (BLACKSBURG, VIRGINIA, AUGUST 3-7, 1970).
VT 013 711 ED 054 358 406
FACTORS RELATED TO VOCATIONAL CHOICES OF AGRICULTURAL EDUCATION STUDENTS.
VT 013 793 ED 055 180 421
THE ADOPTION OF EDUCATIONAL INNOVATIONS AMONG EXPERIENCED TEACHERS OF VOCATIONAL AGRICULTURE IN PREDOMINANTLY NEGRO SCHOOLS IN NORTH CAROLINA.
VT 013 920 ED 056 172 433
OPINION LEADERSHIP AND COMMUNICATION LINKAGES AMONG AGRICULTURAL EDUCATORS.
VT 013 987 ED 055 226 445
GATEKEEPERS IN VOCATIONAL EDUCATION.

VOCATIONAL COUNSELING
VT 013 722 ED 055 160 408
WOMEN IN THE WORLD OF WORK.
VT 013 968 ED 055 222 442
VARIABLES RELATED TO THE EDUCATIONAL-VOCATIONAL DECISION-MAKING OF HIGH SCHOOL SENIORS.
VT 014 105 ED 055 242 459
IMPROVING OCCUPATIONAL ORIENTATION PROGRAMS FOR JUNIOR HIGH SCHOOL STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VIII.
VT 014 222 ED 056 235 472
PERSPECTIVES ON PROGRESS: CAREER EDUCATION IN FLORIDA; STATEWIDE EVALUATION OF VOCATIONAL-TECHNICAL EDUCATION 1970-1971.
VT 014 230 ED 057 209 473
SCHOOL GUIDANCE COUNSELORS' PERCEPTIONS OF POSTSECONDARY VOCATIONAL AND TECHNICAL EDUCATION AND FACTORS THAT CONTRIBUTE TO THESE PERCEPTIONS.
VT 014 331 ED 057 230 478
ESOPUS PREP. A RESIDENTIAL SCHOOL FOR SERIOUS DISADVANTAGED YOUTH.

VOCATIONAL DEVELOPMENT
VT 013 232 ED 050 293 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME I.
VT 013 233 ED 050 294 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME 2.
VT 013 234 ED 050 295 395
CAREER EDUCATION--MORE THAN A NAME.
VT 013 796 ED 055 183 421
AN INVESTIGATION OF THE VOCATIONAL BEHAVIOR OF SELECTED WOMEN VOCATIONAL EDUCATION STUDENTS.

PAGE

VT 013 929 ED 055 209 435
A STUDY OF RELATIONSHIPS BETWEEN STUDENT SCORES ON VARIOUS PREDICTOR MEASURES AND VOCATIONAL SUCCESS OF STUDENTS WHO WERE FOLLOWED UP ONE AND FIVE YEARS FOLLOWING TRAINING IN SELECTED PRIVATE TRADE, TECHNICAL, AND BUSINESS SCHOOLS.
VT 014 080 ED 055 237 454
A LONGITUDINAL STUDY OF VOCATIONAL DEVELOPMENT: IMPLICATIONS FOR VOCATIONAL EDUCATION AND GUIDANCE.

VOCATIONAL DIRECTORS
VT 014 125 ED 056 206 463
AN ATTITUDINAL SURVEY CONCERNING THE RESPONSIBILITIES OF THE INTERMEDIATE-LEVEL DIRECTOR OF VOCATIONAL EDUCATION IN CALIFORNIA.

VOCATIONAL EDUCATION
VT 010 438 ED 054 297 377
MANPOWER REQUIREMENTS IN OCCUPATIONS FOR WHICH VOCATIONAL EDUCATION PREPARES WORKERS.
VT 010 943 388
THE TACOMA PUBLIC SCHOOLS- DIVISION OF VOCATIONAL REHABILITATION. COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS.
VT 012 492 391
FIRST ANNUAL REPORT OF THE STATE ADVISORY COUNCIL FOR VOCATIONAL EDUCATION IN COLORADO.
VT 012 493 391
1970 ANNUAL EVALUATION REPORT TO THE STATE BOARD FOR VOCATIONAL AND TECHNICAL EDUCATION.
VT 012 496 391
ANNUAL REPORT.
VT 013 234 ED 050 295 395
CAREER EDUCATION--MORE THAN A NAME.
VT 013 235 ED 050 296 395
THE PLAN FOR IMPLEMENTATION OF AN EXEMPLARY OCCUPATIONAL EDUCATION PROGRAM IN A RURAL COMMUNITY.
VT 013 368 ED 054 337 397
A GUIDE TO CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT.
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.
VT 013 437 ED 054 344 401
A COOPERATIVE VOCATIONAL PATTERN FOR IN-SCHOOL MENTALLY RETARDED YOUTH.
VT 013 558 ED 054 351 403
RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 609 404
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.
VT 013 710 ED 054 357 406
A CRITICAL STUDY OF VOCATIONAL-INDUSTRIAL EDUCATION IN TAIWAN.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 712 ED 054 359 407
PRINCIPLES FOR VOCATIONAL EDUCATION--VALIDATION OF STATEMENTS OF BELIEFS SELECTED FROM THE LITERATURE AND RESEARCH.

VT 013 718 ED 055 159 407
VOCATIONAL EDUCATION AMENDMENTS OF 1968, PUBLIC LAW 90-576. FIFTH REPORT.

VT 013 726 ED 055 161 408
STATE ADVISORY COUNCILS ON VOCATIONAL EDUCATION; A GUIDE FOR IMPLEMENTING RULES AND REGULATIONS.

VT 013 728 ED 055 162 409
INVESTMENT PLANNING IN VOCATIONAL-TECHNICAL EDUCATION. A PILOT STUDY.

VT 013 762 412
RESEARCH, DEVELOPMENTAL AND EXEMPLARY ACTIVITIES IN VOCATIONAL AND TECHNICAL EDUCATION.

VT 013 779 ED 054 371 416
STATUS OF NON-CREDIT ADULT EDUCATION IN THE COMMUNITY COLLEGES OF THE NORTH CENTRAL ACCREDITING REGION.

VT 013 783 ED 055 175 417
AN ANALYSIS OF SELECTED CURRICULUM ATTRIBUTES WITH RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION IN ETHIOPIA.

VT 013 794 ED 055 181 421
ADMINISTRATIVE PATTERN FOR PUBLIC POST SECONDARY VOCATIONAL TECHNICAL EDUCATION IN NEBRASKA.

VT 013 797 ED 054 375 422
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION: THEIR HISTORY AND PRESENT POSITION IN TEXAS.

VT 013 802 ED 055 184 422
SELECTED ASPECTS OF VOCATIONAL IMAGE AS PERCEIVED BY A PUBLIC CATEGORIZED BY OCCUPATIONAL LEVELS.

VT 013 810 423
OREGON STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION UNDER THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FISCAL YEAR 1971.

VT 013 816 ED 054 378 424
THE CLUSTER CONCEPT PROGRAM AS AN APPROACH TO VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL.

VT 013 818 ED 056 169 425
ADMINISTRATORS' WORKSHOP FOR PROGRAM IMPLEMENTATION: VOCATIONAL EDUCATION OPPORTUNITIES FOR DISADVANTAGED AND HANDICAPPED PERSONS.

VT 013 822 ED 055 190 425
THE EFFECTIVENESS OF VOCATIONAL AND TECHNICAL PROGRAMS: A NATIONAL FOLLOW-UP SURVEY.

VT 013 845 ED 055 198 428
EPDA (EDUCATION PROFESSIONS DEVELOPMENT ACT) INSTITUTE LEADERSHIP DEVELOPMENT IN CURRICULUM PLANNING. FINAL REPORT.

PAGE

VT 013 896 ED 055 204 431
TROUBLESHOOTING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION VIA DYNAMIC SIMULATION.

VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.

VT 013 909 ED 055 205 432
LAWS RELATING TO VOCATIONAL EDUCATION AND AGRICULTURAL EXTENSION WORK.

VT 013 924 ED 055 208 434
A COMPARATIVE ANALYSIS OF SELECTED STUDENT CHARACTERISTICS AND VOCATIONAL COOPERATIVE PROGRAMS.

VT 013 926 ED 054 381 434
ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.

VT 013 930 ED 054 382 435
A STUDY OF VOCATIONAL EDUCATION AS A FACTOR IN SELECTING A COMMUNITY FOR A MANUFACTURING PLANT SITE.

VT 013 931 ED 055 210 436
A FISCAL ANALYSIS OF FIXED-AMOUNT FEDERAL GRANTS-IN-AID: THE CASE OF VOCATIONAL EDUCATION.

VT 013 932 ED 054 383 436
VOCATIONAL EDUCATION IN SELECTED HIGH SCHOOLS.

VT 013 935 ED 056 173 437
THE DIFFERENTIATION OF HIGH SCHOOL STUDENTS IN VOCATIONAL EDUCATION AREAS BY THE OHIO VOCATIONAL INTEREST SURVEY.

VT 013 936 ED 055 213 437
THE STATUS OF AND NEED FOR VOCATIONAL-INDUSTRIAL EDUCATION IN JEFFERSON COUNTY MISSOURI.

VT 013 937 ED 055 214 438
A STUDY OF FEDERAL FINANCIAL AID TO PUBLIC VOCATIONAL EDUCATION, 1917-1964.

VT 013 946 438
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM.

VT 013 951 ED 056 716 439
VOCATIONAL EDUCATION FOR HANDICAPPED PERSONS. HANDBOOK FOR PROGRAM IMPLEMENTATION.

VT 013 959 ED 055 217 440
FACTORS ASSOCIATED WITH PARTICIPATION BY MICHIGAN SCHOOL SUPERINTENDENTS IN PROGRAMS AUTHORIZED UNDER THE PROVISIONS OF THE VOCATIONAL EDUCATION ACT OF 1963.

VT 013 960 ED 055 218 440
ATTITUDES OF SLUM DWELLERS AND SUBURBANITES TOWARD BLUE-COLLAR OCCUPATIONS AND VOCATIONAL EDUCATION.

VT 013 962 ED 055 219 441
AN ANALYSIS OF THE ADMINISTRATIVE STRUCTURE AND THE ROLE OF THE CHIEF VOCATIONAL-TECHNICAL EDUCATION ADMINISTRATOR IN PUBLIC JUNIOR COLLEGES.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 013 963 ED 055 220 441
AN EXAMINATION OF SELECTED SALIENT CORRELATES OF NEBRASKA SCHOOL ADMINISTRATORS AS RELATED TO VOCATIONAL EDUCATION.

VT 013 964 ED 055 221 441
A HISTORIAL ANALYSIS OF VOCATIONAL EDUCATION: LAND-GRANT COLLEGES TO CALIFORNIA JUNIOR COLLEGES, 1862-1940.

VT 013 967 ED 054 384 442
EMPLOYMENT OPPORTUNITIES, TRAINING NEEDS AND VOCATIONAL EDUCATION FOR THE GRAPHIC ARTS IN MISSOURI.

VT 013 971 ED 055 223 443
COMMUNITY POWER AND SOCIAL CHANGE: A CASE FOR SOCIAL ACTION WITH IMPLICATIONS FOR OCCUPATIONAL EDUCATION.

VT 013 972 ED 055 224 443
A MODEL FOR EDUCATIONAL PROFICIENCY.

VT 013 987 ED 055 226 445
GATEKEEPERS IN VOCATIONAL EDUCATION.

VT 013 994 ED 056 181 446
THE IMPACT OF A RESCHEDULED SCHOOL YEAR ON VOCATIONAL TRAINING CENTERS IN NEW YORK STATE.

VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.

VT 014 011 ED 056 186 448
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS.

VT 014 019 ED 055 230 450
VOCATIONAL EDUCATION PROGRAMS OFFERED IN THE METROPOLITAN PUBLIC HIGH SCHOOLS OF THE UNITED STATES.

VT 014 020 ED 056 189 450
A FOLLOW-UP OF THE FINANCIAL ASSETS AND LIABILITIES OF MENTALLY RETARDED YOUTH AS RELATED TO THE COST OF VOCATIONAL TRAINING IN FOUR PUBLIC SCHOOL SYSTEMS.

VT 014 023 ED 055 233 451
A VOCATIONAL AND TECHNICAL PURVIEW FOR EDUCATIONAL ADMINISTRATORS.

VT 014 073 452
TRENDS IN VOCATIONAL EDUCATION: ENROLLMENTS, EXPENDITURES, AND TEACHERS.

VT 014 074 453
A HANDBOOK OF COOPERATIVE PROGRAMS FOR OKLAHOMA VOCATIONAL AND TECHNICAL EDUCATION.

VT 014 077 ED 056 192 454
CHARACTERISTICS OF QUALITY VOCATIONAL-TECHNICAL EDUCATION PROGRAMS.

VT 014 098 ED 055 239 457
AN EVALUATION OF OKLAHOMA'S EXEMPLARY VOCATIONAL EDUCATION AND OCCUPATIONAL ORIENTATION PROGRAM.

PAGE

VT 014 100 ED 055 240 457
THE DEVELOPMENT OF INDIVIDUALIZED INSTRUCTION IN VOCATIONAL EDUCATION.

VT 014 102 ED 054 390 458
MICROFICHE COLLECTION OF CLEARINGHOUSE DOCUMENTS REPORTED IN ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.

VT 014 103 ED 056 201 458
UPDATING THE PROCESS AND CONTENT OF TEACHER EDUCATION CURRICULUMS TO REACH DISADVANTAGED YOUTH IN METROPOLITAN AREAS. FINAL REPORT, VOLUME IX.

VT 014 106 ED 055 243 459
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE V.

VT 014 107 ED 055 244 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FINAL REPORT, VOLUME IV.

VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.

VT 014 109 ED 055 246 460
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS.

VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.

VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.

VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.

VT 014 149 ED 056 211 465
A STUDY TO DETERMINE RELATIONSHIPS BETWEEN VOCATIONAL EDUCATION CURRICULAR EVOLUTION AND SOME ASPECTS OF OCCUPATIONAL EVOLUTION.

VT 014 159 ED 056 214 466
ERIC AND THE RCU.

VT 014 160 ED 056 215 466
TENNESSEE INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM FOR VOCATIONAL EDUCATION (JULY 1, 1970-JUNE 30, 1971).

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 165 ED 056 217 466
USSR-UNICEF SEMINAR ON PREVOCATIONAL TRAINING, EDUCATION AND VOCATIONAL ORIENTATION WITHIN AND OUTSIDE SCHOOLS (MOSCOW, USSR, OCTOBER 12-31, 1970). WORKING PAPERS.
VT 014 166 467
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.
VT 014 202 ED 057 204 469
AN APPRAISAL OF THE IMPACT OF FEDERAL FUNDS GRANTED UNDER SECTION 4(A) OF THE VOCATIONAL EDUCATION ACT OF 1963 ON THE OCCUPATIONAL PROGRAMS OFFERED BY THE PUBLIC TWO-YEAR COLLEGES IN NEW YORK STATE.
VT 014 218 471
A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA.
VT 014 222 ED 056 235 472
PERSPECTIVES ON PROGRESS: CAREER EDUCATION IN FLORIDA; STATEWIDE EVALUATION OF VOCATIONAL-TECHNICAL EDUCATION 1970-1971.
VT 014 226 473
EXEMPLARY PROGRAMS OF THE STATE OF NEW MEXICO. ANNUAL REPORT, 1970-71.
VT 014 230 ED 057 209 473
SCHOOL GUIDANCE COUNSELORS' PERCEPTIONS OF POSTSECONDARY VOCATIONAL AND TECHNICAL EDUCATION AND FACTORS THAT CONTRIBUTE TO THESE PERCEPTIONS.
VT 014 304 476
A PROGRAM FOR THE UTILIZATION OF THE EVANSTON REHABILITATION CENTER FOR MANPOWER TRAINING.
VT 014 348 478
SELECTED APPROACHES IN VOCATIONAL EDUCATION.
VT 014 379 481
SECOND ANNUAL REPORT, 1970-71.
VT 014 421 482
FALL MOUNTAIN LONG-RANGE PLANNING PROJECT.
VT 014 462 484
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE.

VOCATIONAL EDUCATION ACT OF 1963
VT 013 931 ED 055 210 436
A FISCAL ANALYSIS OF FIXED-AMOUNT FEDERAL GRANTS-IN-AID: THE CASE OF VOCATIONAL EDUCATION.

VOCATIONAL EDUCATION ACT OF 1968
VT 014 107 ED 055 244 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FINAL REPORT, VOLUME IV.

PAGE

VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.

VOCATIONAL EDUCATION TEACHERS
VT 013 808 ED 054 377 423
THE PROFESSIONAL INTERNSHIP EXCHANGE PROGRAM IN VOCATIONAL EDUCATION, 1970-1971.
VT 013 878 ED 055 199 429
DEVELOPMENT OF AN INSTRUMENT TO MEASURE THE CHANGE ORIENTATION OF VOCATIONAL TEACHERS.
VT 014 104 ED 055 241 458
IMPROVING PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VI.
VT 014 110 ED 055 247 461
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, VOLUME VII.

VOCATIONAL FOLLOWUP
VT 013 830 426
THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO.
VT 013 884 430
A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS. PROJECT MINI-SCORE.
VT 013 929 ED 055 209 435
A STUDY OF RELATIONSHIPS BETWEEN STUDENT SCORES ON VARIOUS PREDICTOR MEASURES AND VOCATIONAL SUCCESS OF STUDENTS WHO WERE FOLLOWED UP ONE AND FIVE YEARS FOLLOWING TRAINING IN SELECTED PRIVATE TRADE, TECHNICAL, AND BUSINESS SCHOOLS.
VT 014 083 454
IOWA HEALTH OCCUPATIONS EDUCATION; FOLLOW-UP STUDY.
VT 014 451 483
CAREER GRADUATES: A PROFILE OF JOB EXPERIENCE AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES.

VOCATIONAL INTERESTS
VT 010 849 ED 054 318 384
AN ANALYSIS OF THE NAVY VOCATIONAL INTEREST INVENTORY AS A PREDICTOR OF CAREER MOTIVATION.

VOCATIONAL REHABILITATION
VT 010 932 ED 056 159 387
AN EVALUATION OF REHABILITATION SERVICES AND THE ROLE OF INDUSTRY IN THE COMMUNITY ADJUSTMENT OF PSYCHIATRIC PATIENTS FOLLOWING HOSPITALIZATION. FINAL REPORT.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 010 943 388
THE TACOMA PUBLIC SCHOOLS- DIVISION OF VOCATIONAL REHABILITATION. COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS.
VT 013 843 428
AN ANALYSIS OF THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS.
VT 013 951 ED 056 716 439
VOCATIONAL EDUCATION FOR HANDICAPPED PERSONS. HANDBOOK FOR PROGRAM IMPLEMENTATION.
VT 013 995 ED 056 182 447
PRINCIPLES AND PRACTICES FOR FIRST-LINE SUPERVISORS IN REHABILITATION.
VT 014 133 ED 057 199 464
MANUAL FOR THE MINNESOTA IMPORTANCE QUESTIONNAIRE. MINNESOTA STUDIES IN VOCATIONAL REHABILITATION.

VOCATIONAL SUCCESS
VT 013 929 ED 055 209 435
A STUDY OF RELATIONSHIPS BETWEEN STUDENT SCORES ON VARIOUS PREDICTOR MEASURES AND VOCATIONAL SUCCESS OF STUDENTS WHO WERE FOLLOWED UP ONE AND FIVE YEARS FOLLOWING TRAINING IN SELECTED PRIVATE TRADE, TECHNICAL, AND BUSINESS SCHOOLS.

VOCATIONAL TRAINING CENTERS
VT 012 930 ED 054 333 392
ASSESSMENT OF THE CURRENT STATUS OF REGIONAL OCCUPATIONAL CENTERS AND REGIONAL OCCUPATIONAL PROGRAMS.
VT 013 994 ED 056 181 446
THE IMPACT OF A RESCHEDULED SCHOOL YEAR ON VOCATIONAL TRAINING CENTERS IN NEW YORK STATE.
VT 014 071 ED 056 191 452
THE EVALUATION OF A VOCATIONAL PROGRAM FOR DROPOUT-PRONE JUNIOR HIGH SCHOOL STUDENTS.

VOLUNTARY AGENCIES
VT 010 897 ED 054 321 386
NEW APPROACHES IN THE USE OF VOLUNTEER SERVICES. VOLUNTEER SERVICES PROJECT 1115. FINAL REPORT.

VOLUNTEER TRAINING
VT 010 897 ED 054 321 386
NEW APPROACHES IN THE USE OF VOLUNTEER SERVICES. VOLUNTEER SERVICES PROJECT 1115. FINAL REPORT.

VOLUNTEERS
VT 010 897 ED 054 321 386
NEW APPROACHES IN THE USE OF VOLUNTEER SERVICES. VOLUNTEER SERVICES PROJECT 1115. FINAL REPORT.

PAGE

WASHINGTON LAW ENFORCEMENT TRAINING COMMISSION
VT 013 948 438
A STUDY OF LAW ENFORCEMENT TRAINING PROGRAMS.

WEIGHTED AIRMAN PROMOTION SYSTEM
VT 010 846 ED 054 315 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM. PHASE II. VALIDATION OF THE SYSTEM FOR GRADES E-4 THROUGH E-7.

WELFARE
VT 010 786 ED 054 301 379
SOCIOLOGICAL ASPECTS OF SELF-EMPLOYMENT AND SOCIAL WELFARE AMONG CHINESE, JAPANESE, AND NEGROES IN NORTHERN, URBAN AREAS OF THE UNITED STATES, 1900-1940.
VT 010 897 ED 054 321 386
NEW APPROACHES IN THE USE OF VOLUNTEER SERVICES. VOLUNTEER SERVICES PROJECT 1115. FINAL REPORT.

WELFARE SERVICES
VT 013 765 413
NEW CAREERS.

WOODWORKING
VT 013 838 ED 055 195 427
THE CURRENT STATUS AND POSSIBLE TRENDS IN TEACHING INDUSTRIAL ARTS WOOD INFORMATION AT TEACHER EDUCATION INSTITUTIONS.

WORK ATTITUDES
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.
VT 013 583 ED 054 353 404
THE LODGING INDUSTRY'S IMAGE; HOW THE ADULTS AND TEENAGERS VIEW HOTELS AND MOTELS AS EMPLOYERS AND OVERALL.
VT 013 722 ED 055 160 408
WOMEN IN THE WORLD OF WORK.
VT 013 806 ED 054 376 422
THE TRANSITION FROM SCHOOL TO WORK; A STUDY OF THE CHILD'S CHANGING PERCEPTION OF WORK FROM THE AGE OF SEVEN.
VT 013 883 ED 055 201 430
WORK AND NON-WORK: INSTITUTIONAL PERSPECTIVES.
VT 013 921 ED 055 207 434
MODIFYING DISADVANTAGED STUDENTS' PERCEPTIONS OF OFFICE WORK.
VT 014 016 ED 056 187 449
PSYCHOLOGICAL AND ORGANIZATIONAL CORRELATES OF CAREER PATTERNS IN CLINICAL LABORATORY OCCUPATIONS.
VT 014 084 ED 056 193 455
THE JOB ATTITUDES OF WORKERS FROM DIFFERENT ETHNIC BACKGROUNDS.

SUBJECT AND IDENTIFIER INDEX

PAGE

VT 014 133 ED 057 199 464
MANUAL FOR THE MINNESOTA IMPORTANCE QUESTIONNAIRE. MINNESOTA STUDIES IN VOCATIONAL REHABILITATION.

WORK ENVIRONMENT
VT 014 016 ED 056 187 449
PSYCHOLOGICAL AND ORGANIZATIONAL CORRELATES OF CAREER PATTERNS IN CLINICAL LABORATORY OCCUPATIONS.

WORK EXPERIENCE
VT 014 016 ED 056 187 449
PSYCHOLOGICAL AND ORGANIZATIONAL CORRELATES OF CAREER PATTERNS IN CLINICAL LABORATORY OCCUPATIONS.
VT 014 179 468
PART-TIME EXPERIENCE AND THE TRANSITION FROM SCHOOL TO WORK.

WORK EXPERIENCE PROGRAMS
VT 012 163 390
PRE-VOCATION PROGRAM.
VT 013 757 ED 054 364 412
INDUSTRY-EDUCATION COOPERATIVE PROGRAM FOR PRESERVICE AND INSERVICE VOCATIONAL AND TECHNICAL TEACHER TRAINING. FINAL REPORT.
VT 013 946 438
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM.
VT 014 305 476
PROJECT BUILD: PREPARING DISADVANTAGED YOUTH FOR APPRENTICABLE CONSTRUCTION TRADES.

WORK INCENTIVE PROGRAM
VT 013 394 ED 054 341 399
ANALYSIS OF WIN PROGRAM AUTOMATED TERMINATION DATA.

WORK REFERRAL SYSTEMS
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.

WORK STUDY PROGRAMS
VT 013 437 ED 054 344 401
A COOPERATIVE VOCATIONAL PATTERN FOR IN-SCHOOL MENTALLY RETARDED YOUTH.
VT 013 993 446
STATLER FOUNDATION PROJECT REPORT, JULY 1970.

WORKING WOMEN
VT 010 864 ED 054 320 385
WEIGHTLIFTING PROVISIONS FOR WOMEN BY STATE.
VT 013 722 ED 055 160 408
WOMEN IN THE WORLD OF WORK.

WORKSHOPS
VT 010 199 ED 054 295 377
JOB HORIZONS FOR WOMEN AND GIRLS IN THE DISTRICT OF COLUMBIA.

PAGE

VT 014 069 451
DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE.
VT 014 169 468
PAPERS PRESENTED AT THE NATIONAL WORKSHOP ON COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION, 1971.

WORLD OF WORK
VT 012 730 ED 056 165 391
REVIEW AND SYNTHESIS OF INFORMATION ON OCCUPATIONAL EXPLORATION.

WORLD PROBLEMS
VT 013 744 411
REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER.

YOUTH
VT 010 508 ED 054 298 378
TEENAGE EMPLOYMENT: A STUDY OF LOW INCOME YOUTH IN HOUSTON, TEXAS.
VT 014 401 482
SPECIAL STUDY--YOUTH AND TRAFFIC SAFETY EDUCATION.

YOUTH CLUBS
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.
VT 013 869 ED 054 380 429
GUIDELINES FOR THE DEVELOPMENT OF STUDENT ORGANIZATIONS ASSOCIATED WITH AGRICULTURAL PROGRAMS AT TWO-YEAR, POST-SECONDARY EDUCATIONAL INSTITUTIONS IN THE UNITED STATES. RESEARCH REPORT.

YOUTH EMPLOYMENT
VT 013 209 ED 054 336 394
CAREER THRESHOLDS: A LONGITUDINAL STUDY OF THE EDUCATIONAL AND LABOR MARKET EXPERIENCE OF MALE YOUTH. VOLUME THREE.
VT 013 368 ED 054 337 397
A GUIDE TO CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT.
VT 013 841 ED 055 197 428
WORKING CHILDREN: A REPORT ON CHILD LABOR.
VT 014 156 ED 056 213 465
STUDENT HEALTH OPPORTUNITIES PROGRAM: A SUMMER YOUTH EMPLOYMENT PROGRAM.
VT 014 179 468
PART-TIME EXPERIENCE AND THE TRANSITION FROM SCHOOL TO WORK.

YOUTH OPPORTUNITIES
VT 013 492 ED 054 349 402
YOUTH AND WORK: TOWARD A MODEL OF LIFETIME ECONOMIC PROSPECTS.

PAGE

ABDULLAHI, BAKRI
VT 013 783 ED 055 175 417
AN ANALYSIS OF SELECTED CURRICULUM ATTRIBUTES WITH RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION IN ETHIOPIA.

ABRAHAMS, NORMAN M.
VT 010 850 ED 054 319 385
AREA SCALES OF THE NAVY VOCATIONAL INTEREST INVENTORY AS PREDICTORS OF SCHOOL PERFORMANCE AND RATING ASSIGNMENT.

ACADEMY OF PEDAGOGICAL SCIENCES, MOSCOW (USSR). SCIENTIFIC RESEARCH INST. FOR LABOUR TRAINING AND VOCATIONAL GUIDANCE.
VT 014 165 ED 056 217 466
USSR-UNICEF SEMINAR ON PREVOCATIONAL TRAINING, EDUCATION AND VOCATIONAL ORIENTATION WITHIN AND OUTSIDE SCHOOLS (MOSCOW, USSR, OCTOBER 12-31, 1970). WORKING PAPERS.

AGENCY FOR INTERNATIONAL DEVELOPMENT, WASHINGTON, D.C. OFFICE OF PROGRAM COORDINATION.
VT 002 713 376
HUMAN RESOURCES DEVELOPMENT PLANNING.

AIR FORCE PERSONNEL RESEARCH DIV., LACKLAND AFB, TEX.
VT 010 845 ED 054 314 38[illegible]
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM: PHASE 1. ANALYSIS OF THE PROMOTION BOARD COMPONENT IN THE WEIGHTED FACTORS SYSTEM.
VT 010 846 ED 054 315 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM. PHASE II. VALIDATION OF THE SYSTEM FOR GRADES E-4 THROUGH E-7.

ALASKA STATE ADVISORY COUNCIL FOR VOCATIONAL EDUCATION, JUNEAU.
VT 012 493 391
1970 ANNUAL EVALUATION REPORT TO THE STATE BOARD FOR VOCATIONAL AND TECHNICAL EDUCATION.

ALASKA UNIV., FAIRBANKS. INSTITUTE OF SOCIAL, ECONOMIC AND GOVERNMENT RESEARCH.
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.

PAGE

ALBUQUERQUE TECHNICAL-VOCATIONAL INST., N. MEX.
VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.
VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.

ALEXANDER, AARON C.
VT 013 748 ED 055 166 411
A SUMMARY OF THE TYPES OF "PARAPROFESSIONAL TRAINING" PROVIDED BY JUNIOR AND SENIOR COLLEGES AND UNIVERSITIES IN THE AREAS OF HEALTH, EDUCATION, AND WELFARE DURING ACADEMIC YEAR 1970-1971.

ALGER, LEON JOHN, JR.
VT 014 076 ED 055 236 453
A RATIONALE FOR THE ESTABLISHMENT OF AREA VOCATIONAL EDUCATION PROGRAMS IN MICHIGAN.

ALMEN, ROY E.
VT 014 071 ED 056 191 452
THE EVALUATION OF A VOCATIONAL PROGRAM FOR DROPOUT-PRONE JUNIOR HIGH SCHOOL STUDENTS.

ALTENDERFER, MARION E.
VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.

AMERICAN ASSOCIATION OF JUNIOR COLLEGES, WASHINGTON, D.C.
VT 013 731 ED 054 362 409
AGRICULTURE AND NATURAL RESOURCES POSTSECONDARY PROGRAMS.

AMERICAN ASSOCIATION OF STATE COLL. AND UNIV., WASHINGTON, D.C.
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.

AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION, WASHINGTON, D.C.
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.

SUBJECT AND IDENTIFIER INDEX

	PAGE	PAGE
0		
YOUTH PROGRAMS		
VT 014 249 ED 057 212 YOUTH RESOURCES MANUAL FOR COORDINATORS.	474	

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

AMERICAN DEVELOPMENT AND PROGRAM ASSISTANCE CORP., BOCA RATON, FLA.
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.

AMERICAN DIETETIC ASSOCIATION, CHICAGO, ILL., COMMUNITY NUTRITION SECTION.
VT 013 273 ED 055 156 395
GUIDELINES FOR DIETITIANS AND PUBLIC HEALTH NUTRITIONISTS IN HOME HEALTH SERVICES.

AMERICAN HOSPITAL ASSOCIATION, CHICAGO, ILL.
VT 014 099 ED 056 200 457
CAREER MOBILITY: A GUIDE FOR PROGRAM PLANNING IN HEALTH OCCUPATIONS, AND CAREER MOBILITY PROFILES.
VT 014 145 ED 056 209 465
JOB DESCRIPTIONS AND ORGANIZATIONAL ANALYSIS FOR HOSPITALS AND RELATED HEALTH SERVICES.

AMERICAN INDUSTRIAL ARTS ASSOCIATION, WASHINGTON, D.C.
VT 014 358 ED 057 237 479
MAN--SOCIETY--TECHNOLOGY.
VT 014 360 ED 057 239 479
NEW CONCEPTS IN INDUSTRIAL ARTS.

AMERICAN VOCATIONAL ASSOCIATION, WASHINGTON, D.C.
VT 013 954 ED 056 177 439
VOCATIONAL EDUCATION AND SELF-EVALUATION.

ANALYTIC SYSTEMS, INC., VIENNA, VA.
VT 013 394 ED 054 341 399
ANALYSIS OF WIN PROGRAM AUTOMATED TERMINATION DATA.

ANDREWS, EARL RAYMOND
VT 013 936 ED 055 213 437
THE STATUS OF AND NEED FOR VOCATIONAL-INDUSTRIAL EDUCATION IN JEFFERSON COUNTY MISSOURI.

ARIZONA STATE DEPT. OF VOCATIONAL EDUCATION, PHOENIX. DIV. OF HOME ECONOMICS EDUCATION.
VT 013 988 ED 056 180 446
OBSERVATION OF CHILDREN IN A HOME ECONOMICS PROGRAM.

ARIZONA STATE UNIV., TEMPE.
VT 014 106 ED 055 243 459
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE V.

ARKANSAS ENTERPRISES FOR THE BLIND, INC., LITTLE ROCK.
VT 010 928 ED 054 326 387
THE DEVELOPMENT OF A SYLLABUS FOR INSTRUCTION OF COMMUNICATIVE SKILLS IN A REHABILITATION CENTER FOR THE BLIND. FINAL REPORT.

BAILEY, LARRY JOE
VT 013 796 ED 055 183 421
AN INVESTIGATION OF THE VOCATIONAL BEHAVIOR OF SELECTED WOMEN VOCATIONAL EDUCATION STUDENTS.

BARRETT, GERALD V., AND OTHERS
VT 014 092 ED 056 197 456
INDUSTRIAL PSYCHOLOGY IN THE SEVENTIES AND BEYOND.

BARTEL, CARL R.
VT 014 106 ED 055 243 459
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE V.

BENDER, RALPH E.
VT 013 830 426
THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO.
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.
VT 013 869 ED 054 380 429
GUIDELINES FOR THE DEVELOPMENT OF STUDENT ORGANIZATIONS ASSOCIATED WITH AGRICULTURAL PROGRAMS AT TWO-YEAR, POST-SECONDARY EDUCATIONAL INSTITUTIONS IN THE UNITED STATES. RESEARCH REPORT.

BERKEBILE, LONNIE A.
VT 014 134 ED 055 252 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENT COLLECTIONS: A FINAL REPORT.
VT 014 135 ED 056 208 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENTS COLLECTIONS: A USER AND INSTALLATION HANDBOOK.

BINNIE, ARTHUR
VT 014 105 ED 055 242 459
IMPROVING OCCUPATIONAL ORIENTATION PROGRAMS FOR JUNIOR HIGH SCHOOL STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VIII.

BISHOP, HAROLD P.
VT 013 823 425
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

BLAKE, DUANE L.
VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.

BLANTON, LLOYD H., AND OTHERS
VT 013 920 ED 056 172 433
OPINION LEADERSHIP AND COMMUNICATION LINKAGES AMONG AGRICULTURAL EDUCATORS.

BOUTWELL, COLEN J., JR.
VT 013 784 ED 055 176 417
EFFECTS OF AUDIO-VISUAL ORDER OF PRESENTATION AND STRENGTH OF GRIP ON MANIPULATIVE TASK PERFORMANCE.

BRANDAU, GEORGE C.
VT 014 100 ED 055 240 457
THE DEVELOPMENT OF INDIVIDUALIZED INSTRUCTION IN VOCATIONAL EDUCATION.

BRENHOLTZ, GERALD SEVERN
VT 014 149 ED 056 211 465
A STUDY TO DETERMINE RELATIONSHIPS BETWEEN VOCATIONAL EDUCATION CURRICULAR EVOLUTION AND SOME ASPECTS OF OCCUPATIONAL EVOLUTION.

BROOME COUNTY TECHNICAL COMMUNITY COLL., BINGHAMTON, N.Y.
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 352 396
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK).

BROWARD COUNTY SCHOOL BOARD, FORT LAUDERDALE, FLA.
VT 013 641 ED 055 158 405
BROWARD COUNTY HOME ECONOMICS CURRICULUM DEVELOPMENT PROJECT, JULY 1, 1967 TO JULY 1, 1970.

BROWN, DONALD V.
VT 013 757 ED 054 364 412
INDUSTRY-EDUCATION COOPERATIVE PROGRAM FOR PRESERVICE AND INSERVICE VOCATIONAL AND TECHNICAL TEACHER TRAINING. FINAL REPORT.

BUDKE, WESLEY EUGENE
VT 012 730 ED 056 165 391
REVIEW AND SYNTHESIS OF INFORMATION ON OCCUPATIONAL EXPLORATION.

BUFFER, JAMES J., AND OTHERS
VT 014 088 ED 054 389 455
A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY CURRICULUM PROJECT: A FINAL EVALUATION OF THE INDUSTRIAL ARTS CURRICULUM PROJECT (IACP), 1965-1971.

PAGE

BUREAU OF ADULT, VOCATIONAL , AND TECHNICAL EDUCATION (DHEW/OE), WASHINGTON, D.C.
VT 013 103 ED 054 334 393
PREVOCATIONAL EXPLORATORY PROGRAMS IN MANPOWER DEVELOPMENT AND TRAINING.

BUREAU OF ADULT, VOCATIONAL, AND TECHNICAL EDUCATION (DHEW/OE), WASHINGTON, D.C. DIV. OF VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 726 ED 055 161 408
STATE ADVISORY COUNCILS ON VOCATIONAL EDUCATION; A GUIDE FOR IMPLEMENTING RULES AND REGULATIONS.
VT 014 073 452
TRENDS IN VOCATIONAL EDUCATION: ENROLLMENTS, EXPENDITURES, AND TEACHERS.

BUREAU OF ADULT, VOCATIONAL, AND TECHNICAL EDUCATION (DHEW/OE), WASHINGTON, D.C. SECONDARY PROGRAMS BRANCH.
VT 014 077 ED 056 192 454
CHARACTERISTICS OF QUALITY VOCATIONAL-TECHNICAL EDUCATION PROGRAMS.

BUREAU OF LABOR STATISTICS (DOL), NEW YORK, N.Y. MIDDLE ATLANTIC REGIONAL OFFICE.
VT 013 763 413
PROJECTIONS: 1980. THE MANPOWER POSTURE OF THE NATION IN THE 1970'S.

BUREAU OF LABOR STATISTICS (DOL), WASHINGTON, D.C.
VT 010 438 ED 054 297 377
MANPOWER REQUIREMENTS IN OCCUPATIONS FOR WHICH VOCATIONAL EDUCATION PREPARES WORKERS.
VT 013 996 ED 055 228 447
PROCEEDINGS OF NORTH AMERICAN CONFERENCE ON LABOR STATISTIC.

BUREAU OF LABOR STATISTICS (DOL), WASHINGTON, D.C. DIV. OF MANPOWER AND OCCUPATIONAL OUTLOOK.
VT 014 005 ED 056 185 448
OCCUPATIONAL MANPOWER AND TRAINING NEEDS; INFORMATION FOR PLANNING TRAINING PROGRAMS FOR THE 1970'S.

CALIFORNIA COMMUNITY COLLEGES, SACRAMENTO.
VT 014 448 482
AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

CALIFORNIA COMMUNITY COLLEGES, SACRAMENTO. DIV. OF VOCATIONAL EDUCATION.
VT 014 452 483
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

CALIFORNIA STATE ADVISORY COUNCIL ON VOCATIONAL EDUCATION AND TECHNICAL TRAINING, SACRAMENTO.
VT 012 930 ED 054 333 392
ASSESSMENT OF THE CURRENT STATUS OF REGIONAL OCCUPATIONAL CENTERS AND REGIONAL OCCUPATIONAL PROGRAMS.

CALIFORNIA STATE DEPT. OF PUBLIC HEALTH, BERKELEY.
VT 013 957 440
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.

CALIFORNIA UNIV., BERKELEY.
VT 010 786 ED 054 301 379
SOCIOLOGICAL ASPECTS OF SELF-EMPLOYMENT AND SOCIAL WELFARE AMONG CHINESE, JAPANESE, AND NEGROES IN NORTHERN, URBAN AREAS OF THE UNITED STATES, 1900-1940.

CALIFORNIA UNIV., DAVIS. DEPT. OF APPLIED BEHAVIORAL SCIENCES.
VT 014 377 480
EDUCATION IN AGRICULTURE IN CALIFORNIA (OCCUPATIONAL NEEDS AND FUTURE DEMANDS).
VT 014 378 ED 057 241 481
THE DETERMINATION OF PROPER ALLOCATION OF FUNCTIONS AND RESPONSIBILITIES OF INSTITUTIONS PROVIDING EDUCATION IN AGRICULTURE.

CALIFORNIA UNIV., IRVINE. GRADUATE SCHOOL OF ADMINISTRATION.
VT 013 883 ED 055 201 430
WORK AND NON-WORK: INSTITUTIONAL PERSPECTIVES.
VT 014 266 475
CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD.

CALIFORNIA UNIV., LOS ANGELES. DIV. OF VOCATIONAL EDUCATION.
VT 013 681 ED 054 355 405
ANNOTATED REFERENCES ON: ENGINEERING MAINTENANCE, SANITATION PUBLIC HEALTH, SANITATION HEALTH CARE FACILITY, HOUSEKEEPING, AND PURCHASING.

PAGE

CALIFORNIA UNIV., SANTA BARBARA. DEPT. OF ECONOMICS.
VT 014 072 ED 055 234 452
THE CHARACTERISTICS, EDUCATION AND EARNINGS OF TECHNICIANS.

CARPENTER, FRANK ROBERT
VT 013 965 ED 056 178 442
A STUDY OF THE RELATIONSHIP BETWEEN SELECTED EDUCATIONAL EXPERIENCES OF VOCATIONAL AGRICULTURE STUDENTS AND THEIR ENROLLING IN A COLLEGE OF AGRICULTURE.

CARROLL, STEPHEN J.
VT 013 492 ED 054 349 402
YOUTH AND WORK: TOWARD A MODEL OF LIFETIME ECONOMIC PROSPECTS.
VT 014 096 457
A STOCHASTIC MODEL OF DISCRIMINATION IN THE LABOR MARKET.
VT 014 179 468
PART-TIME EXPERIENCE AND THE TRANSITION FROM SCHOOL TO WORK.

CENTER FOR EDUCATIONAL FIELD SERVICES, DURHAM, N.H.
VT 014 421 482
FALL MOUNTAIN LONG-RANGE PLANNING PROJECT.

CENTER FOR NAVAL ANALYSES, ARLINGTON, VA.
VT 013 927 435
ANALYSES OF SELECTION AND PERFORMANCE MEASURES FOR CNA SUPPORT PERSONNEL.

CHAMPAGNE, JOSEPH E.
VT 010 508 ED 054 298 378
TEENAGE EMPLOYMENT: A STUDY OF LOW INCOME YOUTH IN HOUSTON, TEXAS.

CHAPLIN, DAVID
VT 014 093 ED 056 198 456
PRIVATE HOUSEHOLD EMPLOYMENT IN THE UNITED STATES; AN EXPLORATORY PROJECT.

CHARNES, A., AND OTHERS
VT 013 914 ED 055 206 432
MATHEMATICAL MODELS FOR MANPOWER AND PERSONNEL PLANNING, RESEARCH REPORT.

CICCONI, VINCENT A.
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.

CITY UNIV. OF NEW YORK, N.Y. DIV. OF TEACHER EDUCATION.
VT 014 064 451
EFFECTS OF PROGRAMED VERSUS CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

CITY UNIV. OF NEW YORK, N.Y. OFFICE OF COMMUNITY COLL. AFFAIRS.
VT 014 451 483
CAREER GRADUATES: A PROFILE OF JOB EXPERIENCE AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES.

CIVIL SERVICE COMMISSION, WASHINGTON, D.C. BUREAU OF TRAINING.
VT 013 706 ED 054 356 406
AGENCY TRAINING CENTERS FOR GOVERNMENT EMPLOYEES.
VT 013 759 ED 054 365 412
TRAINING EVALUATION: A GUIDE TO ITS PLANNING, DEVELOPMENT, AND USE IN AGENCY TRAINING COURSES. TRAINING SYSTEMS AND TECHNOLOGY SERIES 4.

CLARK, FRANCIS EUGENE
VT 013 785 ED 057 187 418
EFFECTS OF TWO LEARNING TREATMENTS ON THE UNDERSTANDING OF ORTHOGRAPHIC PROJECTION BY STUDENTS VARYING IN VISUAL-HAPTIC APTITUDE.

COATES, SUE STRINGER
VT 013 778 ED 057 185 416
COLLEGE-LEVEL EDUCATION IN RETAILING: A COMPARISON OF PERCEPTIONS OF RETAIL EMPLOYMENT EXECUTIVES AND RETAIL EDUCATORS.

COBURN, JAMES MINTON
VT 013 886 ED 055 202 431
A MODEL (FORMULA) FOR DERIVING A HAZARD INDEX OF RAIL-HIGHWAY GRADE CROSSINGS.

COHEN, BERNARD
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.

COLEMAN, JAY MARIO
VT 013 838 ED 055 195 427
THE CURRENT STATUS AND POSSIBLE TRENDS IN TEACHING INDUSTRIAL ARTS WOOD INFORMATION AT TEACHER EDUCATION INSTITUTIONS.

COLGAN, FRANCIS EUGENE
VT 014 023 ED 055 233 451
A VOCATIONAL AND TECHNICAL PURVIEW FOR EDUCATIONAL ADMINISTRATORS.

COLORADO STATE ADVISORY COUNCIL ON VOCATIONAL EDUCATION, DENVER.
VT 012 492 391
FIRST ANNUAL REPORT OF THE STATE ADVISORY COUNCIL FOR VOCATIONAL EDUCATION IN COLORADO.

PAGE

COLORADO STATE UNIV., FT. COLLINS. DEPT. OF VOCATIONAL EDUCATION.
VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.
VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.
VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.

COMER, JOHN C.
VT 014 168 ED 056 219 467
A DIAGNOSTIC WORK SAMPLE INSTRUMENT FOR ASSESSING AUTOMOTIVE TRADE COMPETENCE.

COMM, WALTER
VT 013 964 ED 055 221 441
A HISTORIAL ANALYSIS OF VOCATIONAL EDUCATION: LAND-GRANT COLLEGES TO CALIFORNIA JUNIOR COLLEGES, 1862-1940.

COMMINS, WILLIAM D.
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.

CONFERENCE BOARD, INC., NEW YORK, N.Y.
VT 013 952 ED 055 216 439
MANPOWER PLANNING: EVOLVING SYSTEMS.

CONGRESS OF THE U.S., WASHINGTON, D.C. HOUSE.
VT 013 909 ED 055 205 432
LAWS RELATING TO VOCATIONAL EDUCATION AND AGRICULTURAL EXTENSION WORK.

CONNELLY, MARILEE N.
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).

COPLEY, GENROSE, COMP.
VT 013 764 413
SELECTED TRAINING PROGRAMS FOR PHYSICIAN SUPPORT PERSONNEL.

COSTER, JOHN K., AND OTHERS
VT 013 972 ED 055 224 443
A MODEL FOR EDUCATIONAL PROFICIENCY.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

COURTNEY, E. WAYNE
VT 013 609 404
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.

COX, STEVEN GRAHN
VT 013 929 ED 055 209 435
A STUDY OF RELATIONSHIPS BETWEEN STUDENT SCORES ON VARIOUS PREDICTOR MEASURES AND VOCATIONAL SUCCESS OF STUDENTS WHO WERE FOLLOWED UP ONE AND FIVE YEARS FOLLOWING TRAINING IN SELECTED PRIVATE TRADE, TECHNICAL, AND BUSINESS SCHOOLS.

CRAFT, RICHARD H.P.
VT 014 222 ED 056 235 472
PERSPECTIVES ON PROGRESS: CAREER EDUCATION IN FLORIDA; STATEWIDE EVALUATION OF VOCATIONAL-TECHNICAL EDUCATION 1970-1971.

CROSS, ALEENE A., AND OTHERS
VT 013 974 ED 054 386 444
EVALUATION OF VOCATIONAL HOME ECONOMICS PROGRAMS IN TERMS OF THE EFFECTIVENESS OF FULL-TIME HOMEMAKERS AND HOMEMAKERS WHO ARE ALSO FULL TIME EMPLOYEES. FINAL REPORT.

CROWLEY, MICHAEL F.
VT 014 005 ED 056 185 448
OCCUPATIONAL MANPOWER AND TRAINING NEEDS; INFORMATION FOR PLANNING TRAINING PROGRAMS FOR THE 1970'S.

D'COSTA, AYRES G.J.E.
VT 013 935 ED 056 173 437
THE DIFFERENTIATION OF HIGH SCHOOL STUDENTS IN VOCATIONAL EDUCATION AREAS BY THE OHIO VOCATIONAL INTEREST SURVEY.

DAVIS, EARL E.
VT 010 818 ED 054 307 380
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME I: FINAL REPORT.
VT 010 819 ED 054 308 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME II: TECHNICAL APPENDIX A, TABLES.
VT 010 820 ED 054 309 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME III, PART 1 AND PART 2: APPENDICES B 1-5.

DAVIS, J. CLARK
VT 014 104 ED 055 241 458
IMPROVING PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VI.

DAVIS, REBA JONES
VT 013 976 444
THE RELATION BETWEEN NUTRITION KNOWLEDGE AND THE DIETARY INTAKE OF SELECTED WOMEN: A BASIS FOR ADULT EDUCATION PROGRAM DEVELOPMENT.

DAVISON, MILDRED
VT 014 451 483
CAREER GRADUATES: A PROFILE OF JOB EXPERIENCE AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES.

DEAN, ERNEST H.
VT 013 930 ED 054 382 435
A STUDY OF VOCATIONAL EDUCATION AS A FACTOR IN SELECTING A COMMUNITY FOR A MANUFACTURING PLANT SITE.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, WASHINGTON, D.C.
VT 013 748 ED 055 166 411
A SUMMARY OF THE TYPES OF "PARAPROFESSIONAL TRAINING" PROVIDED BY JUNIOR AND SENIOR COLLEGES AND UNIVERSITIES IN THE AREAS OF HEALTH, EDUCATION, AND WELFARE DURING ACADEMIC YEAR 1970-1971.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, WASHINGTON, D.C. OFFICE OF THE COMMISSIONER OF EDUCATION.
VT 013 234 ED 050 295 395
CAREER EDUCATION--MORE THAN A NAME.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, WASHINGTON, D.C. OFFICE OF THE SECRETARY.
VT 013 765 413
NEW CAREERS.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, WASHINGTON, D.C. OFFICE OF INTERNATIONAL AFFAIRS.
VT 014 214 471
FOREIGN EXPERIENCE IN PROVIDING WINTER JOBS IN THE CONSTRUCTION INDUSTRY.

DEPARTMENT OF LABOR, WASHINGTON, D.C.
VT 008 010 ED 054 293 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

VT 008 011 ED 054 294 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY. APPENDIX.

DEPARTMENT OF LABOR, WASHINGTON, D.C. DIV. OF CHILD SAFETY.
VT 013 946 438
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM.

DEPARTMENT OF LABOR, WASHINGTON, D.C. LIBRARY.
VT 013 741 ED 054 363 410
COST-BENEFIT ANALYSIS: THEORY AND APPLICATION TO MANPOWER TRAINING PROGRAMS. A BIBLIOGRAPHY.

DEPARTMENT OF LABOR, WASHINGTON, D.C. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.
VT 014 254 ED 057 215 474
PLANNING FOR SAFETY ON THE JOBSITE.

DEPARTMENT OF LABOR, WASHINGTON, D.C. WAGE AND HOUR DIV.
VT 013 841 ED 055 197 428
WORKING CHILDREN: A REPORT ON CHILD LABOR.

DEPARTMENT OF THE AIR FORCE, WASHINGTON, D.C.
VT 013 874 429
AEROMEDICAL EVACUATION TECHNICIAN GUIDE.

DEPARTMENT OF TRANSPORTATION, WASHINGTON, D.C.
VT 014 000 ED 055 229 447
AGRICULTURAL TRACTOR SAFETY ON PUBLIC ROADS AND FARMS.
VT 014 219 472
TECHNICAL TRAINING STUDY.

DEPARTMENT OF TRANSPORTATION, WASHINGTON, D.C. NATIONAL HIGHWAY SAFETY BUREAU.
VT 013 882 ED 055 200 430
NHSB THESAURUS OF TRAFFIC AND MOTOR VEHICLE SAFETY TERMS; A SUPPLEMENT TO HIGHWAY SAFETY LITERATURE.

DOUGLASS, STEPHEN A.
VT 013 779 ED 054 371 416
STATUS OF NON-CREDIT ADULT EDUCATION IN THE COMMUNITY COLLEGES OF THE NORTH CENTRAL ACCREDITING REGION.

DUBIN, ROBERT
VT 013 883 ED 055 201 430
WORK AND NON-WORK: INSTITUTIONAL PERSPECTIVES.

PAGE

DUIS, HAROLD F., COMP.
VT 014 073 452
TRENDS IN VOCATIONAL EDUCATION: ENROLLMENTS, EXPENDITURES, AND TEACHERS.

DUNN, DOROTHY F.
VT 013 984 ED 054 387 445
SURVEY FOR COMPARISON OF EFFECTIVENESS OF HOME MANAGEMENT WITH RESIDENCY VERSUS HOME MANAGEMENT WITHOUT RESIDENCY LABORATORY, 1966-1968. FINAL REPORT.
VT 013 985 ED 054 388 445
A SURVEY OF TRAINING NEEDS AND INTERNSHIPS FOR NON-TEACHING POSITIONS IN HOME ECONOMICS. FINAL REPORT.

EASTERN ILLINOIS UNIV., CHARLESTON. CENTER FOR EDUCATIONAL STUDIES.
VT 013 973 ED 055 225 444
THE OCCUPAC PROJECT (A PROJECT TO DEVELOP OCCUPATIONAL INFORMATION LEARNING ACTIVITY PACKAGES FOR GRADES K-9). FINAL REPORT.

EASTERN KENTUCKY UNIV., RICHMOND.
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.

EASTERN WASHINGTON STATE COLL., CHENEY.
VT 013 808 ED 054 377 423
THE PROFESSIONAL INTERNSHIP EXCHANGE PROGRAM IN VOCATIONAL EDUCATION, 1970-1971.

ECONOMIC DEVELOPMENT ADMINISTRATION (DOC), WASHINGTON, D.C.
VT 013 717 ED 054 360 407
JOBS FOR AMERICA. ANNUAL REPORT FISCAL 1970.

ECONOMIC RESEARCH SERVICE (DOA), WASHINGTON, D.C.
VT 010 962 ED 054 327 389
POTENTIAL MECHANIZATION IN THE FLUE-CURED TOBACCO INDUSTRY--WITH EMPHASIS ON HUMAN RESOURCE ADJUSTMENT.

EDISON TOWNSHIP BOARD OF EDUCATION, N.J.
VT 013 772 ED 055 172 414
CONSUMER EDUCATION: AN INTERDISCIPLINARY APPROACH.

EDWARDS, LEONARD D.
VT 013 780 ED 055 173 417
AN EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM AT BLACK HILLS STATE COLLEGE BY THE GRADUATES.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

EICHER, ROBERT STANLEY
VT 013 794 ED 055 181 421
ADMINISTRATIVE PATTERN FOR PUBLIC POST SECONDARY VOCATIONAL TECHNICAL EDUCATION IN NEBRASKA.

ELLIS, WILLIE THOMAS, SR.
VT 013 793 ED 055 180 421
THE ADOPTION OF EDUCATIONAL INNOVATIONS AMONG EXPERIENCED TEACHERS OF VOCATIONAL AGRICULTURE IN PREDOMINANTLY NEGRO SCHOOLS IN NORTH CAROLINA.

ESPANOLA MUNICIPAL SCHOOLS, N. MEX. JOHN F. KENNEDY JUNIOR HIGH SCHOOL.
VT 012 163 390
PRE-VOCATION PROGRAM.

EVERSOLL, ROBERT I.
VT 013 776 ED 054 369 415
THE EFFECT OF OCCUPATIONAL INFORMATION UPON SECONDARY SCHOOL YOUTH WITH VARYING INTERESTS REGARDING A TEACHING CAREER IN THE FIELD OF INDUSTRIAL ARTS.

FANE, XENIA F.
VT 013 555 ED 054 350 402
NEW DIRECTIONS FOR VOCATIONAL HOME ECONOMICS.

FERMAN, LOUIS A.
VT 010 787 ED 054 302 379
COMMUNITY ORGANIZATION AND THE MOBILIZATION OF RESOURCES FOR MANPOWER DEVELOPMENT PROGRAMS.

FINCH, CURTIS R.
VT 013 896 ED 055 204 431
TROUBLESHOOTING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION VIA DYNAMIC SIMULATION.
VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.

FINDLEY, WILLIAM LOUIS
VT 014 020 ED 056 189 450
A FOLLOW-UP OF THE FINANCIAL ASSETS AND LIABILITIES OF MENTALLY RETARDED YOUTH AS RELATED TO THE COST OF VOCATIONAL TRAINING IN FOUR PUBLIC SCHOOL SYSTEMS.

FLEMISTER, IDA MORRIS
VT 014 022 ED 055 232 451
THE EFFECT ON SELF CONCEPT OF THE CHATTANOOGA NEIGHBORHOOD YOUTH CORPS AND OF EDUCATION, VOCATIONAL ASPIRATION, AND SEX ROLE.

PAGE

FLORIDA STATE UNIV., TALLAHASSEE. DEPT. OF EDUCATIONAL ADMINISTRATION.
VT 014 222 ED 056 235 472
PERSPECTIVES ON PROGRESS: CAREER EDUCATION IN FLORIDA; STATEWIDE EVALUATION OF VOCATIONAL-TECHNICAL EDUCATION 1970-1971.

FLORIDA STATE UNIV., TALLAHASSEE. DEPT. OF VOCATIONAL EDUCATION.
VT 014 348 478
SELECTED APPROACHES IN VOCATIONAL EDUCATION.

FORSSLUND-LJUNGHILL, LENA
VT 014 166 467
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.

FOSTER, HOWARD GEORGE
VT 014 313 477
LABOR SUPPLY IN THE CONSTRUCTION INDUSTRY: A CASE STUDY OF UPSTATE NEW YORK.

FOUNTAIN HOUSE FOUNDATION, INC., NEW YORK, N.Y.
VT 010 932 ED 056 159 387
AN EVALUATION OF REHABILITATION SERVICES AND THE ROLE OF INDUSTRY IN THE COMMUNITY ADJUSTMENT OF PSYCHIATRIC PATIENTS FOLLOWING HOSPITALIZATION. FINAL REPORT.

GAY, EVAN G., AND OTHERS
VT 014 133 ED 057 199 464
MANUAL FOR THE MINNESOTA IMPORTANCE QUESTIONNAIRE. MINNESOTA STUDIES IN VOCATIONAL REHABILITATION.

GEARHART, J. WALTER, AND OTHERS
VT 013 843 428
AN ANALYSIS OF THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS.

GEBHART, RICHARD H.
VT 013 788 ED 054 372 419
A COMPARISON OF TWO APPROACHES TO DEVELOPING AN UNDERSTANDING OF INDUSTRIAL ENTERPRISE AT THE EIGHTH GRADE LEVEL.

GEORGIA UNIV., ATHENS. COLL. OF EDUCATION.
VT 013 974 ED 054 386 444
EVALUATION OF VOCATIONAL HOME ECONOMICS PROGRAMS IN TERMS OF THE EFFECTIVENESS OF FULL-TIME HOMEMAKERS AND HOMEMAKERS WHO ARE ALSO FULL TIME EMPLOYEES. FINAL REPORT.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

GETELES, FRANCES, AND OTHERS
VT 013 437 ED 054 344 401
A COOPERATIVE VOCATIONAL PATTERN FOR IN-SCHOOL MENTALLY RETARDED YOUTH.

GIBSON, J.N., AND OTHERS
VT 010 943 388
THE TACOMA PUBLIC SCHOOLS-DIVISION OF VOCATIONAL REHABILITATION. COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS.

GILLIE, ANGELO C.
VT 012 725 ED 054 331 391
EMPLOYMENT CHARACTERISTICS OF THE PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE GRADUATES.
VT 013 460 ED 054 346 401
PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE TECHNICIAN GRADUATES: SOME DEMOGRAPHIC VARIABLES.
VT 013 461 ED 054 347 401
ASSOCIATE DEGREE TECHNICIANS' JUDGMENTS ON QUALITY OF INSTRUCTION AND COURSE RELEVANCY.

GILLILAND, HUGH RONALD
VT 013 960 ED 055 218 440
ATTITUDES OF SLUM DWELLERS AND SUBURBANITES TOWARD BLUE-COLLAR OCCUPATIONS AND VOCATIONAL EDUCATION.

GINZBERG, ELI
VT 013 324 396
MANPOWER IN ISRAEL. (FIFTH REPORT).

GLEASON, WILLIAM EARL
VT 014 075 ED 055 235 453
FUNCTIONS OF INDUSTRY APPROACH TO CURRICULUM FOR VOCATIONAL EDUCATION.

GREATER WASHINGTON CENTRAL LABOR COUNCIL, WASHINGTON, D.C. AFL-CIO.
VT 014 305 476
PROJECT BUILD: PREPARING DISADVANTAGED YOUTH FOR APPRENTICABLE CONSTRUCTION TRADES.

GREEN RIVER COMMUNITY COLL., AUBURN, WASH.
VT 014 105 ED 055 242 459
IMPROVING OCCUPATIONAL ORIENTATION PROGRAMS FOR JUNIOR HIGH SCHOOL STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VIII.

GUTCHER, G. DALE
VT 014 113 ED 056 202 462
NEW VOCATIONAL EDUCATION CONCEPTS AND PROGRAMS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE I.

PAGE

HALFIN, HAROLD H
VT 013 609 404
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.

HANSEN, NILES M.
VT 010 790 ED 054 304 380
URBAN AND REGIONAL DIMENSIONS OF MANPOWER POLICY.

HARRINGTON, JACKIE T.
VT 013 711 ED 054 358 406
FACTORS RELATED TO VOCATIONAL CHOICES OF AGRICULTURAL EDUCATION STUDENTS.

HARVARD UNIV., CAMBRIDGE, MASS.
VT 010 796 ED 054 305 380
CONCEPTS AND MEASUREMENTS FOR MANPOWER AND OCCUPATIONAL ANALYSIS.

HARVARD UNIV., CAMBRIDGE, MASS. GRADUATE SCHOOL OF EDUCATION.
VT 013 232 ED 050 293 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME I.
VT 013 233 ED 050 294 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME 2.

HARWOOD, EDWIN
VT 010 788 ED 054 303 379
HOUSTON'S OUT-OF-SCHOOL NEIGHBORHOOD YOUTH CORPS: A COMPARATIVE OBSERVATIONAL STUDY OF THE NYC'S IMPACT ON THE WORK ATTITUDES AND JOB FUTURES OF POVERTY YOUTHS.

HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION (DHEW), BETHESDA, MD. COMMUNITY HEALTH SERVICES.
VT 013 459 ED 054 345 401
THE USE OF HEALTH AIDES IN MIGRANT HEALTH PROJECTS.

HEINZEL, JOSEPH R.
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.

HENDERSON, GREGORY
VT 013 704 405
THE EMIGRATION OF HIGHLY-SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

HIEBERT, DON
VT 014 074 453
A HANDBOOK OF COOPERATIVE PROGRAMS FOR OKLAHOMA VOCATIONAL AND TECHNICAL EDUCATION.

HILL, CLAIR S.
VT 013 777 ED 054 370 415
COMPARATIVE EFFECTIVENESS OF TWO STRATEGIES OF COMPUTER-ASSISTED INSTRUCTION FOR TEACHING ORTHOGRAPHIC PROJECTIONS.

HILL, J. M. M.
VT 013 806 ED 054 376 422
THE TRANSITION FROM SCHOOL TO WORK; A STUDY OF THE CHILD'S CHANGING PERCEPTION OF WORK FROM THE AGE OF SEVEN.

HIRSHFELD, MARVIN
VT 014 103 ED 056 201 458
UPDATING THE PROCESS AND CONTENT OF TEACHER EDUCATION CURRICULUMS TO REACH DISADVANTAGED YOUTH IN METROPOLITAN AREAS. FINAL REPORT, VOLUME IX.

HOFF, WILBUR
VT 013 459 ED 054 345 401
THE USE OF HEALTH AIDES IN MIGRANT HEALTH PROJECTS.

HOLAHAN, JOHN F.
VT 013 090 393
A BENEFIT-COST ANALYSIS OF PROJECT CROSSROADS.

HOUSTON UNIV., TEX.
VT 010 508 ED 054 298 378
TEENAGE EMPLOYMENT: A STUDY OF LOW INCOME YOUTH IN HOUSTON, TEXAS.

HOWENSTINE, E. JAY
VT 014 214 471
FOREIGN EXPERIENCE IN PROVIDING WINTER JOBS IN THE CONSTRUCTION INDUSTRY.

HUFFMAN, HARRY, AND OTHERS
VT 013 921 ED 055 207 434
MODIFYING DISADVANTAGED STUDENTS' PERCEPTIONS OF OFFICE WORK.

HUMAN RESOURCES ADMINISTRATION, NEW YORK, N.Y. YOUTH SERVICES AGENCY.
VT 014 331 ED 057 230 478
ESOPUS PREP. A RESIDENTIAL SCHOOL FOR SERIOUS DISADVANTAGED YOUTH.

HUMAN RESOURCES RESEARCH ORGANIZATION, ALEXANDRIA, VA.
VT 013 823 425
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.

PAGE

HUMANIC DESIGNS CORP., MANHASSET, N.Y.
VT 013 733 ED 055 164 410
A HANDBOOK FOR UPGRADING LOW-SKILL WORKERS.

HUNT, ISAAC C., JR.
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.

HURLEY, CARL EDWARD
VT 013 789 ED 054 373 419
THE EFFECTS OF FEEDBACK ON PSYCHOMOTOR PERFORMANCE OF FOURTH AND SIXTH GRADE STUDENTS.

HUSUNG, WILLIAM T., JR.
VT 014 452 483
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.

HYDE, ELDON KEITH
VT 014 230 ED 057 209 473
SCHOOL GUIDANCE COUNSELORS' PERCEPTIONS OF POSTSECONDARY VOCATIONAL AND TECHNICAL EDUCATION AND FACTORS THAT CONTRIBUTE TO THESE PERCEPTIONS.

ILLINOIS RESEARCH AND DEVELOPMENT UNIT, SPRINGFIELD.
VT 013 762 412
RESEARCH, DEVELOPMENTAL AND EXEMPLARY ACTIVITIES IN VOCATIONAL AND TECHNICAL EDUCATION.

ILLINOIS STATE DEPT. OF LABOR, CHICAGO, ILL. HUMAN SERVICES MANPOWER CAREER CENTER.
VT 013 411 ED 054 342 400
NEIGHBORHOOD-BASED CHILD CARE SERVICES FOR THE INNER CITY: A SERVICE MODEL, A STAFFING PLAN AND A PROGRAM IMPLEMENTATION STRATEGY.

ILLINOIS UNIV., URBANA. DEPT. OF VOCATIONAL AND TECHNICAL EDUCATION.
VT 014 167 ED 056 218 467
GUIDELINES FOR HEALTH OCCUPATIONS EDUCATION PROGRAMS.

ILLINOIS UNIV., URBANA. DIV. OF AGRICULTURAL EDUCATION.
VT 014 069 451
DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE.

IMPELLITTERI, JOSEPH T.
VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

VT 014 080 ED 055 237 454
A LONGITUDINAL STUDY OF VOCATIONAL DEVELOPMENT: IMPLICATIONS FOR VOCATIONAL EDUCATION AND GUIDANCE.

INDIANA MANPOWER RESEARCH ASSOCIATION, INDIANAPOLIS.
VT 009 637 ED 056 208 377
INVENTORY OF MANPOWER RESEARCH PROJECTS IN INDIANA. REPORT NO. 4.

INDIANA STATE EMPLOYMENT SECURITY DIV., INDIANAPOLIS.
VT 009 637 ED 056 208 377
INVENTORY OF MANPOWER RESEARCH PROJECTS IN INDIANA. REPORT NO. 4.

INSTITUTE FOR HEALTH RESEARCH, BERKELEY, CALIF.
VT 013 957 440
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.

INSTITUTE OF PUBLIC ADMINISTRATION, NEW YORK, N.Y.
VT 014 252 ED 057 214 474
TIPP (TRAINING INCENTIVE PAYMENTS PROGRAM); A REPORT ON FIRST YEAR'S OPERATIONS.

INTERNATIONAL LABOUR ORGANISATION, GENEVA (SWITZERLAND).
VT 013 744 411
REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER.

IOWA STATE EMPLOYMENT SECURITY COMMISSION, DES MOINES.
VT 013 815 ED 055 188 424
BREAKTHROUGH IN RURAL MANPOWER SERVICES.

IOWA STATE MANPOWER DEVELOPMENT COUNCIL, DES MOINES.
VT 014 295 476
MANPOWER DEVELOPMENT COUNCIL: THE DEVELOPMENT OF A COMPREHENSIVE SYSTEM OF HUMAN RESOURCE DEVELOPMENT FOR IOWA.

IOWA UNIV., IOWA CITY. DIV. OF HEALTH AFFAIRS.
VT 014 083 454
IOWA HEALTH OCCUPATIONS EDUCATION; FOLLOW-UP STUDY.

ISRAEL STATE MINISTRY OF LABOR, JERUSALEM. MANPOWER PLANNING AUTHORITY.
VT 013 324 396
MANPOWER IN ISRAEL. (FIFTH REPORT).

PAGE

IVERSON, MAYNARD J.
VT 013 869 ED 054 380 429
GUIDELINES FOR THE DEVELOPMENT OF STUDENT ORGANIZATIONS ASSOCIATED WITH AGRICULTURAL PROGRAMS AT TWO-YEAR, POST-SECONDARY EDUCATIONAL INSTITUTIONS IN THE UNITED STATES. RESEARCH REPORT.

JACKSON PUBLIC SCHOOLS, MISS. CENTRAL CITY PROJECT.
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.

JALLADE, JEAN-PIERRE, AND OTHERS
VT 014 085 ED 056 194 455
OCCUPATIONAL AND EDUCATIONAL STRUCTURES OF THE LABOUR FORCE AND LEVELS OF ECONOMIC DEVELOPMENT.

JANECZKO, ROBERT JOHN
VT 013 786 ED 057 188 418
THE EFFECT OF INSTRUCTIONAL OBJECTIVES AND GENERAL OBJECTIVES ON STUDENT SELF-EVALUATION OF PSYCHOMOTOR PERFORMANCE IN POWER MECHANICS.

JOHNS HOPKINS UNIV., BALTIMORE, MD. CENTER FOR THE STUDY OF SOCIAL ORGANIZATION OF SCHOOLS.
VT 014 127 ED 055 250 463
ENTRY INTO THE AMERICAN LABOR FORCE.

JOHNSON, KIRK A.
VT 010 835 ED 057 161 382
RETENTION OF ELECTRONIC FUNDAMENTALS: DIFFERENCES AMONG TOPICS.

JOHNSTON, WILLIAM L.
VT 013 772 ED 055 172 414
CONSUMER EDUCATION: AN INTERDISCIPLINARY APPROACH.

KANAWHA COUNTY BOARD OF EDUCATION, CHARLESTON, W. VA.
VT 014 462 484
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE.

KAPES, JEROME T.
VT 014 080 ED 055 237 454
A LONGITUDINAL STUDY OF VOCATIONAL DEVELOPMENT: IMPLICATIONS FOR VOCATIONAL EDUCATION AND GUIDANCE.
VT 014 081 ED 005 238 454
THE RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS OF NINTH GRADE BOYS AND CURRICULUM SELECTION AND SUCCESS IN TENTH GRADE.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

KATZELL, RAYMOND A., AND OTHERS
VT 014 084 ED 056 193 455
THE JOB ATTITUDES OF WORKERS FROM DIFFERENT ETHNIC BACKGROUNDS.

KAUFMAN, JACOB B.
VT 010 797 ED 054 306 380
UNIVERSITY MANPOWER RESEARCH SEMINAR FOR THE STIMULATION OF PROFESSIONAL RESEARCH INTEREST.

KEHRER, KENNETH C.
VT 002 713 376
HUMAN RESOURCES DEVELOPMENT PLANNING.

KELLER, LOUISE JEAN
VT 013 712 ED 054 359 407
PRINCIPLES FOR VOCATIONAL EDUCATION--VALIDATION OF STATEMENTS OF BELIEFS SELECTED FROM THE LITERATURE AND RESEARCH.

KENNEKE, LARRY J.
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.

KENTUCKY UNIV., LEXINGTON.
VT 010 790 ED 054 304 380
URBAN AND REGIONAL DIMENSIONS OF MANPOWER POLICY.

KENTUCKY UNIV., LEXINGTON. INSTRUCTIONAL MATERIALS LAB.
VT 013 845 ED 055 198 428
EPDA (EDUCATION PROFESSIONS DEVELOPMENT ACT) INSTITUTE LEADERSHIP DEVELOPMENT IN CURRICULUM PLANNING. FINAL REPORT.

KLEINFELD, JUDITH
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.

KOHEN, ANDREW I.
VT 013 209 ED 054 336 394
CAREER THRESHOLDS: A LONGITUDINAL STUDY OF THE EDUCATIONAL AND LABOR MARKET EXPERIENCE OF MALE YOUTH. VOLUME THREE.

KOO, PO-KEN
VT 013 710 ED 054 357 406
A CRITICAL STUDY OF VOCATIONAL-INDUSTRIAL EDUCATION IN TAIWAN.

KOPLYAY, JANOS B.
VT 010 845 ED 054 314 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM: PHASE 1. ANALYSIS OF THE PROMOTION BOARD COMPONENT IN THE WEIGHTED FACTORS SYSTEM.

VT 010 846 ED 054 315 383
FIELD TEST OF THE WEIGHTED AIRMAN PROMOTION SYSTEM. PHASE II. VALIDATION OF THE SYSTEM FOR GRADES E-4 THROUGH E-7.

KOSTERS, MARVIN
VT 014 275 475
THE EFFECTS OF MINIMUM WAGES ON THE DISTRIBUTION OF CHANGES IN AGGREGATE EMPLOYMENT.

KREPEL, WAYNE JEROME
VT 013 963 ED 055 220 441
AN EXAMINATION OF SELECTED SALIENT CORRELATES OF NEBRASKA SCHOOL ADMINISTRATORS AS RELATED TO VOCATIONAL EDUCATION.

LABOR-MANAGEMENT SERVICES ADMINISTRATION (DOL), WASHINGTON, D. C.
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.

LACY, ANNELL
VT 013 835 ED 055 193 427
AN ANALYSIS OF FACTORS THAT AFFECT JOB SATISFACTION OF PUBLIC HIGH SCHOOL BUSINESS TEACHERS IN OHIO.

LAHNE, HERBERT J.
VT 013 635 ED 054 354 404
EXCLUSIVE UNION WORK REFERRAL SYSTEMS IN THE BUILDING TRADES.

LANSVILLE, ANTHONY
VT 010 842 ED 054 311 382
INTERIM QUANTITATIVE MANPOWER PROJECTIONS FOR PROPOSED HYDROGRAPHIC SURVEY SHIP SYSTEM (AGS) CANDIDATE CONFIGURATIONS (NAVSHIPS SUBPROJECT S46-27012, TASK 14408).

LAU, ALAN W.
VT 010 850 ED 054 319 385
AREA SCALES OF THE NAVY VOCATIONAL INTEREST INVENTORY AS PREDICTORS OF SCHOOL PERFORMANCE AND RATING ASSIGNMENT.

LAU, ALAN W., AND OTHERS
VT 010 849 ED 054 318 384
AN ANALYSIS OF THE NAVY VOCATIONAL INTEREST INVENTORY AS A PREDICTOR OF CAREER MOTIVATION.

LAW, GORDON F.
VT 013 818 ED 056 169 425
ADMINISTRATORS' WORKSHOP FOR PROGRAM IMPLEMENTATION: VOCATIONAL EDUCATION OPPORTUNITIES FOR DISADVANTAGED AND HANDICAPPED PERSONS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

LECHTER, KAREN, COMP.
VT 013 764 413
SELECTED TRAINING PROGRAMS FOR PHYSICIAN SUPPORT PERSONNEL.

LEHMANN, ELIZABETH, AND OTHERS
VT 013 993 446
STATLER FOUNDATION PROJECT REPORT, JULY 1970.

LESTER, SEELIG
VT 014 107 ED 055 244 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FINAL REPORT, VOLUME IV.

LEVINE, LOUIS
VT 010 797 ED 054 306 380
UNIVERSITY MANPOWER RESEARCH SEMINAR FOR THE STIMULATION OF PROFESSIONAL RESEARCH INTEREST.

LEWIS, ANNABELLE M.
VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.

LEWIS, WILEY B.
VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.

LIFSON, WILSON, FERGUSON, AND WINICK, INC., DALLAS, TEX.
VT 010 847 ED 054 316 384
A METHOD FOR DETERMINING JOB TYPES FOR LOW APTITUDE AIRMEN.
VT 010 848 ED 054 317 384
THREE STUDIES OF JOB INVENTORY PROCEDURES: SELECTING DUTY CATEGORIES, INTERVIEWING, AND SAMPLING.

LIGHT, IVAN HUBERT
VT 010 786 ED 054 301 379
SOCIOLOGICAL ASPECTS OF SELF-EMPLOYMENT AND SOCIAL WELFARE AMONG CHINESE, JAPANESE, AND NEGROES IN NORTHERN, URBAN AREAS OF THE UNITED STATES, 1900-1940.

LITTLE ROCK PUBLIC SCHOOLS, ARK.
VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.

LOCKE, LEWIS ALVIN
VT 013 887 ED 055 203 431
A LICENSING PROGRAM FOR OPERATORS OF TWO-WHEELED MOTOR VEHICLES.

PAGE

LOCKMAN, ROBERT F.
VT 013 927 435
ANALYSES OF SELECTION AND PERFORMANCE MEASURES FOR CNA SUPPORT PERSONNEL.

LONG, ROBERT CHARLES
VT 013 795 ED 055 182 421
A STUDY TO DETERMINE THE EFFECT OF THE VOCATIONAL EDUCATION ACT OF 1963 UPON BUSINESS TEACHER EDUCATION PROGRAMS IN SELECTED COLLEGES AND UNIVERSITIES.

LOSEE, GARRIE J.
VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.

LOWERY, NELSON W.
VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.
VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.

MAGISOS, JOEL H.
VT 014 134 ED 055 252 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENT COLLECTIONS: A FINAL REPORT.

MAINE UNIV., ORONO.
VT 013 728 ED 055 162 409
INVESTMENT PLANNING IN VOCATIONAL-TECHNICAL EDUCATION. A PILOT STUDY.

MALEC, VERNON M.
VT 010 842 ED 054 311 382
INTERIM QUANTITATIVE MANPOWER PROJECTIONS FOR PROPOSED HYDROGRAPHIC SURVEY SHIP SYSTEM (AGS) CANDIDATE CONFIGURATIONS (NAVSHIPS SUBPROJECT S46-27012, TASK 14408).

MALEY, DONALD
VT 013 809 ED 055 185 423
NEW INDUSTRIAL ARTS FOR THE SENIOR HIGH SCHOOL.
VT 013 816 ED 054 378 424
THE CLUSTER CONCEPT PROGRAM AS AN APPROACH TO VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL.

MANNING, PHILLIP R., AND OTHERS
VT 010 884 ED 055 152 385
CONDUCT A COST EFFECTIVENESS STUDY OF POSTGRADUATE MEDICAL EDUCATION PROGRAMS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

MANPOWER ADMINISTRATION (DOL), WASHINGTON, D.C. U.S. TRAINING AND EMPLOYMENT SERVICE.
VT 011 052 ED 057 169 390
EFFECT OF BASIC LITERACY TRAINING ON TEST SCORES.

MANPOWER ADMINISTRATION (DOL), WASHINGTON, D.C., U.S. TRAINING AND EMPLOYMENT SERVICE.
VT 014 145 ED 056 209 465
JOB DESCRIPTIONS AND ORGANIZATIONAL ANALYSIS FOR HOSPITALS AND RELATED HEALTH SERVICES.

MARLAND, S. P., JR.
VT 013 234 ED 050 295 395
CAREER EDUCATION--MORE THAN A NAME.

MARLAND, SIDNEY P., JR.
VT 014 114 ED 056 203 462
CAREER EDUCATION.

MARTINEZ, THOMAS M., AND OTHERS
VT 010 784 ED 054 300 378
PAST AND PRESENT COUNSELING AND PLACEMENT PROCEDURES IN PRIVATE EMPLOYMENT AGENCIES--AN EMPIRICAL STUDY.

MARYLAND UNIV., COLLEGE PARK. DEPT. OF INDUSTRIAL EDUCATION.
VT 013 809 ED 055 185 423
NEW INDUSTRIAL ARTS FOR THE SENIOR HIGH SCHOOL.
VT 013 816 ED 054 378 424
THE CLUSTER CONCEPT PROGRAM AS AN APPROACH TO VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL.

MASON, EMMETT E.
VT 012 875 ED 057 179 392
INDUSTRIAL ARTS CURRICULUM IMPROVEMENTS: A CHANGE AGENT'S GUIDE.

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
VT 010 939 ED 055 153 388
FEDERAL TRAINING PROGRAMS FOR DISPERSED EMPLOYMENT OCCUPATIONS.

MAY, R. V., JR.
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.

MAYO, CLYDE C.
VT 010 847 ED 054 316 384
A METHOD FOR DETERMINING JOB TYPES FOR LOW APTITUDE AIRMEN.

PAGE

VT 010 848 ED 054 317 384
THREE STUDIES OF JOB INVENTORY PROCEDURES: SELECTING DUTY CATEGORIES, INTERVIEWING, AND SAMPLING.

MCCLEARY, JOSEPH LEON
VT 014 019 ED 055 230 450
VOCATIONAL EDUCATION PROGRAMS OFFERED IN THE METROPOLITAN PUBLIC HIGH SCHOOLS OF THE UNITED STATES.

MCCOWAN, RICHARD J.
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.

MCELROY, ROBERT C., AND OTHERS
VT 010 962 ED 054 327 389
POTENTIAL MECHANIZATION IN THE FLUE-CURED TOBACCO INDUSTRY--WITH EMPHASIS ON HUMAN RESOURCE ADJUSTMENT.

MCMANUS, GEORGE P., AND OTHERS
VT 014 119 ED 056 204 462
POLICE TRAINING AND PERFORMANCE STUDY.

MENZEL, HERBERT
VT 012 297 ED 053 287 390
PHYSICIANS' LOCAL ADVISORY SYSTEM. FINAL REPORT AND APPENDICES.

MEYERS, LARRY DUANE
VT 013 829 ED 055 191 426
A SKILLED NEEDS SURVEY WITH IMPLICATIONS FOR VOCATIONAL-TECHNICAL EDUCATION WITHIN THE IOWA WESTERN COMMUNITY COLLEGE DISTRICT AREA XIII.

MICHIGAN STATE UNIV., EAST LANSING.
VT 013 723 408
STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS.

MICHIGAN UNIV., ANN ARBOR.
VT 010 783 ED 054 299 378
THE LABOR FORCE PARTICIPATION OF THE URBAN POOR.
VT 010 787 ED 054 302 379
COMMUNITY ORGANIZATION AND THE MOBILIZATION OF RESOURCES FOR MANPOWER DEVELOPMENT PROGRAMS.

MILAM, THOMAS RUDOLPH
VT 013 932 ED 054 383 436
VOCATIONAL EDUCATION IN SELECTED HIGH SCHOOLS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

MILLER, DAVID HENDRICK
VT 013 787 ED 055 177 418
THE ROLE OF THE INDEPENDENT INVENTOR IN THE EARLY DEVELOPMENT OF ELECTRICAL TECHNOLOGY.

MILLER, F. MILTON
VT 013 790 ED 055 178 420
EFFECTS OF SMALL GROUP INSTRUCTION ON ACHIEVEMENT OF TECHNICAL INFORMATION BY NINTH GRADE INDUSTRIAL ARTS STUDENTS.

MILLER, JACK DEAN
VT 013 381 ED 054 340 398
A FACTOR ANALYSIS OF PROFESSIONAL EDUCATION COMPETENCIES AND SELECTED COMMUNITY COLLEGE INSTRUCTORS.

MINISTRY OF LABOR, TOKYO (JAPAN).
VT 008 010 ED 054 293 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY.
VT 008 011 ED 054 294 376
EMPLOYMENT POLICIES OF THE UNITED STATES AND JAPAN. REPORT OF THE JOINT UNITED STATES-JAPAN EMPLOYMENT STUDY. APPENDIX.

MINNEAPOLIS PUBLIC SCHOOLS, MINN.
VT 013 946 438
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM.

MINNESOTA RESEARCH COORDINATING UNIT IN OCCUPATIONAL EDUCATION, MINNEAPOLIS.
VT 014 086 455
REVIEWING THE LITERATURE: A HANDBOOK FOR THE VOCATIONAL RESEARCHER.

MINNESOTA STATE DEPT. OF EDUCATION, ST. PAUL. DIV. OF VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 946 438
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM.

MINNESOTA UNIV., MINNEAPOLIS. CENTER FOR THE STUDY OF ORGANIZATIONAL PERFORMANCE AND HUMAN EFFECTIVENESS.
VT 014 092 ED 056 197 456
INDUSTRIAL PSYCHOLOGY IN THE SEVENTIES AND BEYOND.

MINNESOTA UNIV., MINNEAPOLIS. DEPT. OF INDUSTRIAL EDUCATION.
VT 013 884 430
A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS. PROJECT MINI-SCORE.

MINNESOTA UNIV., MINNEAPOLIS. INDUSTRIAL RELATIONS CENTER.
VT 014 133 ED 057 199 464
MANUAL FOR THE MINNESOTA IMPORTANCE QUESTIONNAIRE. MINNESOTA STUDIES IN VOCATIONAL REHABILITATION.

MOBILIZATION FOR YOUTH, INC., NEW YORK, N.Y. EXPERIMENTAL MANPOWER LAB.
VT 014 311 ED 056 241 477
THE WORK SAMPLE: REALITY-BASED ASSESSMENT OF VOCATIONAL POTENTIAL.

MONGERSON, M. DUANE
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.

MOORE, SAMUEL A., II.
VT 013 723 408
STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS.

MOREHOUSE, THOMAS A.
VT 013 730 ED 055 163 409
MANPOWER NEEDS IN ALASKA STATE AND LOCAL GOVERNMENT.

MORGAN, ROBERT L.
VT 014 321 478
THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS.

MORGAN, ROBERT L., AND OTHERS
VT 013 235 ED 050 296 395
THE PLAN FOR IMPLEMENTATION OF AN EXEMPLARY OCCUPATIONAL EDUCATION PROGRAM IN A RURAL COMMUNITY.

MURPHY, J. O.
VT 010 928 ED 054 326 387
THE DEVELOPMENT OF A SYLLABUS FOR INSTRUCTION OF COMMUNICATIVE SKILLS IN A REHABILITATION CENTER FOR THE BLIND. FINAL REPORT.

MYERS, RANDOLPH L.
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

NATIONAL ADVISORY COUNCIL ON VOCATIONAL EDUCATION, WASHINGTON, D.C.
VT 013 718 ED 055 159 407
VOCATIONAL EDUCATION AMENDMENTS OF 1968, PUBLIC LAW 90-576. FIFTH REPORT.

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VT 013 716 407
COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE V: PLANNING.

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VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.

NATIONAL COMMITTEE FOR CHILDREN AND YOUTH, WASHINGTON, D.C.
VT 013 088 ED 055 155 392
PROJECT CROSSROADS. FINAL REPORT.
VT 013 089 393
PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION. A PROGRAM EVALUATION.
VT 013 090 393
A BENEFIT-COST ANALYSIS OF PROJECT CROSSROADS.

NATIONAL INST. OF MENTAL HEALTH (DHEW), BETHESDA, MD.
VT 013 749 ED 055 167 411
EXPERIMENTS IN MENTAL HEALTH TRAINING. PROJECT SUMMARIES.

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VT 013 724 ED 054 361 408
HEALTH PROFESSIONS AND NURSING STUDENT LOAN AND SCHOLARSHIP PROGRAMS. MANUAL OF INFORMATION, POLICIES, AND PROCEDURES.

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VT 013 369 ED 054 338 397
HEALTH MANPOWER IN HOSPITALS.

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VT 013 120 ED 054 335 393
EQUIVALENCY AND PROFICIENCY TESTING. A DESCRIPTIVE COMPILATION OF EXISTING TESTING PROGRAMS IN ALLIED HEALTH AND OTHER HEALTH OCCUPATIONS, WITH AN ANNOTATED BIBLIOGRAPHY.

PAGE

NATIONAL INSTITUTES OF HEALTH (DHEW), BETHESDA, MD. OFFICE OF PROGRAM PLANNING AND EVALUATION.
VT 013 774 415
THE USE OF ANALYTICAL TECHNIQUES IN THE MANAGEMENT OF PROGRAMS OF HEALTH MANPOWER EDUCATION.

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VT 013 764 413
SELECTED TRAINING PROGRAMS FOR PHYSICIAN SUPPORT PERSONNEL.

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VT 013 769 ED 054 367 414
GUIDE FOR THE DEVELOPMENT OF LIBRARIES FOR SCHOOLS OF NURSING. THIRD EDITION.

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VT 013 768 ED 054 366 413
ASSOCIATE DEGREE EDUCATION FOR NURSING--CURRENT ISSUES, 1971.
VT 014 248 474
ASSOCIATE DEGREE EDUCATION FOR NURSING. INFORMATION ABOUT STATE-APPROVED ASSOCIATE DEGREE PROGRAMS IN NURSING.

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VT 013 767 ED 055 169 413
TOWARD EXCELLENCE IN NURSING EDUCATION: A GUIDE FOR DIPLOMA SCHOOL IMPROVEMENT.
VT 014 132 463
EDUCATION FOR NURSING--THE DIPLOMA WAY.

NATIONAL SANITATION FOUNDATION, ANN ARBOR, MICH.
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 352 396
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK).
VT 013 353 397
ENVIRONMENTAL INFORMATION (INFORMATION PACK).
VT 013 354 397
TECHNICIAN DESCRIPTIONS (INFORMATION PACK). PROGRAMS OF TRAINING AND EDUCATION IN ENVIRONMENTAL TECHNOLOGY. (POTEET).

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D.C.
VT 014 401 482
SPECIAL STUDY--YOUTH AND TRAFFIC SAFETY EDUCATION.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

NAVAL PERSONNEL RESEARCH ACTIVITY, SAN DIEGO, CALIF.
VT 010 843 ED 054 312 383
A STUDY OF THE RATING STRUCTURE REQUIREMENTS FOR THE AVIATION 3M DATA ANALYST.
VT 010 844 ED 054 313 383
PERSONNEL IMPLICATIONS OF NEW TECHNOLOGICAL DEVELOPMENTS: UNDERSEA TECHNOLOGIES.
VT 010 849 ED 054 318 384
AN ANALYSIS OF THE NAVY VOCATIONAL INTEREST INVENTORY AS A PREDICTOR OF CAREER MOTIVATION.
VT 010 850 ED 054 319 385
AREA SCALES OF THE NAVY VOCATIONAL INTEREST INVENTORY AS PREDICTORS OF SCHOOL PERFORMANCE AND RATING ASSIGNMENT.

NAVAL PERSONNEL RESEARCH ACTIVITY, SAN DIEGO, CALIF. NAVY TRAINING RESEARCH LAB.
VT 010 835 ED 057 161 382
RETENTION OF ELECTRONIC FUNDAMENTALS: DIFFERENCES AMONG TOPICS.
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).
VT 010 842 ED 054 311 382
INTERIM QUANTITATIVE MANPOWER PROJECTIONS FOR PROPOSED HYDROGRAPHIC SURVEY SHIP SYSTEM (AGS) CANDIDATE CONFIGURATIONS (NAVSHIPS SUBPROJECT S46-27012, TASK 14408).

NEEDHAM, RAYMOND
VT 014 105 ED 055 242 459
IMPROVING OCCUPATIONAL ORIENTATION PROGRAMS FOR JUNIOR HIGH SCHOOL STUDENTS IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VIII.

NEVADA UNIV., RENO. CENTER FOR RESEARCH AND PLANNING.
VT 014 104 ED 055 241 458
IMPROVING PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VI.

NEW JERSEY HOSPITAL RESEARCH AND EDUCATIONAL TRUST, PRINCETON.
VT 014 156 ED 056 213 465
STUDENT HEALTH OPPORTUNITIES PROGRAM: A SUMMER YOUTH EMPLOYMENT PROGRAM.

PAGE

NEW JERSEY STATE DEPT. OF EDUCATION, TRENTON. CENTER FOR CONSUMER EDUCATION SERVICES.
VT 013 772 ED 055 172 414
CONSUMER EDUCATION: AN INTERDISCIPLINARY APPROACH.

NEW MEXICO OCCUPATIONAL RESEARCH AND DEVELOPMENT COORDINATING UNIT, SANTA FE.
VT 014 226 473
EXEMPLARY PROGRAMS OF THE STATE OF NEW MEXICO. ANNUAL REPORT, 1970-71.

NEW MEXICO STATE UNIV., UNIVERSITY PARK. COLL. OF BUSINESS ADMINISTRATION AND ECONOMICS.
VT 013 917 433
EVALUATION OF CURRICULAR REQUIREMENTS FOR THE TWO-YEAR SECRETARIAL PROGRAM AT NEW MEXICO STATE UNIVERSITY, 1965-1969.

NEW YORK CITY BOARD OF EDUCATION, BROOKLYN, N.Y.
VT 013 555 ED 054 350 402
NEW DIRECTIONS FOR VOCATIONAL HOME ECONOMICS.

NEW YORK CITY POLICE DEPT., N.Y.
VT 014 119 ED 056 204 462
POLICE TRAINING AND PERFORMANCE STUDY.

NEW YORK CITY RAND INST., N.Y.
VT 014 225 ED 057 207 472
MINORITY RECRUITING IN THE NEW YORK CITY POLICE DEPARTMENT.

NEW YORK STATE DEPT. OF CIVIL SERVICE, ALBANY.
VT 013 738 ED 055 165 410
FOURTH ANNUAL REPORT ON THE OCCUPATIONS, JOB STATUS AND ETHNIC CHARACTERISTICS OF EMPLOYEES IN NEW YORK STATE AGENCIES.

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VT 013 996 ED 055 228 447
PROCEEDINGS OF NORTH AMERICAN CONFERENCE ON LABOR STATISTIC.

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VT 013 826 425
INDUSTRIAL ARTS: MUSEUM RESOURCES. A DIRECTORY OF SELECTED CENTERS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

NEW YORK STATE EDUCATION DEPT., ALBANY. BUREAU OF OCCUPATIONAL EDUCATION RESEARCH.
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.
VT 013 994 ED 056 181 446
THE IMPACT OF A RESCHEDULED SCHOOL YEAR ON VOCATIONAL TRAINING CENTERS IN NEW YORK STATE.

NEW YORK STATE EDUCATION DEPT., ALBANY. DIV. OF RESEARCH.
VT 013 722 ED 055 160 408
WOMEN IN THE WORLD OF WORK.

NEW YORK UNIV., N.Y.
VT 012 297 ED 053 287 390
PHYSICIANS' LOCAL ADVISORY SYSTEM. FINAL REPORT AND APPENDICES.
VT 014 084 ED 056 193 455
THE JOB ATTITUDES OF WORKERS FROM DIFFERENT ETHNIC BACKGROUNDS.

NEWTON, DAVE
VT 013 351 396
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK).
VT 013 352 396
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK).

NICHOLS, CHARLES W.
VT 014 011 ED 056 186 448
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS.

NORTH CAROLINA STATE UNIV., RALEIGH. CENTER FOR OCCUPATIONAL EDUCATION.
VT 013 235 ED 050 296 395
THE PLAN FOR IMPLEMENTATION OF AN EXEMPLARY OCCUPATIONAL EDUCATION PROGRAM IN A RURAL COMMUNITY.
VT 013 971 ED 055 223 443
COMMUNITY POWER AND SOCIAL CHANGE: A CASE FOR SOCIAL ACTION WITH IMPLICATIONS FOR OCCUPATIONAL EDUCATION.
VT 013 972 ED 055 224 443
A MODEL FOR EDUCATIONAL PROFICIENCY.
VT 014 321 478
THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS.

NORTHWESTERN UNIV., EVANSTON, ILL.
VT 013 770 ED 055 170 414
A BIBLIOGRAPHY ON POLICE ADMINISTRATION.

PAGE

NORTON, ROBERT E., AND OTHERS
VT 014 098 ED 055 239 457
AN EVALUATION OF OKLAHOMA'S EXEMPLARY VOCATIONAL EDUCATION AND OCCUPATIONAL ORIENTATION PROGRAM.

O'NEILL, JOHN NICHOLAS
VT 013 837 ED 055 194 427
THE FEASIBILITY OF A SYSTEM FOR THE EXCHANGE OF INFORMATION ABOUT LOCALLY PRODUCED INSTRUCTIONAL MATERIALS BETWEEN INDUSTRIAL ARTS PROGRAMS IN HIGHER EDUCATION.

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A COOPERATIVE VOCATIONAL PATTERN FOR IN-SCHOOL MENTALLY RETARDED YOUTH.

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THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SEATTLE. SUMMARY, 1971.
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THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, SAN FRANCISCO. SUMMARY, 1971.
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VOCATIONAL EDUCATION FOR HANDICAPPED PERSONS. HANDBOOK FOR PROGRAM IMPLEMENTATION.
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CAREER EDUCATION.
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THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, NEW YORK. SUMMARY, 1971.
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THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, PHILADELPHIA. SUMMARY, 1971.
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THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, DALLAS. SUMMARY, 1971.
VT 014 209 ED 056 232 470
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, CHICAGO. SUMMARY, 1971.
VT 014 210 ED 056 233 471
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, BOSTON. SUMMARY, 1971.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

VT 014 228 ED 056 239 473
THE SECRETARY'S REGIONAL CONFERENCES ON VOCATIONAL EDUCATION, KANSAS CITY. SUMMARY, 1971.

OHIO STATE ADVISORY COUNCIL FOR VOCATIONAL EDUCATION.
VT 014 379 481
SECOND ANNUAL REPORT, 1970-71.

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VT 013 947 ED 055 215 438
OCCUTAPES.

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VT 013 209 ED 054 336 394
CAREER THRESHOLDS: A LONGITUDINAL STUDY OF THE EDUCATIONAL AND LABOR MARKET EXPERIENCE OF MALE YOUTH. VOLUME THREE.

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VT 012 730 ED 056 165 391
REVIEW AND SYNTHESIS OF INFORMATION ON OCCUPATIONAL EXPLORATION.
VT 012 875 ED 057 179 392
INDUSTRIAL ARTS CURRICULUM IMPROVEMENTS: A CHANGE AGENT'S GUIDE.
VT 013 920 ED 056 172 433
OPINION LEADERSHIP AND COMMUNICATION LINKAGES AMONG AGRICULTURAL EDUCATORS.
VT 013 921 ED 055 207 434
MODIFYING DISADVANTAGED STUDENTS' PERCEPTIONS OF OFFICE WORK.
VT 013 926 ED 054 381 434
ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.
VT 014 102 ED 054 390 458
MICROFICHE COLLECTION OF CLEARINGHOUSE DOCUMENTS REPORTED IN ABSTRACTS OF RESEARCH AND RELATED MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM), SUMMER 1971.
VT 014 134 ED 055 252 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENT COLLECTIONS: A FINAL REPORT.
VT 014 135 ED 056 208 464
COMPUTER APPLICATIONS TO ERIC CLEARINGHOUSE DOCUMENTS COLLECTIONS: A USER AND INSTALLATION HANDBOOK.

PAGE

OHIO STATE UNIV., COLUMBUS. DEPT. OF AGRICULTURAL EDUCATION.
VT 013 830 426
THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO.
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.
VT 013 869 ED 054 380 429
GUIDELINES FOR THE DEVELOPMENT OF STUDENT ORGANIZATIONS ASSOCIATED WITH AGRICULTURAL PROGRAMS AT TWO-YEAR, POST-SECONDARY EDUCATIONAL INSTITUTIONS IN THE UNITED STATES. RESEARCH REPORT.
VT 013 919 433
AGRICULTURAL EDUCATION IN "LIFE 2000." A REPORT OF A TASK FORCE ON LONG RANGE PLANNING.
VT 014 376 480
USE OF RECRUITMENT MATERIALS BY OHIO TEACHERS OF VOCATIONAL AGRICULTURE.

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VT 014 088 ED 054 389 455
A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY CURRICULUM PROJECT: A FINAL EVALUATION OF THE INDUSTRIAL ARTS CURRICULUM PROJECT (IACP), 1965-1971.

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A HANDBOOK OF COOPERATIVE PROGRAMS FOR OKLAHOMA VOCATIONAL AND TECHNICAL EDUCATION.

OKLAHOMA STATE DEPT. OF VOCATIONAL AND TECHNICAL EDUCATION, STILLWATER. DIV. OF RESEARCH, PLANNING, AND EVALUATION
VT 014 218 471
A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA.

OKLAHOMA VOCATIONAL RESEARCH COORDINATING UNIT, STILLWATER.
VT 013 558 ED 054 351 403
RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 870 ED 056 171 429
RESEARCH UTILIZATION SPECIALIST; REVIEW AND SYNTHESIS OF SELECTED LITERATURE ON RESEARCH DEVELOPMENT.
VT 014 098 ED 055 239 457
AN EVALUATION OF OKLAHOMA'S EXEMPLARY VOCATIONAL EDUCATION AND OCCUPATIONAL ORIENTATION PROGRAM.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

OLASOV, ROBERT
VT 010 788 ED 054 303 379
HOUSTON'S OUT-OF-SCHOOL NEIGHBORHOOD YOUTH CORPS: A COMPARATIVE OBSERVATIONAL STUDY OF THE NYC'S IMPACT ON THE WORK ATTITUDES AND JOB FUTURES OF POVERTY YOUTHS.

OLSON, RICHARD R.
VT 013 460 ED 054 346 401
PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE TECHNICIAN GRADUATES: SOME DEMOGRAPHIC VARIABLES.

OPINION RESEARCH CORP., PRINCETON, N.J.
VT 013 583 ED 054 353 404
THE LODGING INDUSTRY'S IMAGE; HOW THE ADULTS AND TEENAGERS VIEW HOTELS AND MOTELS AS EMPLOYERS AND OVERALL.

OREGON STATE BOARD OF EDUCATION, SALEM.
VT 013 810 423
OREGON STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION UNDER THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FISCAL YEAR 1971.

OREGON STATE UNIV., CORVALLIS. DIV. OF VOCATIONAL, ADULT, AND COMMUNITY COLL. EDUCATION.
VT 013 609 404
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, PARIS (FRANCE).
VT 014 085 ED 056 194 455
OCCUPATIONAL AND EDUCATIONAL STRUCTURES OF THE LABOUR FORCE AND LEVELS OF ECONOMIC DEVELOPMENT.

ORNSTEIN, MICHAEL D.
VT 014 127 ED 055 250 463
ENTRY INTO THE AMERICAN LABOR FORCE.

OVERSEAS DEVELOPMENT COUNCIL, WASHINGTON, D.C.
VT 013 572 403
JOBS AND AGRICULTURAL DEVELOPMENT; A STUDY OF THE EFFECTS OF A NEW AGRICULTURAL TECHNOLOGY ON EMPLOYMENT IN POOR NATIONS.

PALLADINO, N.J., AND OTHERS
VT 014 263 475
TECHNICIANS, TECHNOLOGISTS, AND ENGINEERS FOR NUCLEAR POWER.

PAGE

PARNES, HERBERT S.
VT 013 209 ED 054 336 394
CAREER THRESHOLDS: A LONGITUDINAL STUDY OF THE EDUCATIONAL AND LABOR MARKET EXPERIENCE OF MALE YOUTH. VOLUME THREE.

PASCAL, ANTHONY H.
VT 013 492 ED 054 349 402
YOUTH AND WORK: TOWARD A MODEL OF LIFETIME ECONOMIC PROSPECTS.

PATTERSON, PHILIP D., JR.
VT 013 931 ED 055 210 436
A FISCAL ANALYSIS OF FIXED-AMOUNT FEDERAL GRANTS-IN-AID: THE CASE OF VOCATIONAL EDUCATION.

PENN, THOMAS L.
VT 013 937 ED 055 214 438
A STUDY OF FEDERAL FINANCIAL AID TO PUBLIC VOCATIONAL EDUCATION, 1917-1964.

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
VT 013 460 ED 054 346 401
PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE TECHNICIAN GRADUATES: SOME DEMOGRAPHIC VARIABLES.
VT 013 461 ED 054 347 401
ASSOCIATE DEGREE TECHNICIANS' JUDGMENTS ON QUALITY OF INSTRUCTION AND COURSE RELEVANCY.

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK. DEPT. OF VOCATIONAL EDUCATION.
VT 012 725 ED 054 331 391
EMPLOYMENT CHARACTERISTICS OF THE PENNSYLVANIA STATE UNIVERSITY ASSOCIATE DEGREE GRADUATES.
VT 013 896 ED 055 204 431
TROUBLESHOOTING INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION VIA DYNAMIC SIMULATION.
VT 013 897 432
THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.
VT 014 080 ED 055 237 454
A LONGITUDINAL STUDY OF VOCATIONAL DEVELOPMENT: IMPLICATIONS FOR VOCATIONAL EDUCATION AND GUIDANCE.
VT 014 081 ED 005 238 454
THE RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS OF NINTH GRADE BOYS AND CURRICULUM SELECTION AND SUCCESS IN TENTH GRADE.

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK. INST. FOR RESEARCH ON HUMAN RESOURCES.
VT 010 797 ED 054 306 380
UNIVERSITY MANPOWER RESEARCH SEMINAR FOR THE STIMULATION OF PROFESSIONAL RESEARCH INTEREST.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

PERKOWSKI, ROBERT
VT 013 818 ED 056 169 425
ADMINISTRATORS' WORKSHOP FOR PROGRAM IMPLEMENTATION: VOCATIONAL EDUCATION OPPORTUNITIES FOR DISADVANTAGED AND HANDICAPPED PERSONS.

PERLMAN, LEONARD G.
VT 013 933 ED 055 211 436
A PREDICTIVE MODEL FOR THE IDENTIFICATION OF POTENTIAL DROPOUTS FROM VOCATIONAL TRAINING IN A COMPREHENSIVE REHABILITATION CENTER.

PETERSEN, DALE F.
VT 014 083 454
IOWA HEALTH OCCUPATIONS EDUCATION; FOLLOW-UP STUDY.

PETERSON, M. LARRY
VT 013 791 ED 055 179 420
A COMPARISON AND COST ANALYSIS OF TWO APPROACHES TO THE PROVISION OF OCCUPATIONAL INFORMATION.

PETERSON, MARLA, AND OTHERS
VT 013 973 ED 055 225 444
THE OCCUPAC PROJECT (A PROJECT TO DEVELOP OCCUPATIONAL INFORMATION LEARNING ACTIVITY PACKAGES FOR GRADES K-9). FINAL REPORT.

PHILLIPS, THOMAS GORDON, JR.
VT 013 792 ED 054 374 420
A COMPARISON OF THE EFFECTIVENESS OF A PROGRAMMED TEXT AND A COMPUTER BASED DISPLAY UNIT MEDIA IN TEACHING FORTRAN IV.

PIERCE, ROBERT BENJAMIN
VT 013 934 ED 055 212 437
AN ANALYSIS OF THE IMPACT OF THE VOCATIONAL EDUCATION ACT OF 1963 ON BUSINESS EDUCATION IN THE PUBLIC SECONDARY SCHOOLS OF MISSOURI WITH IMPLICATIONS FOR TEACHER PREPARATION.

PIERCE, WILLIAM FRANK
VT 013 959 ED 055 217 440
FACTORS ASSOCIATED WITH PARTICIPATION BY MICHIGAN SCHOOL SUPERINTENDENTS IN PROGRAMS AUTHORIZED UNDER THE PROVISIONS OF THE VOCATIONAL EDUCATION ACT OF 1963.

PIORE, MICHAEL J.
VT 010 939 ED 055 153 388
FEDERAL TRAINING PROGRAMS FOR DISPERSED EMPLOYMENT OCCUPATIONS.

PAGE

PLANNING RESEARCH CORP., MCLEAN, VA.
VT 014 399 482
SOCIAL SECURITY DATA: AN AID TO MANPOWER PROGRAM EVALUATION. INTERIM REPORT.

PONTIAC SCHOOL DISTRICT, MICH. OFFICE OF EVALUATION.
VT 013 699 405
WORLD OF MANUFACTURING: EVALUATION REPORT OF A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY DEMONSTRATION PROGRAM.

PORTER, LYMAN W., AND OTHERS
VT 014 266 475
CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD.

POWELL, KATHRYN SUMMERS
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.

POWELL, MEL D., AND OTHERS
VT 013 716 407
COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE V: PLANNING.

PRATER, ROBERT L.
VT 010 508 ED 054 298 378
TEENAGE EMPLOYMENT: A STUDY OF LOW INCOME YOUTH IN HOUSTON, TEXAS.

PRATT, ARDEN L.
VT 013 731 ED 054 362 409
AGRICULTURE AND NATURAL RESOURCES POSTSECONDARY PROGRAMS.
VT 014 202 ED 057 204 469
AN APPRAISAL OF THE IMPACT OF FEDERAL FUNDS GRANTED UNDER SECTION 4(A) OF THE VOCATIONAL EDUCATION ACT OF 1963 ON THE OCCUPATIONAL PROGRAMS OFFERED BY THE PUBLIC TWO-YEAR COLLEGES IN NEW YORK STATE.

PREITZ, CLARENCE H.
VT 010 963 ED 054 328 389
GOALS AND BASIC UNITS OF INSTRUCTION FOR TREATMENT MEDIA COURSES FOR THE PREPARATION OF OCCUPATIONAL THERAPISTS.

PRESCOTT, EDWARD C.
VT 014 466 484
ANALYSIS OF MDTA INSTITUTIONAL AND OJT DATA TAPES FOR 1968.

PRESIDENT'S COMMITTEE ON EMPLOYMENT OF THE HANDICAPPED, WASHINGTON, D.C.
VT 014 308 476
PROPRIETARY PRODUCTS: PROJECT EARNING POWER.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

PRESIDENT'S COUNCIL ON YOUTH OPPORTUNITY, WASHINGTON, D.C.
VT 014 249 ED 057 212 474
YOUTH RESOURCES MANUAL FOR COORDINATORS.

PRESIDENTIAL TASK FORCE ON WOMEN'S RIGHTS AND RESPONSIBILITIES, WASHINGTON, D.C.
VT 013 426 ED 055 157 400
A MATTER OF SIMPLE JUSTICE.

PRICE, DANIEL O.
VT 010 919 ED 054 323 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME I.
VT 010 920 ED 054 324 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME II.
VT 010 921 ED 054 325 387
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME III.

PUBLIC HEALTH SERVICE (DHEW), WASHINGTON, D.C.
VT 013 273 ED 055 156 395
GUIDELINES FOR DIETITIANS AND PUBLIC HEALTH NUTRITIONISTS IN HOME HEALTH SERVICES.

PUBLIC HEALTH SERVICE (DHEW), WASHINGTON, D.C. INJURY CONTROL RESEARCH LAB.
VT 014 394 481
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.

PUCEL, DAVID J., AND OTHERS
VT 013 884 430
A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS. PROJECT MINI-SCORE.

PUERTO RICAN FORUM, INC., NEW YORK, N.Y.
VT 010 827 ED 055 151 381
BASIC OCCUPATIONAL LANGUAGE TRAINING (BOLT), FINAL REPORT.

PUMPER, FRED JOHN
VT 013 563 ED 054 352 403
DETERMINATION OF SUBJECT MATTER UNITS TAUGHT IN WISCONSIN AND THE EXTENT OF CONTRIBUTION MADE TOWARD MEETING THE NATIONAL OBJECTIVES OF VOCATIONAL AGRICULTURE.

PAGE

PURDUE RESEARCH FOUNDATION, LAFAYETTE, INC. DEPT. OF PSYCHOLOGY.
VT 014 016 ED 056 187 449
PSYCHOLOGICAL AND ORGANIZATIONAL CORRELATES OF CAREER PATTERNS IN CLINICAL LABORATORY OCCUPATIONS.

RAND CORP., SANTA MONICA, CALIF.
VT 013 492 ED 054 349 402
YOUTH AND WORK: TOWARD A MODEL OF LIFETIME ECONOMIC PROSPECTS.
VT 014 096 457
A STOCHASTIC MODEL OF DISCRIMINATION IN THE LABOR MARKET.
VT 014 179 468
PART-TIME EXPERIENCE AND THE TRANSITION FROM SCHOOL TO WORK.
VT 014 275 475
THE EFFECTS OF MINIMUM WAGES ON THE DISTRIBUTION OF CHANGES IN AGGREGATE EMPLOYMENT.

RAYFORD, ERWIN WILLIAM
VT 013 967 ED 054 384 442
EMPLOYMENT OPPORTUNITIES, TRAINING NEEDS AND VOCATIONAL EDUCATION FOR THE GRAPHIC ARTS IN MISSOURI.

REED, GEORGE M., JR. AND OTHERS
VT 014 318 477
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.

REHABILITATION CENTER, INC., EVANSVILLE, IND.
VT 014 304 476
A PROGRAM FOR THE UTILIZATION OF THE EVANSTON REHABILITATION CENTER FOR MANPOWER TRAINING.

REHABILITATION SERVICES ADMINISTRATION (DHEW), WASHINGTON, D.C.
VT 013 995 ED 056 182 447
PRINCIPLES AND PRACTICES FOR FIRST-LINE SUPERVISORS IN REHABILITATION.

RHODE ISLAND STATE ADVISORY COUNCIL FOR VOCATIONAL AND TECHNICAL EDUCATION, PROVIDENCE.
VT 012 496 391
ANNUAL REPORT.

RICE UNIV., HOUSTON, TEX. DEPT. OF ANTHROPOLOGY AND SOCIOLOGY.
VT 010 788 ED 054 303 379
HOUSTON'S OUT-OF-SCHOOL NEIGHBORHOOD YOUTH CORPS: A COMPARATIVE OBSERVATIONAL STUDY OF THE NYC'S IMPACT ON THE WORK ATTITUDES AND JOB FUTURES OF POVERTY YOUTHS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

RICHLAND COUNTY BOARD OF EDUCATION, MANSFIELD, OHIO.
VT 013 947 ED 055 215 438
OCCUTAPES.

RIGHTHAND, HERBERT
VT 014 110 ED 055 247 461
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, VOLUME VII.

RIO HONDO JUNIOR COLL., WHITTIER, CALIF.
VT 014 453 483
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

ROBINSON, BOYD FILLMORE, JR.
VT 013 987 ED 055 226 445
GATEKEEPERS IN VOCATIONAL EDUCATION.

ROLPH, JOHN E.
VT 014 096 457
A STOCHASTIC MODEL OF DISCRIMINATION IN THE LABOR MARKET.

ROSS, RALPH W.
VT 014 218 471
A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA.

ROVNER-PIECZENIK, ROBERTA
VT 013 089 393
PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION. A PROGRAM EVALUATION.

RUBINSKY, STANLEY
VT 014 394 481
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.

RUMMELL, WINFIELD RAYMOND
VT 013 970 ED 054 385 443
AN EXPERIMENT COMPARING THE EFFECTIVENESS OF LOW COST INSTRUCTIONAL SIMULATION AGAINST HIGH COST EQUIPMENT UTILIZATION IN TEACHING NUMERICAL CONTROL PRINCIPLES.

RUSH, ERNEST L.
VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.

PAGE

RUSSELL, EARL BELL
VT 013 878 ED 055 199 429
DEVELOPMENT OF AN INSTRUMENT TO MEASURE THE CHANGE ORIENTATION OF VOCATIONAL TEACHERS.

RUTGERS, THE STATE UNIV., NEW BRUNSWICK, N.J. DEPT. OF VOCATIONAL-TECHNICAL EDUCATION.
VT 013 818 ED 056 169 425
ADMINISTRATORS' WORKSHOP FOR PROGRAM IMPLEMENTATION: VOCATIONAL EDUCATION OPPORTUNITIES FOR DISADVANTAGED AND HANDICAPPED PERSONS.

SANTA CLARA UNIV., CALIF. COMMUNITY STUDIES CENTER.
VT 010 784 ED 054 300 378
PAST AND PRESENT COUNSELING AND PLACEMENT PROCEDURES IN PRIVATE EMPLOYMENT AGENCIES--AN EMPIRICAL STUDY.

SAWERS, LARRY BRUCE
VT 010 783 ED 054 299 378
THE LABOR FORCE PARTICIPATION OF THE URBAN POOR.

SCHMIDT, JAMES R., AND OTHERS
VT 010 932 ED 056 159 387
AN EVALUATION OF REHABILITATION SERVICES AND THE ROLE OF INDUSTRY IN THE COMMUNITY ADJUSTMENT OF PSYCHIATRIC PATIENTS FOLLOWING HOSPITALIZATION. FINAL REPORT.

SCOVILLE, JAMES G.
VT 010 796 ED 054 305 380
CONCEPTS AND MEASUREMENTS FOR MANPOWER AND OCCUPATIONAL ANALYSIS.

SEXTON, WILLIAM E.
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.

SHAW, ROBERT D'A.
VT 013 572 403
JOBS AND AGRICULTURAL DEVELOPMENT; A STUDY OF THE EFFECTS OF A NEW AGRICULTURAL TECHNOLOGY ON EMPLOYMENT IN POOR NATIONS.

SHERMAN, G. ALLEN
VT 013 731 ED 054 362 409
AGRICULTURE AND NATURAL RESOURCES POSTSECONDARY PROGRAMS.

SHULTZ, FRED ALFRED
VT 013 802 ED 055 184 422
SELECTED ASPECTS OF VOCATIONAL IMAGE AS PERCEIVED BY A PUBLIC CATEGORIZED BY OCCUPATIONAL LEVELS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

SIEGEL, IRVING H.
VT 013 812 ED 055 186 424
AGGREGATION AND AVERAGING.

SILVERSTEIN, SAM, AND OTHERS
VT 013 749 ED 055 167 411
EXPERIMENTS IN MENTAL HEALTH TRAINING. PROJECT SUMMARIES.

SIMONS, JEROLD J.
VT 007 748 376
RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS BY STUDENTS MAJORING IN ELECTRONICS TECHNOLOGY.

SKIDMORE, CAROLYN R.
VT 014 462 484
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE.

SKILL ADVANCEMENT, INC., NEW YORK, N.Y.
VT 010 818 ED 054 307 380
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME I: FINAL REPORT.
VT 010 819 ED 054 308 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME II: TECHNICAL APPENDIX A, TABLES.
VT 010 820 ED 054 309 381
A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING. VOLUME III, PART 1 AND PART 2: APPENDICES B 1-5.

SMITH, GERARD C.
VT 014 005 ED 056 185 448
OCCUPATIONAL MANPOWER AND TRAINING NEEDS; INFORMATION FOR PLANNING TRAINING PROGRAMS FOR THE 1970'S.

SMITH, JAY T.
VT 013 782 ED 055 174 417
ORIGIN AND DEVELOPMENT OF INDUSTRIAL EDUCATION AT ALCORN AGRICULTURAL AND MECHANICAL COLLEGE.

SMITH, MERLE
VT 013 699 405
WORLD OF MANUFACTURING: EVALUATION REPORT OF A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY DEMONSTRATION PROGRAM.

SMITH, NELSON F.
VT 014 394 481
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.

PAGE

SOMERS, GERALD G., AND OTHERS
VT 013 814 ED 055 187 424
THE AVAILABILITY OF DATA ON COMPANY TRAINING PROGRAMS: A FEASIBILITY STUDY.
VT 013 822 ED 055 190 425
THE EFFECTIVENESS OF VOCATIONAL AND TECHNICAL PROGRAMS: A NATIONAL FOLLOW-UP SURVEY.

SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION, CLEMSON.
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.

SOUTH CAROLINA STATE DEPT. OF EDUCATION, COLUMBIA. OFFICE OF VOCATIONAL EDUCATION.
VT 014 318 477
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.

SOUTH CAROLINA VOCATIONAL EDUCATION RESEARCH COORDINATING UNIT, CLEMSON.
VT 014 318 477
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.

SOUTHERN ILLINOIS UNIV., CARBONDALE. DEPT. OF TECHNICAL AND INDUSTRIAL EDUCATION.
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.

SOUTHERN REGIONAL EDUCATION BOARD, ATLANTA, GA.
VT 012 103 ED 054 329 390
SUMMER INSTITUTE IN AGRICULTURAL MECHANICS EDUCATION, SOUTHERN REGION, PROCEEDINGS (BLACKSBURG, VIRGINIA, AUGUST 3-7, 1970).

SPEARS, MARVIN O.
VT 013 995 ED 056 182 447
PRINCIPLES AND PRACTICES FOR FIRST-LINE SUPERVISORS IN REHABILITATION.

SPENCER, ALBERT
VT 014 015 ED 057 191 449
LESS-THAN-BACCALAUREATE LEVEL TECHNICAL EDUCATION PROGRAMS IN HIGHER EDUCATION.

ST. JOHN, DAVID RICHARD
VT 013 775 ED 054 368 415
EFFECTS OF MOVEMENT AND COMMENTARY ON MANIPULATIVE PERFORMANCE.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

STADT, RONALD W.
VT 013 992 ED 055 227 446
TEACHER COMPETENCIES FOR THE CYBERNATED AGE.

STANGER, NORMAN ROBERT
VT 014 125 ED 056 206 463
AN ATTITUDINAL SURVEY CONCERNING THE RESPONSIBILITIES OF THE INTERMEDIATE-LEVEL DIRECTOR OF VOCATIONAL EDUCATION IN CALIFORNIA.

STATE UNIV. OF NEW YORK, BUFFALO. EDUCATIONAL RESEARCH AND DEVELOPMENT COMPLEX.
VT 013 376 ED 054 339 398
EMPLOYMENT STATUS AND ATTITUDES OF SECONDARY SCHOOL OCCUPATIONAL EDUCATION GRADUATES IN NEW YORK STATE.

STENHOLM, BRITTA
VT 014 158 ED 057 200 465
EDUCATION IN SWEDEN.

STEVENSON, WILLIAM W.
VT 013 558 ED 054 351 403
RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION.

STUART, CHIPMAN GRAY
VT 013 797 ED 054 375 422
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION: THEIR HISTORY AND PRESENT POSITION IN TEXAS.

SUSSMAN, MARVIN B., AND OTHERS
VT 010 901 ED 054 322 386
PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS IN REHABILITATION COUNSELING.

SWEDISH INST., STOCKHOLM.
VT 014 158 ED 057 200 465
EDUCATION IN SWEDEN.

SWEDISH NATIONAL BOARD OF EDUCATION, STOCKHOLM.
VT 014 166 467
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.

SYHLMAN, BILL D.
VT 013 808 ED 054 377 423
THE PROFESSIONAL INTERNSHIP EXCHANGE PROGRAM IN VOCATIONAL EDUCATION, 1970-1971.

SYRACUSE CITY SCHOOL DISTRICT, N.Y.
VT 013 993 446
STATLER FOUNDATION PROJECT REPORT, JULY 1970.

PAGE

SYSTEM DEVELOPMENT CORP., FALLS CHURCH, VA.
VT 013 412 ED 054 343 400
EVALUATION OF THE IMPACT OF SELECTED URBAN CONCENTRATED EMPLOYMENT PROGRAMS.

TALENT CORPS, INC., NEW YORK, N.Y.
VT 013 292 396
THE JOB DESCRIPTION: ACTION TOWARD CAREER DEVELOPMENT.

TATUM, JULIAN P., JR.
VT 013 968 ED 055 222 442
VARIABLES RELATED TO THE EDUCATIONAL-VOCATIONAL DECISION-MAKING OF HIGH SCHOOL SENIORS.

TAVISTOCK INST. OF HUMAN RELATIONS, LONDON (ENGLAND).
VT 013 806 ED 054 376 422
THE TRANSITION FROM SCHOOL TO WORK; A STUDY OF THE CHILD'S CHANGING PERCEPTION OF WORK FROM THE AGE OF SEVEN.

TAXIS, LINDA A., ED.
VT 014 358 ED 057 237 479
MAN--SOCIETY--TECHNOLOGY.

TAYLOR, C.W., AND OTHERS
VT 010 947 ED 055 154 388
SYNTHESIS OF MULTIPLE CRITERIA OF PHYSICIAN PERFORMANCE.

TAYLOR, DAVID P.
VT 010 939 ED 055 153 388
FEDERAL TRAINING PROGRAMS FOR DISPERSED EMPLOYMENT OCCUPATIONS.

TEAGUE, RICHARD L.
VT 013 971 ED 055 223 443
COMMUNITY POWER ANC SOCIAL CHANGE: A CASE FOR SOCIAL ACTION WITH IMPLICATIONS FOR OCCUPATIONAL EDUCATION.

TEMPLE UNIV., PHILADELPHIA, PA.
VT 014 107 ED 055 244 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FINAL REPORT, VOLUME IV.

TEMPLE UNIV., PHILADELPHIA, PA. DIV. OF VOCATIONAL EDUCATION.
VT 014 011 ED 056 186 448
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

VT 014 103 ED 056 201 458
UPDATING THE PROCESS AND CONTENT OF TEACHER EDUCATION CURRICULUMS TO REACH DISADVANTAGED YOUTH IN METROPOLITAN AREAS. FINAL REPORT, VOLUME IX.
VT 014 109 ED 055 246 460
COORDINATION OF SUPPORTIVE PROGRAMS FOR VOCATIONAL EDUCATION STUDENTS IN METROPOLITAN AREAS.
VT 014 110 ED 055 247 461
IMPROVING THE PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, VOLUME VII.

TENNESSEE OCCUPATIONAL RESEARCH AND DEVELOPMENT COORDINATING UNIT, KNOXVILLE.
VT 014 159 ED 056 214 466
ERIC AND THE RCU.
VT 014 160 ED 056 215 466
TENNESSEE INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM FOR VOCATIONAL EDUCATION (JULY 1, 1970-JUNE 30, 1971).

TENNESSEE UNIV., KNOXVILLE.
VT 014 159 ED 056 214 466
ERIC AND THE RCU.
VT 014 160 ED 056 215 466
TENNESSEE INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM FOR VOCATIONAL EDUCATION (JULY 1, 1970-JUNE 30, 1971).

TEXAS UNIV., AUSTIN. CENTER FOR CYBERNETIC STUDIES.
VT 013 914 ED 055 206 432
MATHEMATICAL MODELS FOR MANPOWER AND PERSONNEL PLANNING, RESEARCH REPORT.

THOMAS, ANTHONY JESWALD
VT 014 016 ED 056 187 449
PSYCHOLOGICAL AND ORGANIZATIONAL CORRELATES OF CAREER PATTERNS IN CLINICAL LABORATORY OCCUPATIONS.

THOMAS, GEORGE I.
VT 013 994 ED 056 181 446
THE IMPACT OF A RESCHEDULED SCHOOL YEAR ON VOCATIONAL TRAINING CENTERS IN NEW YORK STATE.

THOMPSON, O.E., AND OTHERS
VT 014 378 ED 057 241 481
THE DETERMINATION OF PROPER ALLOCATION OF FUNCTIONS AND RESPONSIBILITIES OF INSTITUTIONS PROVIDING EDUCATION IN AGRICULTURE.

PAGE

THOMPSON, ORVILLE E., AND OTHERS
VT 014 377 480
EDUCATION IN AGRICULTURE IN CALIFORNIA (OCCUPATIONAL NEEDS AND FUTURE DEMANDS).

TIEDEMAN, DAVID V., AND OTHERS
VT 013 232 ED 050 293 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME I.
VT 013 233 ED 050 294 394
THOUGHT, CHOICE, AND ACTION: PROCESSES OF EXPLORATION AND COMMITMENT IN CAREER DEVELOPMENT. VOLUME 2.

TOMLINSON, ROBERT M., AND OTHERS
VT 014 167 ED 056 218 467
GUIDELINES FOR HEALTH OCCUPATIONS EDUCATION PROGRAMS.

TRACOR, INC., AUSTIN, TEX.
VT 010 919 ED 054 323 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME I.
VT 010 920 ED 054 324 386
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME II.
VT 010 921 ED 054 325 387
A STUDY OF ECONOMIC CONSEQUENCES OF RURAL TO URBAN MIGRATION. FINAL REPORT, VOLUME III.

TRAICOFF, GEORGE, JR.
VT 014 021 ED 055 231 450
THE KNOWLEDGE AND OPINIONS OF BUSINESS EDUCATORS TOWARD VOCATIONAL EDUCATION WITH SPECIAL EMPHASIS TOWARD DISTRIBUTIVE EDUCATION.

TROUT, LEN L.
VT 014 104 ED 055 241 458
IMPROVING PREPARATION OF PROFESSIONAL PERSONNEL FOR VOCATIONAL EDUCATION IN METROPOLITAN AREAS. FINAL REPORT, INSTITUTE VI.

TROUTMAN, FRANK H.
VT 014 108 ED 055 245 460
ANNUAL AND LONG-RANGE PROGRAM PLANNING IN METROPOLITAN AREAS IN ACCORDANCE WITH THE VOCATIONAL EDUCATION ACT AMENDMENTS OF 1968. FINAL REPORT, INSTITUTE X.

UDELL, GILMAN G., COMP.
VT 013 909 ED 055 205 432
LAWS RELATING TO VOCATIONAL EDUCATION AND AGRICULTURAL EXTENSION WORK.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

ULLERY, JESSE WILLIAM
VT 013 924 ED 055 208 434
A COMPARATIVE ANALYSIS OF SELECTED STUDENT CHARACTERISTICS AND VOCATIONAL COOPERATIVE PROGRAMS.

UNION CARBIDE CORP., OAK RIDGE, TENN. NUCLEAR DIV.
VT 013 757 ED 054 364 412
INDUSTRY-EDUCATION COOPERATIVE PROGRAM FOR PRESERVICE AND INSERVICE VOCATIONAL AND TECHNICAL TEACHER TRAINING. FINAL REPORT.

UNITED NATIONS ECONOMIC AND SOCIAL COUNCIL, NEW YORK, N.Y.
VT 013 744 411
REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER.

UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH (UNITAR), NEW YORK, N.Y.
VT 013 704 405
THE EMIGRATION OF HIGHLY-SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES.

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
VT 010 884 ED 055 152 385
CONDUCT A COST EFFECTIVENESS STUDY OF POSTGRADUATE MEDICAL EDUCATION PROGRAMS.

UPJOHN (W.E.) INST. FOR EMPLOYMENT RESEARCH, KALAMAZOO, MICH.
VT 013 812 ED 055 186 424
AGGREGATION AND AVERAGING.

UTAH UNIV., SALT LAKE CITY. DEPT. OF PSYCHOLOGY.
VT 010 947 ED 055 154 388
SYNTHESIS OF MULTIPLE CRITERIA OF PHYSICIAN PERFORMANCE.

VALENTINE, IVAN E.
VT 014 111 ED 055 248 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME I.
VT 014 112 ED 055 249 461
METROPOLITAN AREA APPLICATION OF VOCATIONAL EDUCATION INNOVATIONS RESULTING FROM RESEARCH AND DEVELOPMENT PROGRAMS. FINAL REPORT, INSTITUTE IX, VOLUME II.

PAGE

VASILYEV, YU.K., AND OTHERS
VT 014 165 ED 056 217 466
USSR-UNICEF SEMINAR ON PREVOCATIONAL TRAINING, EDUCATION AND VOCATIONAL ORIENTATION WITHIN AND OUTSIDE SCHOOLS (MOSCOW, USSR, OCTOBER 12-31, 1970). WORKING PAPERS.

VIAILLE, HAROLD D.
VT 013 995 ED 056 182 447
PRINCIPLES AND PRACTICES FOR FIRST-LINE SUPERVISORS IN REHABILITATION.

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
VT 012 103 ED 054 329 390
SUMMER INSTITUTE IN AGRICULTURAL MECHANICS EDUCATION, SOUTHERN REGION, PROCEEDINGS (BLACKSBURG, VIRGINIA, AUGUST 3-7, 1970).

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG. COLL. OF ARTS AND SCIENCES.
VT 014 006 448
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS.

WAGE AND HOUR AND PUBLIC CONTRACTS DIVISIONS (DOL), WASHINGTON, D.C.
VT 013 368 ED 054 337 397
A GUIDE TO CHILD LABOR PROVISIONS OF THE FAIR LABOR STANDARDS ACT.

WARD, WILLIAM GARY
VT 013 870 ED 056 171 429
RESEARCH UTILIZATION SPECIALIST; REVIEW AND SYNTHESIS OF SELECTED LITERATURE ON RESEARCH DEVELOPMENT.

WASHINGTON STATE COORDINATING COUNCIL FOR OCCUPATIONAL EDUCATION, OLYMPIA.
VT 013 808 ED 054 377 423
THE PROFESSIONAL INTERNSHIP EXCHANGE PROGRAM IN VOCATIONAL EDUCATION, 1970-1971.

WASHINGTON STATE DEPT. OF INSTITUTIONS, OLYMPIA. OFFICE OF PROGRAM EVALUATION AND ANALYSIS.
VT 013 843 428
AN ANALYSIS OF THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS.

WASHINGTON STATE DEPT. OF PUBLIC INSTRUCTION, OLYMPIA. RESEARCH OFFICE.
VT 010 943 388
THE TACOMA PUBLIC SCHOOLS-DIVISION OF VOCATIONAL REHABILITATION. COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS.

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

WASHINGTON STATE LEGISLATURE, OLYMPIA. JOINT COMMITTEE ON HIGHER EDUCATION.
VT 013 948 438
A STUDY OF LAW ENFORCEMENT TRAINING PROGRAMS.

WAYNE STATE UNIV., DETROIT, MICH.
VT 010 963 ED 054 328 389
GOALS AND BASIC UNITS OF INSTRUCTION FOR TREATMENT MEDIA COURSES FOR THE PREPARATION OF OCCUPATIONAL THERAPISTS.

WAYNE STATE UNIV., DETROIT, MICH. DEPT. OF INDUSTRIAL EDUCATION.
VT 013 463 ED 054 348 402
IMPLEMENTATION OF SELECTED MISSIONS, VOCATIONAL AND APPLIED ARTS EDUCATION PROGRAM. FINAL REPORT.

WEINER, DONALD A.
VT 013 834 ED 055 192 426
EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION CURRICULUM AT PERU STATE COLLEGE.

WEISSMAN, SHELDON
VT 012 163 390
PRE-VOCATION PROGRAM.

WELCH, FINIS
VT 014 275 475
THE EFFECTS OF MINIMUM WAGES ON THE DISTRIBUTION OF CHANGES IN AGGREGATE EMPLOYMENT.

WELCH, WILLIAM G., SR.
VT 014 171 ED 056 220 468
THE DETERMINATION OF A TECHNICAL CORE CURRICULUM FOR A TWO YEAR TECHNICAL PROGRAM IN BIO-MEDICAL ELECTRONICS.

WELTON, RICHARD F.
VT 013 832 ED 054 379 426
RELATIONSHIP OF STUDENT CHARACTERISTICS AND PROGRAM POLICIES TO PARTICIPATION IN FFA. A DIGEST OF A PH. D. DISSERTATION.

WEST, LEONARD J.
VT 014 064 451
EFFECTS OF PROGRAMED VERSUS CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS.

WESTERN RESERVE UNIV., CLEVELAND, OHIO. DEPT. OF SOCIOLOGY AND ANTHROPOLOGY.
VT 010 901 ED 054 322 386
PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS IN REHABILITATION COUNSELING.

PAGE

WESTERN WISCONSIN TECHNICAL INST., LA CROSSE. INDUSTRIAL DIV.
VT 014 171 ED 056 220 468
THE DETERMINATION OF A TECHNICAL CORE CURRICULUM FOR A TWO YEAR TECHNICAL PROGRAM IN BIO-MEDICAL ELECTRONICS.

WHARTON ECONOMETRIC FORECASTING ASSOCIATES, INC., PHILADELPHIA, PA.
VT 014 466 484
ANALYSIS OF MDTA INSTITUTIONAL AND OJT DATA TAPES FOR 1968.

WHEELER, DAVID N.
VT 014 086 455
REVIEWING THE LITERATURE: A HANDBOOK FOR THE VOCATIONAL RESEARCHER.

WHITNEY, LARRY JEROME
VT 013 962 ED 055 219 441
AN ANALYSIS OF THE ADMINISTRATIVE STRUCTURE AND THE ROLE OF THE CHIEF VOCATIONAL-TECHNICAL EDUCATION ADMINISTRATOR IN PUBLIC JUNIOR COLLEGES.

WIGGINS, MELVIN C.
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.

WIHRY, DAVID F.
VT 013 728 ED 055 162 409
INVESTMENT PLANNING IN VOCATIONAL-TECHNICAL EDUCATION. A PILOT STUDY.

WILDER, DOLORES J., ED.
VT 014 159 ED 056 214 466
ERIC AND THE RCU.
VT 014 160 ED 056 215 466
TENNESSEE INFORMATION RETRIEVAL AND DISSEMINATION SYSTEM FOR VOCATIONAL EDUCATION (JULY 1, 1970-JUNE 30, 1971).

WILLIAMS, DAVID L., AND OTHERS
VT 014 069 451
DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE.

WILLINGBORO PUBLIC SCHOOLS, N.J.
VT 014 100 ED 055 240 457
THE DEVELOPMENT OF INDIVIDUALIZED INSTRUCTION IN VOCATIONAL EDUCATION.

WILLIS, JOE E.
VT 010 840 ED 054 310 382
THE DEVELOPMENT OF A HUMAN EFFECTIVENESS FUNCTION ALLOCATION METHODOLOGY (HEFAM).

PERSONAL AND INSTITUTIONAL AUTHOR INDEX

PAGE

WILSON, DAVID A.
VT 010 844 ED 054 313 383
PERSONNEL IMPLICATIONS OF NEW TECHNOLOGICAL DEVELOPMENTS: UNDERSEA TECHNOLOGIES.

WILSON, JAMES A.
VT 013 728 ED 055 162 409
INVESTMENT PLANNING IN VOCATIONAL-TECHNICAL EDUCATION. A PILOT STUDY.

WINNICK, ANDREW J.
VT 014 072 ED 055 234 452
THE CHARACTERISTICS, EDUCATION AND EARNINGS OF TECHNICIANS.

WINTHROP COLL., ROCK HILL, S.C. SCHOOL OF HOME ECONOMICS.
VT 014 018 ED 056 188 449
EDUCATIONAL AND VOCATIONAL GOALS OF URBAN WHITE AND NEGRO YOUTH IN SOUTH CAROLINA.

WISCONSIN STATE DEPT. OF HEALTH AND SOCIAL SERVICES, MADISON.
VT 010 897 ED 054 321 386
NEW APPROACHES IN THE USE OF VOLUNTEER SERVICES. VOLUNTEER SERVICES PROJECT 1115. FINAL REPORT.

WISCONSIN STATE EMPLOYMENT SERVICE, MADISON.
VT 011 051 ED 057 168 389
DEVELOPMENT OF USTES APTITUDE TEST BATTERY FOR PHOTOGRAPH FINISHER (ANY INDUSTRY) I 976.886.

WISCONSIN STATE UNIVERSITIES CONSORTIUM OF RESEARCH DEVELOPMENT, STEVENS POINT.
VT 013 984 ED 054 387 445
SURVEY FOR COMPARISON OF EFFECTIVENESS OF HOME MANAGEMENT WITH RESIDENCY VERSUS HOME MANAGEMENT WITHOUT RESIDENCY LABORATORY, 1966-1968. FINAL REPORT.
VT 013 985 ED 054 388 445
A SURVEY OF TRAINING NEEDS AND INTERNSHIPS FOR NON-TEACHING POSITIONS IN HOME ECONOMICS. FINAL REPORT.

WISCONSIN UNIV., MADISON. CENTER FOR STUDIES IN VOCATIONAL AND TECHNICAL EDUCATION.
VT 013 814 ED 055 187 424
THE AVAILABILITY OF DATA ON COMPANY TRAINING PROGRAMS: A FEASIBILITY STUDY.
VT 013 822 ED 055 190 425
THE EFFECTIVENESS OF VOCATIONAL AND TECHNICAL PROGRAMS: A NATIONAL FOLLOW-UP SURVEY.

PAGE

WISCONSIN UNIV., MADISON. DEPT. OF SOCIOLOGY.
VT 014 093 ED 056 198 456
PRIVATE HOUSEHOLD EMPLOYMENT IN THE UNITED STATES; AN EXPLORATORY PROJECT.

WOLFE, HELEN BICKEL
VT 013 722 ED 055 160 408
WOMEN IN THE WORLD OF WORK.

WOMEN'S BUREAU (DOL), WASHINGTON, D.C.
VT 010 199 ED 054 295 377
JOB HORIZONS FOR WOMEN AND GIRLS IN THE DISTRICT OF COLUMBIA.
VT 010 282 ED 054 296 377
FACTS ABOUT WOMEN'S ABSENTEEISM AND LABOR TURNOVER.
VT 010 864 ED 054 320 385
WEIGHTLIFTING PROVISIONS FOR WOMEN BY STATE.

WOOD, MILDRED WEIGLEY
VT 013 988 ED 056 180 446
OBSERVATION OF CHILDREN IN A HOME ECONOMICS PROGRAM.

WOODIN, RALPH J.
VT 014 376 480
USE OF RECRUITMENT MATERIALS BY OHIO TEACHERS OF VOCATIONAL AGRICULTURE.

WOODIN, RALPH J., AND OTHERS
VT 013 919 433
AGRICULTURAL EDUCATION IN "LIFE 2000." A REPORT OF A TASK FORCE ON LONG RANGE PLANNING.

WRIGHT, AMOS W.
VT 013 736 410
TEACHING AND LEARNING FOR OCCUPATIONAL INDEPENDENCE, FIRST PHASE EVALUATION 1968-1969.

YOUNG, EARL B., AND OTHERS
VT 013 951 ED 056 716 439
VOCATIONAL EDUCATION FOR HANDICAPPED PERSONS. HANDBOOK FOR PROGRAM IMPLEMENTATION.

VT 002 713
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ABSTRACT - SEVERAL TYPES OF RESEARCH HAVE RECENTLY BEGUN TO DEVELOP TECHNIQUES FOR DECIDING HOW MUCH OF A DEVELOPING SOCIETY'S SCARCE RESOURCES SHOULD BE ALLOCATED TO EDUCATION AND TRAINING, AND THE RELATIVE EMPHASIS WHICH SHOULD BE PLACED ON DIFFERENT LEVELS AND TYPES OF EDUCATION. FOR EACH OF FIVE MAJOR TYPES OF RESEARCH THIS REPORT INDICATES THE QUESTION WHICH THE RESEARCH SEEKS TO ANSWER, THE TECHNIQUES USED TO ANSWER THE QUESTION, AND THE MAJOR LIMITATIONS OF THE APPROACH. THE TYPES OF RESEARCH INCLUDE: (1) THE RATE OF RETURN TO EDUCATION, OR WHAT IS THE NET VALUE (EXPECTED BENEFITS MINUS COSTS) TO AN INDIVIDUAL OR THE ECONOMY OF DIFFERENT KINDS AND LEVELS OF EDUCATION AND TRAINING, (2) THE RESIDUAL IN ECONOMIC GROWTH, OR HOW MUCH HAS IMPROVEMENT IN THE QUALITY OF LABOR CONTRIBUTED TO ECONOMIC GROWTH IN THE PAST, (3) FORECASTING AND PLANNING FOR MANPOWER REQUIREMENTS, OR WHAT IS THE QUANTITY AND COMPOSITION OF ADDITIONAL SKILLED PERSONS NEEDED OVER THE PLANNING PERIOD IN ORDER TO SUPPORT THE DESIRED RATE AND PATTERN OF ECONOMIC DEVELOPMENT. FOR EACH TYPE OF RESEARCH, THE REPORT ALSO REFERS TO SEVERAL OF THE MOST IMPORTANT STUDIES AND THEIR MAJOR CONCLUSIONS. (CH)

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HUMAN RESOURCES DEVELOPMENT PLANNING

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OFFICE OF EDUCATION

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March, 1967

Introduction

This paper was prepared for the Office of Program Coordination as part of the 1966 Summer Research Project sponsored by that office. It is intended to serve as an introduction to the rapidly expanding body of literature on the economics of education. The knowledgeable reader will find little that is original in the pages that follow. What will be found, however, is an attempt to integrate the literature, with a view toward evaluating it from the perspective of the planner. The essay seeks to find policy guidelines in the literature.

Human Resources Development Planning:

An Introduction

by Kenneth C. Kehrer

The growing awareness of the contribution of improvements in the quality of human resources to the process of economic and social development has become increasingly evident. The pace of development is seen as depending upon the amount and quality of education (both formal and informal) embodied in the population, just as it depends upon the amount and quality of machinery and other fixed capital. Economists and planners had been more narrowly concerned lest lack of skills become a bottleneck to growth; the current concern makes explicit the resource allocation problems under conditions of scarcity.

These problems take a very practical form: Planners must decide what fractions of development and recurrent budgets to allocate to the education sector. Resources scheduled for this sector must be partitioned into those available for the formal education system (schooling), and those allotted to training programs and more informal processes of education. Portions of the schooling funds must be designated for each stage of the system. Competing demands for those funds arise even within the primary school subsector, and decisions must be made among such uses as teacher' salaries, buildings, equipment, and textbooks.

Educators, for their part, can urge increased investment and operating budgets for education, but they surely will get less than is required to improve quality, extend coverage, and reorient the content of education as quickly as they would like. Moreover, planning the development of an education system is complex: it is necessary to take into account not only the funds likely to be available both in the coming year and for several years thereafter, but also the comparative costs and effectiveness of different types of education; the rate at which different types of facilities can be constructed, and the possibilities for the development and manufacture (or importation) of textbooks and equipment; the number of teachers of different levels of qualification and training available, and the rate at which more could be trained or imported; the number of qualified students expected to be available to enter different intermediate and advanced courses in the next few years; the comparative drop-out and failure rates of different courses of education, modified for expected improvements; and a host of other factors affecting the feasibility and costs of expanding and improving different parts of the system. Both because resources are scarce, and because the problems are so complex, educators are becoming increasingly interested in techniques which will permit them to take the relevant factors into account systematically, and to make judgments as to which are the highest priority problems on which to concentrate funds and attention.

In response to these kinds of questions, there has emerged a body of literature -- "human resources development planning". This is an umbrella concept, sheltering quite disparate methods of inquiry. They

are similar, however, in that they view education as an investment which will lead to increases in Gross National Product or social welfare.

The purpose of this report is to summarize briefly several of these types of research which have recently begun to develop techniques for deciding how much of a developing society's scarce resources should be allocated to education and training, as well as determining the relative emphasis to be placed on different levels and types of education. The report will indicate, for each of five major types of research:

the question(s) which the research seeks to answer
the techniques used to answer the question(s)
the major limitations of the approach

The report also refers to several of the most important studies of each type, and their major conclusions, for further reference.

THE RATE OF RETURN TO EDUCATION

(i) The question. What is the net value (expected benefits minus costs) to an individual or the economy of different kinds and levels of education and training?

This is essentially two questions: one focuses on the decision of an individual, while the other concerns choices by society. Both the personal profit and the national productivity orientations seek to weigh alternative uses of resources; the alternative which maximizes the difference between expected gain and loss, expressed as an average annual rate of return on the cost, is regarded as the best investment.

(ii) The research technique. As in all techniques of this type (systems analysis, operations research), the usefulness of cost-benefit analysis depends on the analyst's ability to identify all the costs and benefits, and to express alternatives in commensurable ways.

Much of the research conducted to date has consisted of attempts to identify the costs and benefits of kinds and levels of education; dollar value has been taken as the yardstick in most cases.

When the question focuses on the individual, the future stream of gains attributable to an extra period of education can be compared with the costs incurred in obtaining that increment. Since a dollar received in the future is less valuable than a dollar received today, the future stream of gains must be discounted by an appropriate factor, analogous to an interest rate. The rate which equates the costs incurred in a given year with the discounted stream of benefits is the "internal" rate of return. The person making the decision can then compare various internal rates of return on different courses of education and training. He may also weigh an extra year's schooling against an investment in real or financial assets. The rates of return will presumably provide guidelines toward rational economic action.

For the individual, the discounted future stream of extra earnings attributable to education is frequently taken to be the relevant concept of benefit. But these extra earnings may understate the benefits of an increment in education. Education may lead to benefits which exceed the extra money incomes earned by the educated. Jobs which require

relatively more education may be the "preferred" jobs. If this is true, the analyst should add a dollar sum which approximates this nonmonetary attraction to the total benefits. Part of the value of an extra period of education may be the option it gives one to continue still further up the education ladder. The value of this option will vary with the rate of return on higher educational stages, and the probability that the option will in fact be used. Viewing education as a series of related steps, Weisbrod [40] demonstrated that the expected rate of return on primary education in 1939 would rise from 35 percent to 52 percent in the U.S.

In arriving at a measure of benefit, the analyst generally compares lifetime after-tax earnings of people who have had relatively more education with those who have had relatively less. But this may attribute increases in earnings to education which may actually have been caused by systematic differences in intelligence, ambition, family connections, mortality rates, or unemployment experience. Becker [3] has demonstrated that adjusting U.S. data for differential ability reduces his estimate of the rate of return on college education from 11 to 9 percent. Denison [13] reduced the observed earnings differentials by two-fifths as an arbitrary attempt to correct for the possible overstatement of the benefits of education.

Identifying the costs of education can also be a major problem. For studies of the private rate of return, only the costs incurred by the individual (or his family) appear to be relevant to his decision to obtain more or less education. A large part of the costs borne by the individual are "opportunity costs" -- costs which are approximated by

the income that he could have earned if he had been working instead of being in school. Schultz [31] has found opportunity costs to be about 60 percent of the total costs of high school and college education in 1956.

Education is also a source of present and future pleasure. Treating expenditures on education as an investment neglects the consumption aspects of the educational experience, reflected in the evidence that many people thoroughly enjoy schooling. The impact of education on consumption also appears to endure beyond the period of schooling, extending the range of leisure activity. Schultz has suggested elsewhere [33] that the value of these consumption components should be identified and subtracted from total costs in any study of the rate of return to education as an investment. Bruton [11] has agreed with this approach, but it has been criticized by Bowen [5] on the grounds that it is difficult to estimate the consumption element of educational costs. Even if the consumption costs could be conceptually separated from the investment costs, he argues, the information would be of little use since one could not decrease the consumption expenditures without at the same time cutting back on the investment expenditures on education. Bowen suggests, alternatively, that the worth of these consumer experiences be estimated in money terms, and that they be added to the benefits in the cost-benefit calculation. This method encounters difficulties too, for the evaluation of the consumption part of education depends upon the preferences of individuals and society as a whole, with respect to both education and other kinds of

consumable experiences. Lewis [22] has asserted that a developing country cannot afford the luxury of the consumption components of education.

A set of similar studies has questioned whether society as a whole is investing the proper share of its resources in education. These studies assume that earnings reflect productivity in a market economy, and look at differentials in earnings as an index of the impact of education on economic development. Along with other types of cost-benefit studies, analysis of the social rate of return to education shares many of the problems pertaining to the private rate, discussed above.

The relevant concept of cost here clearly appears to be all costs, including public subsidies. Problems arise on the benefit side, however, due to the existence of "external economies" and the nonmonetary attractions of educationally-heavy occupations.

External economies (often called indirect benefits or social benefits) consist of those benefits which are not confined to the individuals receiving education; rather, they spill over to the economy as a whole. Society may gain more from the education of ten more college students than the simple sum of their discounted future increases in income. For example, some other persons may earn higher incomes because of the further education of these ten. Possibilities include their employers,

subordinates, or families. Education may move individuals to perform acts which give pleasure to others. Failure to allow for these kinds of external consequences of education would distort any attempt to assess its relative costs and benefits.

Then too, education is inextricably associated with advances in knowledge, which has important economic effects. The social and political external benefits which society as a whole receives may also have certain economic effects. Weisbrod [40] has suggested that these savings might be estimated by means of "avoidance costs". If it were not for education, society might have to pay more for police protection, traffic control, and medical care (as opposed to prevention).

As society becomes more affluent, people tend to place more and more weight on the nonmonetary attractions of a job or career. Since a disproportionate share of these attractive jobs are open only to college graduates, the social rate of return should take the value of this benefit of education into account. Villard [39] has suggested adopting an upward revision of the benefits, as in the individual rate of return calculations. Bowen [5] disagrees, arguing that the important consideration is whether or not the nonmonetary attraction to the employee is a cost to the employer. No revision of the benefits is called for if attractions like "prestige" only change the willingness of people to enter different occupations at different fixed pay scales. But if the employer offers subsidized housing, travel, lush offices, generous paid vacations,

or other fringe benefits which increase his costs, the rate of return should be adjusted upward.

Bowen's arguments neglect the possibility that the nonmonetary attractions of certain jobs may be detrimental to the income or rate of growth of income of a society. Others [5][30], including Balogh [2] and Lewis [22], have asserted that the attractions of white-collar jobs in underdeveloped countries have diverted workers away from preparation for the technical and mechanical occupations which are so necessary for development.

These controversies ultimately hinge on whether the benefits under review are those which enter into a standard measure of economic well-being like GNP, or a less narrow concept like social welfare. Nonmonetary attractions of educationally heavy jobs would raise the rate of return on education expressed in terms of social benefits, but not always in terms of GNP.

Since the benefits of education occur over time, and a sum earned tomorrow is worth less than the same sum earned today, rate of return studies encounter the problem of choosing an appropriate discount factor. Such a factor could be applied systematically to any future stream of earnings to determine its present value, i.e., the amount that those future earnings could be sold for today. The "market rate" of interest is often suggested as the proper discount rate in theoretical discussions. In practice, however, there are many interest rates, each reflecting the ability of different types of borrowers to gain access to

resources. Bowen [5] has suggested that individual calculations utilize the rate of interest that individuals face in the market as a discount factor, while social decisions should be based on future returns discounted by the cost which the government incurs in borrowing. This raises interesting possibilities inherent in the availability of foreign aid. If the government of a developing nation can obtain soft term loans or grants for the purpose of improving its educational system, Bowen's criteria would suggest using a very low discount factor, or not discounting future income at all.

Alternatively, Becker [3] has used the average rate of return on private investment in physical capital as a discount factor, but this overlooks the existence of differences in risk between investment in factories and in people. It is also possible that the government may not possess opportunities for investment which are as lucrative as those of the private sector. This controversy over discount rates stems from the realization that rate of return comparisons are highly sensitive to the choice of the rate. Using U.S. data for 1950, Houthakker [19] has shown that the saleable value at age 14 of a college education varied from $280.989 using a zero discount rate, to $30,085 using a rate of 8 percent.

(iii) The limitations. The rate of return approach has great appeal because it offers a means of determining the extent to which individuals should obtain further education, and the amount of education which society should underwrite. There are, however, serious limitations to this kind

of analysis. These concern two aspects of the use of current earnings data in the calculation of benefits. On the one hand, present differences in the earnings of one occupation relative to another may not persist into the future. On the other, current earnings may not be an adequate measure of the productivity of a worker.

The structure of relative earnings among occupations is expected to change over time as relative scarcities change. Suppose high schools had to pay higher salaries to attract and keep relatively scarce science teachers than to hire abundant history teachers. The observed rate of return on a specialization in science would be greater than the return on a history concentration. Drawing a policy prescription from this evidence, it would appear that more science teachers should be trained on the margin. Individuals who opt for this training might be surprised later in life to discover that abundant science teachers were then earning less than the scarce history teachers.

The existence of divergent rates of return on preparation costs for alternative professions may set into operation market forces which will tend to destroy those differences. In the course of development, the income structure of occupations changes substantially and rapidly. It is not clear how accurately current or historical rates of return predict future rates. Renshaw [30] and Machlup [24] expect future rates of return to be lower than present ones, due to the phenomenon of diminishing returns. An increase in educational attainment, they argue, takes

place only by lowering the average ability or motivation of the entrants and graduates. Others also expect the past to be a poor guideline, but feel that it understates future returns. They see the dawn of an era in which education and knowledge will become increasingly important.

The evidence, however, supports the proponents of the rate of return approach. Miller [26] has found that the returns on increments of education do not fall over time as an increasing proportion of the population obtains education. Becker [3] has also discovered nearly constant rates of return on education between 1940 and 1950. Renshaw admitted that factors like dynamic technological progress could produce such results. It thus may be plausible to predict future rates of return on the basis of current ones.

Whereas the existence of such constant rates of return may be adequate justification for a personal decision to obtain more of a specific kind of education, it may not be a correct indicator for social or government expansion of education expenditure. This is because earnings may not measure productivity. High rates of return on a medical education or the study of probate or tax law reflect the high earnings of the practitioners, rather than the social productivity of these professions. The high incomes are the result of barriers to entry into the profession, or confusing laws and arrangements which necessitate the services of duly licensed specialists or "insiders." Society could instead choose to remove restrictions on entrance into medical school, or change the laws which create economic advantages for a few.

This question is further muddled by the realization that all education gives the recipient some monopoly power over a non-recipient. An economist can earn a relatively high income because he has worked at understanding a set of problems; if the answers to those problems were common knowledge, it is doubtful that the rate of return on a Ph.D. in economics would be as high.

Others [5] [15] have pointed out that high salaries may be paid although they are unnecessary for recruitment. Wage structures may be determined by tradition, or they may reflect the former colonial wage scale which distorts the present day allocation of human skills in the underdeveloped countries. Harbison and Myers [15], and W.A. Lewis [21] have described how earnings in Africa are set abnormally high, in order to prevent a drain of educated human resources to Europe. Bowen [5] has cited a problem which occurs more frequently in modern industrial nations. Employers might engage in "conspicuous production," hiring, say, college graduates for jobs which don't require college education.

The criticism of the rate of return approach on the grounds that current earnings are poor guidelines to future social productivity is especially telling in the context of the less developed countries. There the wage structure is particularly distorted. Hollister [17] has emphasized the misallocations of labor resources which occur when wages do not provide employers and employees with cues for decision-making.

Also damaging to the rate of return approach is the failure to account adequately for the interaction between the education of one person and the benefits which others receive from it. Certain kinds of education may be complementary (e.g., that of doctors, nurses, and laboratory technicians). Educating one group but not the others may be fruitless. In cognizance of these complex interactions, it is widely held that society's return on education expenditures is greater than the sum total of individual returns on the same expenditures. Attempts to investigate these relationships border on (1) studies of the residual in economic growth on the one hand, and (2) correlations between levels of education and economic development on the other.

THE RESIDUAL IN ECONOMIC GROWTH

(i) The question. How much has improvement in the quality of labor contributed to economic growth in the past?

The quality of the labor force is expected to rise as its members receive more and better education and training. This approach seeks to isolate the impact of education and training on the historical growth rate of GNP. The procedure used, however, is indirect; the contribution of improvements in the quality of labor is generally found as a residual.

(ii) The research technique. Economists traditionally identify two kinds of physical inputs in the production process: capital and labor. The analyst asks what the contribution of these identifiable factors of production has been to the historical rate of growth of output. Given

the latter, he calculates constant price indices of the amounts of capital and labor actually used in production during the period in question.

Since he is interested in the contribution to output growth of both capital and labor, the analyst wishes to combine these two indices into one overall arithmetic index of inputs. To do so, he takes a weighted average of the original indices, using the share of output earned by the owners of capital as the capital weight, and weighting the labor input index by labor's share of the output.

The composite input index is then compared with a constant price output index. Simply subtracting the rate of growth of the inputs from the rate of growth of output yields the residual.

What is this residual? Although it has been attributed to many things, it has most often been identified with improvements in the quality of labor, the impact of education and increases in knowledge, or technical progress. Other possible explanations of this residual include improvements in the health of the labor force and in the conditions under which labor works, progressive historical improvements in the quality of machines or management, increase in the size of firms, and new products. Abramovitz has called the residual a "measure of our ignorance."

How large is the residual? Kendrick [20] performed the calculations outlined above for the U.S. economy from 1889 to 1957. He found that the output index increased at an average annual rate of about 3.5 percent, compared to the 1.9 percent per annum increase in the combined

input index. This left a residual of 1.6 percent, which Kendrick called "total factor productivity." Hence 46 percent of the rate of increase in total output is not attributable to the rate of growth of capital and labor. The residual is quite large.

Kendrick's study also examined the contribution of the residual to increases in productivity or output per unit of labor input. Using data for the private sector of the economy, he attributed only 20 percent of increases in productivity to increases in the amount of capital used by each worker on the average. If only one fifth of increases in output per worker are brought about by increases in capital per worker, the remaining 80 percent is the unexplained residual.

The size of the residual and the uncertainty about its components have been a challenge to further research. One method of gaining insight into the puzzle of the residual would be to trace out the implications of specific assumptions about the nature of the way inputs are transformed into outputs in the production process. Solow [34] and Massell [25] both assume that productive enterprises are exactly reproducible, and that inventions and technical change proceed in such a way that they do not, in and of themselves, change the relative use of capital and labor.

Although they utilize different data sources and perform slightly different adjustments to allow for unemployed machines, Solow and Massell obtain virtually identical results. Solow's finding was that the residual contributed 87 percent of the increase in output per man hour; Massell found that 90 percent of increases in productivity in the U.S. economy

from 1915 to 1955 were attributable to the residual. That is, if doubling the inputs used in production exactly doubles output, and if technical progress has a neutral effect on the relative use of inputs, almost nine-tenths of historical increases in productivity are unexplained by the traditional inputs.

Another approach to the problem posed by the residual would be to attempt to disaggregate it into recognizable elements. Denison [13] identifies inputs other than capital and labor, and subtracts the rate of growth attributable to all identifiable inputs from the total rate of growth of output. The resultant small residual is called the effect of advances in knowledge. Denison makes separate estimates of the impact on output of factors like formal education and the growth of the size of firms. Thus he is able to reduce the size of the residual by explicitly considering factors which had been lumped together elsewhere.

In estimating the contribution of schooling, Denison [13, Ch. 7] uses the rate of return approach of the last section. On the basis of 1949 data, he compares the average earnings of males over 25 with the amount of formal schooling they have obtained. The average differences permit calculation of an average rate of return on extra education. This rate of return is then used to relate net changes in the stock of educated people to the influence of improved labor quality on the growth rate. For the period 1929-1957, Denison calculates that the rate of increase in GNP due to the education of the labor force alone was .68 percent. Since GNP

grew at the rate of 2.93 percent per annum, education of the labor force accounts for almost one-quarter of output growth. Rising educational attainments of the labor force accounted for more than 40 percent of the increase in per capita income.

Harberger and Selowsky [14] have used Denison's approach in the study of an underdeveloped country. Although they considered official investment rate projections for Chile implausibly high, they nevertheless found official projections of growth rates to be attainable. This was because increases in the quality of labor as the result of education were expected to add .93 percent to the Chilean growth rate during each of the years from 1967 to 1970.

As one of the steps toward that conclusion, Harberger and Selowsky calculated rates of return on several stages of education. In Chile, special education beyond the primary level appears to have the highest payoff, 29 percent per annum. Primary education itself was found to return 24 percent on its costs, while the rates of return on secondary and university education were 16.9 and 12.2 percent, respectively. These returns were combined in a weighted average rate of return to education of 21.8 percent, which was called the "marginal efficiency of educational capital." Information about the changing size of the labor force, and the amount of education they had experienced, permitted calculation of the contribution of improvements in labor quality to the growth rate.

(iii) The limitations. Studies of the residual have dramatized the importance of education in the process of economic growth. This success

of the analysis of residuals may also be a weakness. The emphasis on rates of growth of GNP has perhaps occurred at the cost of underemphasis of other social goals. In the economic sphere, a society also has objectives with regard to price stability, full employment of labor, the distribution of income, and the composition of output. The work reviewed in this section has not attempted to analyze the impact of education on these areas of concern.

The research performed by Kendrick, Solow, and Massell fails to take into account the interaction between capital and technical progress. The capital input series essentially reflects the exact duplication of old machines in the manufacture of new ones. In these studies there is no way to allow for the fact that newer machines are usually better than their older counterparts. Thus, estimates of the contribution of capital may be too low, and the size of the residual may be exaggerated.

The work originated by Denison has attempted to sort out these kinds of interrelationships, but the methods of calculation employed have frequently been questioned [15], [8]. Though Denison and Harberger and Solowsky claim to measure improvements in labor quality derived from education, they include only formal education in their analyses; informal education and on-the-job training are neglected. In addition, the returns computed in the course of these studies are private, not social, returns. No effort is made to understand the contribution which education and work experience make to increased mobility and adaptability, and hence to more

rapid application of advances in technology.

To the extent that the residual approach uses rates of return and draws policy prescriptions from historical behavior, it is subject to the limitations discussed earlier. Moreover, unless one is willing to assume with Denison that an extra day of education at, say, the primary level has the same effect on GNP as a day spent at any level (even post-graduate), this form of research appears to add little to the policy-making framework. That is, decisions about the allocation of resources to education which were based upon rate of return calculations would not gain substantial insights by also undertaking analysis of the residual. Harberger's work has demonstrated new uses for this technique, however, and it may not yet have been pursued far enough.

The residual has established the relative significance of education in economic growth. Dissatisfaction with the large portion of unexplained phenomena, and a desire to understand the causal relationships prompt an interest in statistical inference. Pursuing Denison's study in a behavioral direction, one would encounter the attempts to correlate indices of education with indices of development.

THE CORRELATION BETWEEN EDUCATION AND DEVELOPMENT

(i) The question. Is there a systematic relationship between a society's educational attainment and the level of its GNP?

Since expenditures on education are expected to increase incomes, questions arise as to what the nature of this relationship is. Will a

nation which devotes a relatively large share of its resources to educating its labor force always obtain relatively higher levels of GNP? Will it obtain extra income immediately, or only after some delay? Does the same relationship hold among industries, and among firms?

(ii) The research technique. Simple correlation analysis is applied in the search for these relationships, either cross-sectionally, or over time. Statistical tests are used to judge the strength of the relationship.

Perhaps the easiest correlation to envisage is the one expected between education expenditures and GNP over time. Schultz [32] and Harris [16] have attempted correlations of this kind for the United States. Their hypothesis, that levels of expenditures on education are related to (or cause) levels of GNP in the same year, has come under attack by Bowen [5]. He argues that education is a long-lived asset; the recipient of education earns (or contributes) a higher income for most of the rest of his life. Thus the economic effect of an increase in education expenditures should not be sought in the year of its disbursement. GNP may even be lower that year, due to the diversion of labor resources from factories to schools. Education expenditures today should instead be related to future rises in GNP.

The choice of an appropriate time lag for the regression model is a difficult one. Most choices are either arbitrary or designed to obtain the neatest results, after trying a host of alternatives. Rather than adopt these indefensible positions, an alternative is suggested by the nature of the lagged response. The level of GNP ten years from now is

seen to depend partly on education expenditures last year, partly on those of this year, partly on next year's expenditure, etc. In other words, the level of GNP in a given year depends upon the total stock of educated persons in that year. This stock is the result of all past additions to education minus any attrition.

Schultz [31] [32], who has provided the creative leadership for much of the study of the economics of education, has attempted to measure the stock of educational capital for the United States. His suggestion to weight younger persons more heavily than older ones when adding up the stock of education has been criticized by Bowen. The weighting procedure is correct if one wishes to know the salable value of education, Bowen asserts, but it is not desirable for the relation of current educational attainments to current GNP. This controversy appears to hinge upon whether educational units are commensurable over time.

Opinions on the intertemporal quality of education vary markedly. Denison [13] concluded that a graduate of eighth grade today is equivalent to a 1910 college graduate. At the other extreme, Machlup [24] contends that the quality of a given grade deteriorates with the dilution of the quality of students brought about by the drive toward universal education. When the length of compulsory education is changed from, say, six to eight years, schools merely stretch the same educational content over two extra years, to cope with the new seventh and eighth graders who have less ability or motivation on the average than their predecessors. Denison's conclusion

actually stems from an assumption of constant quality of education per day over time. Doubling the number of days spent in school per year, he asserts, should have the same effect on output as doubling the number of years of schooling.

Another way to investigate the education-income relationship is to observe the differences among countries. Svennilson, Edding, and Elvin [35] have attempted inter-country correlations between per capita GNP and enrollment rates. The latter are the number of students enrolled in a particular grade or stage of education expressed as a percentage of all students whose age qualifies them for it. Bowman and Anderson [10] also look at international comparisons of income and education levels. They first divide countries into three groups according to their index of energy potentials per capita. This was used as a proxy for productive potentials; energy potentials are independent of past capital accumulation, the quality of labor, and socio-economic attitudes and organization For each group, GNP per capita was correlated in turn with each of the following variables: (1) the percentage of adults who are literate, (2) the percentage of population in post primary school, and (3) the percentage of population, age 5-14, enrolled in primary school (primary enrollment rate). Their study also tried to correct for agricultural potential on the basis of cultivated hectares per capita. Despite all of this careful work, neither the Bowman and Anderson study, nor the work of Svennilson, Edding, and Elvin produced very strong conclusions. To be sure, GNP per capita was positively related to indices of education, but there was considerable dispersion.

In a recent study, McClelland [23] has attempted to use a dynamic approach to cross-country analysis which allows for the introduction of the time lag. He compares enrollment rates in one period with growth rates in a later period. Grouping the countries studied by an electric power index, in the manner of Bowman and Anderson, he observes that countries with higher university enrollment rates in 1950 achieved greater increases in per capita income during the 1950s. These differences allow him to calculate an annual rate of return on extra university education of 12 percent. McClelland also concludes that countries with higher secondary enrollment rates in 1930 grew more rapidly during the 1950s than countries with lower rates.

This study is weakened by the lack of an attempt to correct for other factors which might have caused the higher growth rates of GNP per capita. Then too, McClelland's results would be reversed if the U.S. and Canada were excluded from the study. His analysis is severely challenged by Bowman [8] [10] who found that income in the 1930s explained enrollment rates in the 1950s better than schooling in the 1930s explained income in the 1950s.

Little work has been accomplished in the area of inter-industry or inter-firm analysis. Cross-sectional correlations between the training or education of workers and the profitability of firms or industries await further study. Economic theory would not expect a systematic bias between profitability and the use of highly trained manpower. If a strong relationship were uncovered, an explanation would certainly be necessary. Casual

empiricism suggests that a correlation exists between profitability and the percentage of a firm's labor force who have training beyond the secondary level. The more profitable industries, however, may also be the ones with a high degree of market power; or they may be engaged in Bowen's conspicuous production, or both. Clearly, further study is needed here.

(iii) The limitations. The correlation analyses are subject to chicken-egg controversies, for while it can be shown that countries which invest relatively more in education reap higher rates of growth of national income, it can also be demonstrated that nations which have high levels or rates of growth of income tend to consume more education. An example of this two-way causation problem is the correlation calculated by Schultz [32] between expenditures on education and GNP. The coefficient obtained through regression analysis indicates that expenditures on education grew 3.5 times as fast as income. The significance of this coefficient may be that as people attain higher incomes, they tend to spend a larger portion of it on education. Or it could reveal how much extra education was necessary to obtain a given increase in GNP. Both of these propositions are undoubtedly true to some extent, but the work reported on in this section cannot disentangle the relationship in the absence of other information.

The cross-country work of Svennilson, et al. does serve some useful purposes, however. Planners in a developing nation are able to look at their own educational programs in the perspective of the experience of

other countries. Countries with the same per capita income and socioeconomic characteristics can yield information on what levels of education may be possible, on the one hand, and necessary, on the other. The current levels of education in more advanced countries can give planners a general idea about future demands, and the experience of these countries can also be instructive.

There is a danger, however, in regarding the levels of educational activity associated with advanced countries as norms. It is doubtful whether current or historical patterns of educational development in these countries are to be considered optimal. Many developing countries may have over-invested in education, as Anderson and Bowman [9] and Lewis [22] have suggested. It is also probable that the more complicated levels of technology associated with today and tomorrow will require higher levels of education at every stage of development then have been observed historically. Since the effectiveness of education appears to depend upon the extraschool environment, more education would be required in a primitive rural area than in a city to achieve equal results. In any case, identical education expenditures in two countries would imply equal educational output only if teachers, buildings, and other resources were used with the same efficiency.

Ignoring all these problems, McClelland [23] observes that the successful growth cases among the less developed countries were those in which enrollment rates ranged from 10 to 20 per thousand in the population. He also found that university enrollment rates are about 2 per thousand for those less developed countries which are growing rapidly. He thus concludes

that these levels of education should be the targets of the more stagnant LDCs.

Inter-firm and inter-industry correlations may prove interesting, for one would not expect the chicken-egg problem to be as severe as in the more aggregative education-GNP correlations. The usual view of the behavior of firms does not suggest that they would hire educationally heavy inputs in order to enjoy their presence. Firms which hire a disproportionately large number of scientists or other highly educated people presumably do so to increase profits. Even if there is some conspicuous production, it cannot be as pronounced as the consumption attitudes toward education among individuals.

Correlation analysis suffers from many of the same problems as the rate of return studies. It is forced into assuming that a great many other things are equal. The external benefits of education are not explicitly considered. For example, in the cross-country correlations, no attempt was made to measure the effect of education in one country on the incomes of other countries. Bowen [5] concludes that simple correlations of this kind cannot give us any information about the quantitative dimensions of the contribution of education to development.

In the face of all of these difficulties, planners have still managed to design and attempt to implement programs for human resources development in the past, and they will continue to do so in the future. What methods of analysis have they utilized? One set of studies is designed to assess the demands of the economy for skilled workers. Other kinds of analysis have set their goal to be the supply of these skills.

FORECASTING AND PLANNING FOR MANPOWER REQUIREMENTS

(i) The question. What is the quantity and composition of additional skilled persons needed over the planning period in order to support the desired rate and pattern of economic development?

The production of goods and services requires capital and labor; the production of certain kinds of goods and services requires certain kinds of machines and labor. Labor is differentiated by skill, and skills are usually obtained over the course of time through formal or informal processes of education and training. Given the output goals of an economy, it is necessary to determine how many skilled workers in each skill category will be needed, just as one estimates the requirements for the number and types of machines. Similar to the manner in which one anticipates the need for the use of capital by planning to produce domestically some items and import others, the successful implementation of the plan depends upon the ability of the society to produce the necessary mix of skills.

(ii) The research techniques. There are essentially three methods of forecasting manpower requirements: (1) employer surveys, (2) analysis of the experience of more advanced countries, and (3) use of fixed-coefficient projection techniques.

Surveys of employers' expectations of their future needs are rapid methods of obtaining useful planning information. The survey can be restricted to those industries which are expected to expand, and the information may be

collected inexpensively. The shortages revealed by employer surveys may, however, be relevant only in the short run. Employers probably possess shorter planning horizons than is suitable for decisions made on behalf of the whole society. The immediate nature of employers' perceived demands is important with regard to skills which require long periods of training. An educational system cannot be asked to give three years of training to a person required next month.

The experience of other countries, whether similar or more advanced, can also yield information about the size and composition of skilled labor pools that may be required in the course of a country's growth. Again, planners must be cautioned against relying on the pattern of skills observed in other countries, for most of the same reasons that reliance on the enrollment rates of others may be inappropriate. The range of possibilities for substitution among inputs in the production process is often quite wide. This substitution can take place between labor and machines, and among labor of different skills. The value of looking at skills used in other countries depends upon the range of substitution permitted by available technology, as does the entire manpower forecasting and planning exercise.

Some production processes are characterized by fixed coefficients--i.e., the amount of labor necessary is determined once the amount of capital to be employed in the operation is known. A good example is the ordinary shovel. It is generally set into operation by the use of one worker. Less than one worker will not do, and more than one worker using a shovel may be

almost as bad as none. Other production processes are capable of using a wide variety of combinations of men and machines. The use of fixed-ratio projection techniques thus pertains more to the former processes.

The methodology of projecting manpower requirements with fixed ratios has been described exhaustively by Sugg [38] and Parnes [27]. First, it is necessary to obtain an estimate of total employment for the target date. This can be accomplished in several ways. If the planner is fairly confident that he can predict future investment, he can estimate future employment on the basis of fixed incremental capital-labor ratios. Alternatively, the planned investment figures could yield the level of increased output when divided by incremental capital-output ratios. The amount of labor necessary to achieve those increases in output can then be obtained with the use of assumptions about productivity (output-labor ratios). These anticipated levels of employment can be corrected for observed trends or any other relationships the analyst can discover between employment in various industries and other economic indicators.

The projection of employment of undifferentiated labor thus should take into account any anticipated changes in demand, hours worked, or productivity. The level of aggregation chosen usually depends upon the information available, but a detailed analysis of the projections by sector or industry is desirable. By disaggregating, allowance can be made for changes in industrial structure which occur as industries grow at different rates.

It is then necessary to determine the skill composition of the projected employment by industry. This is accomplished by applying existing

or anticipated occupational composition patterns for each industry. Data availability will again determine the choice of skill detail, but attention should be addressed to the skills which require long periods of training.

In practice, as in the Mediterranean Regional Project of the OECD [28] [29], fixed-ratio projections are adjusted on the basis of the experience of other countries and surveys of employers.

Once the manpower requirements have been forecast, it is possible to trace their implications for the educational system and training institutions. The requirements can be compared with the expected supply by the target date, and shortages and surpluses of various occupations and skills can be ascertained. On the basis of these projected gaps, the educational planners can expand some activities and curtail others.

An essential link, however, must be forged conceptually before supply can be contrasted with demand. It is necessary to determine the amount of education and training required by each occupation. The translation of the demand for labor differentiated by skills into the composition and duration of education has never been accomplished satisfactorily. Even the detailed job analysis and exhaustive listing of educational qualifications for very specific occupations by the OECD [27] have proven inadequate.

The problem is that very few jobs require a specific combination of ability and training. Most skills fall between two extremes: occupations which require only a short period of observation, as opposed to jobs which require the mastery of precise operations which can only be learned over a

considerable time span. Not only must the duration of training be decided upon, but the choice must be made between formal and informal education. There appears to be a wide range of substitution between educational qualification and job experience in many occupations. The type and length of training required for, say, a shoemaker will also vary with the kind of capital he has available on the job. Simple tools require a process of training, and perhaps a trainee, quite different from that demanded by automatic machines. The problem is further complicated by the observation that general education often enables a person to grasp specific instruction more readily.

(iii) The limitations. There are some [5] who would assert that manpower planning does not belong in this survey, since it is not directed at assessing the economic contribution of education. This line of argument is misleading, for if manpower requirements are interpreted in their strictest sense, all of the economic contribution of certain activities could be assigned to education. For example, a modern jet airliner could not get off the ground unless there existed a technician or crew trained to fly it. In this case, if the training failed to take place, the airplane would make no economic contribution; the entire economic contribution of the airplane in service could be attributed to the training of pilot and crew.

But how well should the pilot be trained? A minimum amount of training is necessary to enable him to get the plane aloft, and return it safely to the ground; but beyond that, should he be a first-rate pilot? Or should he be second or even third-rate? The manpower forecasting and

planning technique no doubt assumes that training requirements are more specific than they really are. There is enough substitutability in economic activities to negate the existence of fixed coefficients, but the opposite extreme may be even further from reality. Workers of different skills are not perfect substitutes for each other.

Manpower planning implies that the levels of economic activity which have been forecast could not take place without the specified training. This is not completely correct, but it is probable that the activities could not take place very well without the required skilled workers. Bruton [11] has argued that there is evidence that substitution is far from perfect among skills in an LDC, so the manpower forecasting and planning approach may thus be relevant for its needs. He cautions against always assuming that the education sector will or should respond to the needs of the production sector. Often the latter will initiate an activity in response to the existence of a pool of skilled labor resources.

The record of manpower forecasts, however, has been rather poor; major projections have been substantially inaccurate. Bowen [5] has suggested that they tend to understate the future demand for labor of various skills, due to the rapid pace of scientific developments. Difficulties are also encountered in projecting the employment of people with general training. Even where the notion of fixed coefficients is approximated, as in the case of engineers, the graduates of training programs may thwart the planners by not entering the occupations for which they were trained.

In the course of a recent attack on the foundations of manpower projection, Bowman and Anderson [9] agree with the earlier criticism by Bowen [5] and Hollister [17]: manpower planning is only a partial method of analysis, since it ignores costs. It may be true that employers will need workers of specific skills, but are they willing or able to pay for them? Manpower planners have often been guilty of identifying shortages and proceeding to train the appropriate number of workers regardless of cost. Decisions to train additional workers or to expand educational facilities, under conditions of scarcity, require the balancing of costs and benefits.

Manpower planning has been accused by its several critics of misleading students in their career choices and creating a rigid pattern of staffing whereby all positions in a society are filled according to strict educational qualifications. More relevant is the criticism that manpower planners frequently assume that formal education in vocational and technical schools is the only source of middle level manpower. This neglect of the possibilities for on-the-job training and skill upgrading has contributed to inaccurate forecasting, and wastefulness, since technical schools are very expensive.

The Mediterranean Regional Project of the OECD was a large-scale manpower planning effort in six Southern European nations. The framework for the study is discussed by Parnes [27] and there are country reports, of which Turkey [29] and Spain [28] are representative. Hollister [18] has criticized the project for concerning itself too narrowly with educational

planning, at the expense of programming and implementing activities.

With the exception of Bowman and Anderson, who find it totally useless, the critics of manpower forecasting and planning believe that this kind of analysis has a role in decisions about the allocation of resources to and within education and training.

The manpower approach is a unique method of obtaining information that can be incorporated into broader types of analysis; manpower policy should be integrated with overall social and economic policy.

EDUCATION PLANNING MODELS

(i) The question. Education planning models do not attempt to answer a general question; rather, they are designed with specific questions in mind. The complex interrelationships of an education system are simulated, in order to provide a framework for testing the consequences of alternative policies and investment patterns over time. A model can be used to discover which alternative best achieves particular objectives. Models may be designed to generate consistent plans, assess the feasibility or costs of a proposed plan, or point out the bottlenecks to further educational development.

(ii) The technique. All education models share the characteristic of expressing the interrelationships of the education system in algebraic form. This means that all important flows of students, teachers and the services of equipment, textbooks, and buildings are explicitly related to each other in quantifiable ways. For example, the enrollment of sixth graders in 1971 equals the number of fifth graders in 1970 times the progression rate (or

one minus the wastage rate). The progression rate is thus the sixth grade enrollment in one year divided by the fifth grade enrollment of the previous year, and the wastage rate is the sum of the drop-out and failure rates.

Other examples of these specified relationships readily come to mind. The supply of teachers required for a particular grade in a given year is equal to the enrollment in that grade during that year, divided by the appropriate pupil-teacher ratio. Recurring costs per pupil are equal to the total cost of teacher salaries plus textbooks plus materials plus maintenance, all divided by the level of enrollment.

Once the relationships have been stated algebraically it is possible to begin assigning numbers to the various symbols. The purpose of the model will dictate which variables are assigned values, and which will be determined in the solution of the model. Values must be assigned to the parameters, which relate the variables to each other. These numbers may be taken from history, or they may be set by policy. For example, drop-out rates can be those observed historically, or extrapolations of recent trends. Policy decisions could be reflected in, say, pupil-teacher ratios. Solutions to the model can be made subject to constraints on resource use; even social and political constraints can be built into the model, if they can be quantified.

The early educational planning exercises were supply models. Targets were accepted as given (often by independent manpower projections), and the problem they addressed was the investigation of alternative methods of supply. Timbergen, Correa, Bos, and others at the Netherlands School

of Economics were in the vanguard of these efforts. Much of the work which was carried out under Tingergen's [36] direction, however, consisted of the application of pre-existing economic models to the problems of education. In essence, the Tinbergen models investigated the paths followed by key variables in response to changes in assumptions.

The most complete supply model has been developed by UNESCO with the cooperation of ECAFE [37]. It was designed as a tool to aid the Asian member nations in developing educational policy. After specifying, quantifying, and programming the relationships, it became possible to observe the implications of changes in the educational system, almost instantaneously. The costs of new programs became readily apparent, in spite of the long time spans they embraced.

Although they did it in a sophisticated way, these models were only looking at half the problem of allocating resources efficiently in the education sector. They dealt solely with the cost or supply side of the problem, in much the same way as the manpower projections dealt only with the demand side. To be sure, Correa [12] considered both sides of the problem, but even there the first part of his book was devoted to the supply of labor, and demand considerations were postponed until the latter part. The integration of supply and demand into one model had to await more recent developments.

Linear optimizing models have been applied to human resources development planning by Adelman [1], Bowles [6] [7], and Benard [4]. The models used by Benard and Adelman encompass the entire economy, but

they give detailed attention to the education sector. Using data from Argentina, Adelman's model efficiently allocates investment resources to both education and real capital. Solution of the model results in the optimal pattern of production, imports, and exports in the several sectors of the Argentine economy over time. With respect to the education sector, the model determines the number of graduates from each of the various schools, and allocates these graduates to different sectors of the economy, in response to their labor requirements.

In contrast with Adelman's general equilibrium model, Bowles takes the resource flows from the rest of the economy as given, and attempts to allocate those resources efficiently among educational activities. His study of Northern Nigeria incorporates variations in educational policy, such as the increased use of audio-visual equipment, or the introduction of team teaching. Among the constraints on his solutions are politically determined minimum levels of secondary enrollments, and limits on the pace of expansion of facilities.

In order to make decisions about resource allocation, these models require a criterion. Bowles seeks a solution which will maximize the contribution of the educational system to future (discounted) national income. Adelman similarly attempts to maximize the discounted sum of GNP, but in other trials she experimented with maximizing the growth of GNP between a base year and a target year. In another set of runs, she minimizes the discounted sum of net foreign capital inflows, an approach which is of interest to those concerned with foreign assistance. It is interesting to

note that, in the operation of both models, technical and vocational education was a bad investment; the benefits derived from them failed to cover their cost.

Perhaps the most significant aspect of this new approach is its promise as a means of integrating the other techniques of human resources development planning. Not only have demand and supply been brought into the same model, but the work of others has been incorporated.

Bowles has permitted a choice between producing teachers domestically and importing them, an innovation of Tinbergen. To arrive at the productivity of various kinds of education, Bowles calculates rates of return, and then proceeds to assume that these rates will remain constant. Dividing the labor force into three skill categories, Adelman borrows from the manpower planners by assuming fixed productivity ratios in each category, and refusing to permit labor in one category to substitute for any other. The output-skilled labor ratios are derived from correlations between education and income. Unlike Bowles, however, her model does not have constant rates of return from each stage of education; the returns are allowed to vary with the relative scarcity of the skills (supply) and the growth of various sectors of the economy (demand). Bowles follows Tinbergen and the OECD in skipping over the differentiation of the labor force by skills. Instead they specify labor by educational attainment.

As other models are developed and enlisted in the search for policy guidelines, this groping toward a synthesis of planning techniques may continue.

(iii) The limitations. Models may become quite sophisticated, but they are only as powerful in generating solutions as the knowledge built into them. To the extent that the recently developed models synthesize the various techniques of human resources development planning, criticism of the models is criticism of the state of the entire field.

For example, if one argues that Bowles's assumption of perfect substitutability among different kinds of educated labor is unrealistic, one is actually quarreling with the advocates of a fixed rate of return. Studies conducted to date have assumed either no substitution, or perfect substitution among skills. The truth lies somewhere in between, and studies of the elasticity of substitution between skills are clearly required.

The particular objectives which the models maximize are subject to the same lengthy criticism as the rate of return analysis. Since the models use this kind of analysis to determine the desirability of different stages and types of education, they also fail to account adequately for noneconomic social benefits, the consumption aspect of education, external economics and complementarities. Bowles and Adelman, like the other analysts discussed in this paper, find it easier to deal with formal education, and tend to ignore the economic contribution of on-the-job training, in-service programs, and extension activities.

Adelman's investigation of the relation between output and labor differentiated by skill is a fresh approach to the correlation problem. Efforts like this may yet provide a bridge between rate of return analysis and the manpower requirements approach. Further clues may be provided by

inter-firm correlations. More detailed information about the range of possible substitution among skills could be useful as constraints on the perfect substitutability models. Since manpower projections tend to understate the future requirements for skilled workers, they might also be effectively utilized as a constraint, providing a floor on the formation of skills.

Very little is known about the translation of the requirements of producers (labor differentiated by skill) into the composition and number of school graduates. Most studies avoid this problem by specifying labor demanded by the production sector in terms of educational attainments. But just what precisely does an increment of education change in a man? This question is acute enough with respect to how education relates to economically useful skills, let alone how it influences the total man. A greater understanding of the relation between education and development is undoubtedly dependent upon our knowledge of how a person's economic and social activities are transformed by his educational experience.

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ABSTRACT - THIS STUDY IDENTIFIED THE MATHEMATICAL CONCEPTS WHICH ARE NEEDED BY THE ENTRY-LEVEL ELECTRONICS TECHNICIAN AND DEVELOPED AN ACHIEVEMENT TEST TO DETERMINE THE UNDERSTANDING OF SUCH CONCEPTS BY STUDENTS GRADUATING FROM PUBLIC POST-HIGH SCHOOL ELECTRONICS TECHNOLOGY INSTITUTIONS. CONCEPTS WERE SELECTED AND SUBMITTED TO A JURY FOR EVALUATION AS BASIC MATHEMATICAL CONCEPTS. A TOTAL OF 56 BASIC CONCEPTS WERE THUS IDENTIFIED AS BEING NECESSARY FOR ENTRY-LEVEL ELECTRONICS TECHNICIANS. TWO EQUIVALENT TEST FORMS WERE CONSTRUCTED TO TEST UNDERSTANDING OF THE IDENTIFIED CONCEPTS AND ADMINISTERED TO 2672 STUDENTS. SPECIFIC CONCLUSIONS OF THE STUDY WERE: (1) IT IS POSSIBLE TO DETERMINE THE NEEDED CONCEPTS, (2) IT IS POSSIBLE TO DEVELOP AND STANDARIZE A VALID AND RELIABLE DIAGNOSTIC-ACHIEVEMENT TEST FOR THE PURPOSE OF ISOLATING THE CONCEPTS, AND (3) ELECTRONIC TECHNICIANS ARE NOT PLACING ENOUGH EMPHASIS ON ESSENTIAL MATHEMATICAL CONCEPTS. (AUTHOR/GEB)

VT 007 748

RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS

By:

Dr. Jerold J. Simons

February, 1968

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RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS BY STUDENTS MAJORING IN ELECTRONICS TECHNOLOGY

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By

Dr. Jerold J. Simons

Submitted to the Texas Educational Agency
and Texas A&M University

February, 1968

TABLE OF CONTENTS

Chapter		Page
I.	INTRODUCTION	1
	Statement of the Problem	1
	Significance of the Problem	2
	Hypothesis	4
	Assumptions	4
	Limitations	5
	Definitions	5
	Basic Electronics	5
	Electronics Technology	6
	Mathematical Concept	6
	Diagnostic Achievement Test	6
	Content Validity	7
	Reliability	7
	Instrument	7
	Item Analysis	7
	Standardization	7
	Procedure	8
	Financial Assistance	11
II.	REVIEW OF LITERATURE	12

Chapter		Page
	Mathematical Skills Needed by Public School Teachers	12
	Mathematical Skills Important to the Technician	16
III.	DETERMINING AND TESTING MATHEMATICAL CONCEPTS NEEDED BY THE ENTRY-LEVEL ELECTRONICS TECHNICIAN	22
	Determining Needed Mathematical Concepts . .	22
	Textbook Analysis	22
	Industrial Survey	24
	Mathematical Concept Checklist	26
	Needed Mathematical Concepts	26
	Construction of Diagnostic Achievement Test .	29
	Selection of National Normative Sample . . .	33
	Selecting the Sample	34
	Administering the Test	39
	Scoring the Test	39
IV.	ANALYSIS OF TEST RESULTS	43
	Analysis Procedure	43
	Central Tendency of Variability	43
	Standard Error of Measurement	50
	Test Reliability	51
	Test Validity	57

Chapter		Page
	Test Norms	57
	Determining Relative Understanding of Essential Mathematics Concepts	59
	Analysis of Test Items	59
	Understanding of Mathematical Concepts . .	68
	Summary of Test Analysis	72
V.	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . . .	73
	Summary	73
	Conclusions	75
	Recommendations	77
BIBLIOGRAPHY	. . . . .	78
APPENDICES	. . . . .	81
	APPENDIX A: Textbooks Used to Determine Mathematical Concepts	82
	APPENDIX B: Jury Members	87
	APPENDIX C: Mathematical Concepts Determined From Textbook Analysis	90
	APPENDIX D: Information Checklist	93
	APPENDIX E: Mathematics Achievement Test . . .	98
	APPENDIX F: Achievement Test Administration Instruction Sheet	121
	APPENDIX G: Achievement Test General Information Form	123

LIST OF TABLES

TABLE		Page
I.	COMPANIES PARTICIPATING IN STUDY	25
II.	ITEM ANALYSIS OF TEST--FORM X	31
III.	ITEM ANALYSIS OF TEST--FORM Y	32
IV.	ITEM ANALYSIS OF TEST--FORM Z	33
V.	POST-HIGH-SCHOOL INSTITUTIONS PARTICIPATION SUMMARY	35
VI.	POST-HIGH-SCHOOL ELECTRONICS TECHNICIAN STUDENTS PARTICIPATION SUMMARY	40
VII.	MEASURE OF CENTRAL TENDENCY AND VARIABILITY OF TEST FORM Z FOR TWO-YEAR INSTITUTIONS	44
VIII.	MEASURE OF CENTRAL TENDENCY AND VARIABILITY OF TEST FORM Z FOR FOUR-YEAR INSTITUTIONS	47
IX.	ESTIMATES OF RELIABILITY FOR TWO-YEAR INSTITUTIONS	52
X.	ESTIMATES OF RELIABILITY FOR FOUR-YEAR INSTITUTIONS	54
XI.	AVERAGE RELIABILITY COEFFICIENTS FOR TEST FORM Z, WESCHLER AND STANFORD-BINET INTELLIGENCE SCALES, ARMY GENERAL CLASSIFICATION TEST, SCHOLASTIC APTITUDE TEST, AND MILLER ANALOGIES TEST	56
XII.	NATIONAL NORMS FOR TWO-YEAR POST-HIGH-SCHOOL INSTITUTIONS OFFERING ELECTRONICS TECHNOLOGY	58
XIII.	NATIONAL NORMS FOR FOUR-YEAR POST-HIGH-SCHOOL INSTITUTIONS OFFERING ELECTRONICS TECHNOLOGY	59
XIV.	STATE NORMS FOR TWO-YEAR POST-HIGH-SCHOOL INSTITUTIONS OFFERING THE ELECTRONICS TECHNOLOGY CURRICULUM	60

TABLE Page

XV. STATE NORMS FOR FOUR-YEAR POST-HIGH-SCHOOL INSTITUTIONS OFFERING THE ELECTRONICS TECHNOLOGY CURRICULUM 61

XVI. RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS FOR STUDENTS FROM TWO-YEAR INSTITUTIONS 62

XVII. RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS FOR STUDENTS FROM FOUR-YEAR INSTITUTIONS 65

XVIII. MATHEMATICAL CONCEPTS WHICH ARE LEAST UNDERSTOOD BY STUDENTS FROM TWO AND FOUR-YEAR POST-HIGH-SCHOOL INSTITUTIONS WHICH OFFER THE ELECTRONICS TECHNOLOGY CURRICULUM 69

XIX. MATHEMATICAL CONCEPTS WHICH ARE UNDERSTOOD BY STUDENTS FROM TWO AND FOUR-YEAR POST-HIGH-SCHOOL INSTITUTIONS WHICH OFFER THE ELECTRONICS TECHNOLOGY CURRICULUM 71

LIST OF FIGURES

Page

Figure 1. Mathematics Courses Which Electronics Instructors and Technical Workers Felt Were Important 20

Figure 2. Post-High-School Institutes Administering Achievement Test--Form Z 38

ABSTRACT

Relative Understanding of Mathematical Concepts by Students Majoring in Electronics Technology

Dr. Jerold J. Simons, Research Director

The purpose of this investigation was (1) to identify the mathematical concepts which are needed by the entry-level electronics technician and (2) to develop and standardize an achievement test for the purpose of determining the relative understanding of such concepts by students graduating from public-post-high-school electronics technology institutions. The research included thirty-eight states and the District of Columbia.

Forty-seven electrical-electronics textbooks were examined, and all basic mathematical concepts presented by each of the textbooks were listed. The concepts which were identified were submitted to a jury of college instructors of courses in electronics, mathematics, statistics, and education. These instructors were asked to evaluate each concept listed in terms of whether it was a basic mathematical concept.

A checklist containing all the identified concepts was constructed and distributed to 568 electronics industries throughout the United States. Qualified industrial personnel were asked to indicate which mathematical concepts were needed by the entry-level electronics technician. Fifty-six basic mathematical concepts were identified.

Two equivalent test forms were constructed--forms X and Y. Both forms X and Y were administered to a sixty-eight student pilot study group and an item analysis was performed. They were submitted to the previously mentioned jury of college instructors for their evaluation. The final test, form Z, consisted of a compilation of the most valid and reliable test items from forms X and Y. Test form Z was administered to the pilot study group and evaluated by an item analysis and jury of instructors.

Test form Z was administered to 1556 eligible electronics technology students graduating from two-year post-high-school institutes and 1116 students graduating from four-year institutes agreed to participate in the study. All of the tests were administered by the instructor or the author and scored by an electronic scanner.

An analysis of the test results was made by computing the mean, the median, the standard deviation and the standard error of the mean for both two and four-year institutions which offered the electronics technology curriculum. The Kuder-Richardson and

Spearman-Brown reliability coefficients were determined as well as the number of errors, percentage of errors, and rank order of understanding for each concept tested.

The total analysis revealed that electronic instructors are not placing enough emphasis on the essential mathematical concepts. Specifically, the following conclusions were reached:

1. It is possible to determine which specific mathematical concepts are needed by the entry-level electronics technician.
2. It is possible to develop and standardize a valid and reliable diagnostic-achievement test for the purpose of isolating those mathematical concepts which are least understood so that additional education may be provided for students to correct such weaknesses.
3. Six of the forty-seven electronics technology textbooks analyzed included all of the fifty-six essential mathematical concepts.
4. Electronics instructors are not placing enough emphasis on mathematical concepts which the personnel from the electronics industries consider essential for the entry-level electronic technician.

It is believed that these findings will provide a sound basis for updating the mathematical content of the electronics curriculum to fit the needs of industry.

CHAPTER I

INTRODUCTION

The rate of technological change varies greatly among the many technical areas. In the electronics industry, the rate of change has been most rapid. With the persisting demands of the electronics industries, more and more electronics technicians are being trained in trade schools, junior and senior colleges, through correspondence courses, and on the job. Hickey and Villines point out that even with the intensified training programs, the number of competent technicians is insufficient for the construction and maintenance of newly developed electronic systems.[1]

The process of training a person, of average intelligence, to be a competent technician within a reasonable length of time poses quite a problem, especially when persons with different educational backgrounds have to be considered. Because of the continuing complexity of the area of electronics, the student who enters the electronics technician field must develop some degree of skill with basic mathematical concepts.

Statement of the Problem

This research was conducted to identify the mathematical concepts which are needed by the entry-level electronics technician

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[1] Henry V. Hickey and William M. Villines, Jr., Elements of Electronics (New York: McGraw-Hill Book Company, Inc., 1961), p. vii.

and to determine the relative understanding of such concepts by students graduating from public post-high-school electronics technology institutions. Specifically, this study was designed to answer the following questions:

1. Which mathematical concepts do industries in the United States consider to be required, preferred, or unnecessary knowledge for the electronics technician they employ?
2. What is the relative understanding of the mathematical concepts which are necessary in industry for students graduating from public post-high-school electronics technology programs?
3. How much emphasis is being placed on mathematics within the electronics curriculum presently being offered in public post-high-school technical programs of the United States?
4. What are the implications of these findings for curriculum content improvement in present and future electronics technology programs?

Significance of the Problem

A primary objective of an electronics technology curriculum, whether it is a part of a post-secondary, area vocational-technical school, a community, a junior or senior college, or an extension of a state university, is to develop an educational product who will help meet the needs of the electronics industry. If the technician is to

meet the demands of industry, he must be able to apply mathematics to a practical situation.[2]

Most of the basic ideas of electronic phenomena are based upon mathematical reasoning and are stated in mathematical terms.[3] The electronics technology student must be able to express electrical theory in clear and concise mathematical terms arranged in logical order. Without mathematical assistance, the student must be satisfied with the long and painful process of accumulating lists of information and details of experiences, and he still will never achieve a thorough understanding of the field in which he lives and works.

Because a thorough grounding in mathematics is essential to proficiency in any of the numerous branches of electronics, it is necessary that the electronics technological curriculum include those mathematical concepts which are essential for success as for an electronics technician. The significance of this research lies in the attempt to determine the specific mathematical concepts which are needed by the entry-level electronics technician. This study also provides the electronics teacher with a standardized diagnostic-achievement test which he can use to isolate mathematical deficiencies in needed concepts.

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[2]Nelson M. Cooke, Basic Mathematics of Electronics (New York: McGraw-Hill Book Company, Inc., 1960), p. v.

[3]John L. Clark, Emerging Practices in Mathematics Education. Twenty-second Yearbook of the National Council of Teachers of Mathematics (Washington, D.C.: Government Printing Office, 1954), p. 16.

Hypothesis

The hypothesis underlying the design of this investigation is that it is possible (1) to determine which specific mathematical concepts are needed by the entry-level electronics technologist and (2) to develop and standardize a valid and reliable diagnostic-type achievement test for the purpose of isolating those mathematical concepts which are least understood so that additional education may be provided for students to correct such weaknesses.

Assumptions

This investigation was designed with the following assumptions:

1. Persons responding to the information forms understood the questions, and their responses represented valid answers.
2. Basic mathematical concepts for the entry-level electronics technician are the same throughout the United States.
3. Knowledge of mathematical concepts is measurable.
4. An achievement test to diagnose weaknesses can be standardized.
5. Participating students will make a valid attempt to solve all problems contained in the achievement test.

Limitations

The following limitations have been made concerning this research:

1. Samples were limited to public post-high-school institutions offering at least fifteen semester hours of electricity and electronic courses.
2. Only those students who had completed at least ninety per cent of their electronics technology curriculum were tested.
3. Students participating in the study had completed at least one year of high school algebra.
4. A sample of at least sixty students was used for the purpose of performing an item analysis on the achievement test and making a preliminary check on test validity and reliability.
5. A sufficient sample was drawn from post-high-school institutions offering electronics technology throughout the United States to develop normative information.

Definitions

The definitions of certain key terms used in this study are listed below:

Basic Electronics. A course preceded by a fundamental electricity course, dealing with the concepts, principles, and applications of vacuum tubes and semiconductors.

Electronics Technology. A post-high-school curriculum which provides educational experiences for the purpose of developing technical skills pertinent to the scientific application of electronic instruments, systems, processes, research, and design.[4]

The institutions offering the electronics technology programs either require two or four years of full time study. The majority of two year programs lead to an associate of arts degree or a certificate of graduation, while the four year programs lead to a bachelor's degree.[5]

Mathematical Concept. A notation, idea, or mental impression--the content of which is primarily related to computation, quantitative relationships, systematic reasoning, or the structure of configuration.[6]

Diagnostic Achievement Test. A test which is designed to provide a detailed picture of strengths and weaknesses in an area.[7]

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[4]Occupational Outlook Handbook: 1963-64 Edition, United States Department of Labor (Washington: United States Printing Office, 1963), pp. 168-69.

[5]"Occupation Outlooks for the Electronics Technician," Electronics World, Vol. 77, No. 6, June 1967, pp. 64-66.

[6]Carter V. Good, Dictionary of Education (New York: McGraw-Hill Book Company, 1959), p. 92.

[7]Robert L. Thorndike and Elizabeth Hagen, Measurement and Evaluation in Psychology and Education (New York: John Wiley & Sons, Inc., 1961), pp. 296-97.

Content Validity. "Content validity involves essentially the systematic examination of the test content to determine whether it covers a representative sample of the behavior domain to be measured."[8]

Reliability. Reliability of a test refers to the consistency of scores obtained by the same individual on different occasions or with different sets of equivalent items.[9]

Instrument. In this dissertation this terms refers to a psychological testing device for the measuring of past accomplishments in a specified area of work.

Item Analysis. Item analysis is a systematic procedure for determining the discrimination power and difficulty level of each of the test items.

Standardization. Standardization involves applying research to establish the reliability and validity of a test, providing for uniform administration and scoring of the test, and making the normative data available to aid in interpreting the test results.[10]

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[8]Anne Anastasi, Psychological Testing (New York: The Macmillan Company, 1961), p. 135.

[9]Anne Anastasi, Psychological Testing (New York: The Macmillan Company, 1961), p. 105.

[10]Dorothy C. Adkins, Construction and Analysis of Achievement Tests (Washington: United States Government Printing Office, 1947), p. 145.

Procedure

The procedure used in the execution of this research was as follows:

I. Determined mathematical concepts needed by the electronics technician.

   A. Reviewed pertinent research and electrical-electronics textbooks.

   B. Constructed checklist containing mathematical concepts included in the literature.

   C. Obtained from industrial directories the names and addresses of electronic industries employing electronic technicians.

   D. Sent contact letter to administrative personnel of electronic industries requesting assistance in study and the names of persons cognizant of the mathematical needs of the entry-level electronic technician.

   E. Mailed electronic industries a check list requesting qualified personnel to indicate mathematical skills essential for the entry-level electronic technician.

   F. Analyzed mathematical skills recommended by the personnel from the electronics industries to determine essential mathematical concepts.

II. Developed an achievement test to diagnose weaknesses of needed mathematical concepts.

A. Constructed two problems for each of the essential mathematical concepts to test mathematical skills.

B. Selected a jury of experienced electronics teachers, mathematicians, statisticians, electrical engineers, and educational psychologists.

C. Submitted mathematical problems to jury for suggestions and recommendations as to content validity.

D. Revised mathematical problems according to the recommendations of the jury.

E. Assembled mathematical problems into two equivalent tests--forms X and Y.

F. Administered both test forms X and Y to control group.

G. Performed an item analysis to determine inter-item consistency, split-half reliability, difficulty level, and item discrimination power of test forms X and Y.

H. Combined test forms X and Y into a single test (form Z) using the item analysis data as the basis for item selection.

I. Selected four logical multiple-choice distractors for each of the test items of form Z.

J. Administered test form Z to control group.

K. Performed an item analysis to determine the discrimination power of each multiple-choice item.

L. Revised form Z by retaining the three multiple-choice distractors which had the highest discrimination power.

M. Determined step-by-step directions to facilitate uniformity in test administration.

N. Printed test booklets, instruction sheets, and answer sheets.

III. Selected sample and administered test form Z to normative group.

A. Determined post-high-school institutions throughout the United States that offered an electronics technology program.

B. Sent to the electronics technology instructors a letter requesting their participation in the study.

C. Administered test form Z to students graduating from electronics technology programs during fall semester 1966 and spring semester 1967.

IV. Analyzed results of test form Z and established state and national norms.

A. Scored answer sheets returned by participating educators.

B. Divided the scores into to major categories: (1) two-year curriculum institutions, and (2) four-year curriculum institutions.

C. Determined test reliability by using the Kuder-Richardson method, the Pearson product-moment method, and the Spearman-Brown prophecy method.

D. Transformed raw data into stanine norms.

E. Recorded normative information in tabular and graphic form.

F. Provided each participating institution with student scores, test answer key, national and state normative data, and data concerning standard error of the mean, test reliability, and test validity.

Financial Assistance

In August of 1966 a research proposal was submitted to the federal government with the intent of obtaining financial assistance necessary to conduct this investigation. In January, 1967 an official from the Department of Health, Education, and Welfare suggested that the proposal be withdrawn from the U. S. Office of Education and be submitted to the state educational agency. In accordance with the above suggestion, the research proposal was submitted to the Texas Education Agency during the latter part of January, 1967. The Texas Education Agency, in cooperation with the Texas Engineering Experiment Station, granted $12,843 for the purpose of conducting this research.

CHAPTER II

REVIEW OF LITERATURE

There was no evidence found of studies made to determine specific mathematical concepts needed by the entry-level electronics technician. However, a review of the literature did disclose some studies which are pertinent to this investigation.

The review of literature for this study is concerned with two general areas: (1) related research and (2) electrical-electronics textbooks. This chapter is a review of the related research. The pertinent electrical-electronics textbooks are cited in later chapters.

Mathematical Skills Needed by Public School Teachers

Jones attempted to determine which basic concepts of mathematics presented in grades IV through VIII were least understood by certain elementary education majors. The basic mathematical concepts that are ordinarily presented in grades IV through VIII were identified by means of an analysis of twelve arithmetical-textbook series which had been published during the period 1956-1960. Eighty-eight basic mathematical concepts were identified. An instrument was designed to test understanding of the identified concepts and was administered to 303 participants at ten colleges. Twenty-six of the eighty-eight concepts were not understood by the elementary education majors who participated in the research. Jones concluded that a special course should be

constructed to correct the mathematical deficiencies of those preparing to teach in elementary schools.[1]

Robinson conducted a study relative to the professional education of junior high school teachers in the field of mathematics. One of the purposes of his study was to determine what inadequacies, if any, exist in the junior high mathematics teacher's knowledge of the fundamental principles of arithmetic which might reasonably be considered to handicap him in his attempt to teach the subject effectively.[2] The examination papers of 10,976 candidates seeking junior high school teaching licenses for the New York City public schools were analyzed. Robinson also observed the teaching of arithmetic to students in twenty-eight different public junior high schools for a total of 652 different observations of arithmetic teaching by 278 different mathematics teachers. In addition, he gave examinations in arithmetic to 322 junior high school mathematics teachers. He concluded in part:

> As shown (a) by teachers' examinations reviewed, (b) by the special arithmetic examinations given to junior high school students from the seventh through the ninth grades and (c) by conferences with the teachers

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[1] George Lucas Jones, "A Study to Determine Which Basic Mathematical Concepts Commonly Presented in Grades IV Through VIII Are Least Understood by Certain Elementary Education Majors" (Unpublished Doctor's Dissertation, Colorado State University, 1963), pp. 68-74.

[2] Arthur E. Robinson, The Professional Education of Junior High School Mathematics Teachers in the Field of Arithmetic. Bureau of Publications, Teachers College, Columbia University, New York (1936).

> whose teaching was observed, junior high school mathematics teachers have at best only a mechanical knowledge of arithmetic even though they are fairly proficient in their skills in the manipulation of its various mechanical processes. Anything like a clear and versatile knowledge of the fundamental principles of arithmetic and their mathematical significance is all but totally lacking on the part of such teachers. Because of this fact, it is difficult to see how the arithmetic they teach or would be called upon to teach to elementary school children could be anything more than mechanical.

Glennon conducted a study to determine the extent of growth and mastery of certain basic mathematical understanding possessed by persons at seven educational levels:

> Research in the fields of education and psychology has contributed many principles for increasing teacher effectiveness. One of the more fundamental principles that has been derived from this research states that understanding facilitates learning. Other closely allied principles state that there is an inverse relationship between the degree of understanding developed during the learning process and the retroactival inhibition; and that understanding increases the degree of transfer of training.
>
> As a result of many such research studies, educators are now in general agreement that one of the major objectives in the teaching-learning process is the development of understandings both within and without the various subject matter fields.

Findings relative to three of the educational levels included in Glennon's study are particularly pertinent. These three levels are college freshmen, college seniors, and teachers-in-service. A total of 476 prospective and practicing teachers at these three levels were included in his study, of which 144 were freshmen, 172 were seniors, and 160 were teachers-in-service. All of the above-mentioned participants were enrolled in teachers' colleges and all were prospective or

practicing elementary teachers. The findings indicated that the freshmen understood about forty-four percent of the basic mathematical understandings tested; the seniors understood about forty-three percent; and the teachers-in-service understood about fifty-five percent. The understandings tested were limited to those that Glennon considered to be basic to the computational processes commonly taught in grades I through VI.[3]

Taylor included in his investigation a test on meanings of basic mathematical concepts. He found that thirty-six percent of the 333 freshmen tested did not know the number represented by the digits 2, 3, and 4 in 2304, and forty-nine percent did not know the number represented by 0. An analysis of the responses to statements to be marked true or false showed that thirty-one percent of the freshmen tested marked 12/12 = 17/17 false; twenty-two percent marked 2/3 = 2 ÷ 3 false, thirty-four percent marked 2/5 plus 3/7 = $\frac{2 \text{ plus } 3}{5 \text{ plus } 7}$ true; seventy-four percent marked \$12 ÷ \$4 = 3 incorrect; twenty-two percent marked 18 in. ÷ 3 = 6 inches incorrect. Of these findings Taylor said that "it is evident that there cannot be good teaching of mathematics until students preparing to teach arithmetic get rid of such errors as these."[4]

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[3]Vincent J. Glennon, "A Study in Needed Redirection in the Preparation of Teachers of Arithmetic," The Mathematics Teacher, XLII (December, 1949), 389-96.

[4]E. H. Taylor, "Mathematics for a Four-Year Course for Teachers," School Science and Mathematics, XXXVIII (May 1958), 499-503.

Mathematical Skills Important to the Technician

In the Occupational Outlook Handbook it is stated that the potential technician should be able to perform the basic mathematical operations with a slide rule. In addition, the technician needs a strong background in electronics theory and mathematics to enable him to handle complex technical work.[5]

Dauwalder points out that in the next ten years there will be a 26.5 per cent increase in the number of electronics technicians needed. The educational institutions cannot educate enough competent electronics technicians to satisfy the needs of industry. According to Dauwalder, by the year 1970 there will be a deficit of 25,122 electronics technicians. Industries desire an electronics technician who has a background in mathematics and electronics. The rapid upgrading of the electronics technician since 1950 is the result of additional responsibilities given the technician and the need for a deeper knowledge of electronics and mathematical concepts. A potential technical should complete several mathematics courses in high school and junior college.[6]

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[5]United States Department of Labor, Occupational Outlook Handbook, 1963-64 edition (Washington: United States Printing Office, 1963), pp. 168-69.

[6]Donald D. Dauwalder, "Education and Training for Technical Occupations." A Study Prepared by the Los Angelec City Junior College District (Los Angeles: Westwood Blueprint Company, 1960), pp. 26-42.

Jelden lists the specific electronics principles with which the electronics technician should be familiar. The specific concepts mentioned were four equations: (1) Ohm's Law, (2) power formulas, (3) series resistance, and (4) parallel resistance.[7]

Bowman concluded that high school or college industrial arts electronics teachers, who train the electronics technician, should have a background of several mathematics courses. A basic background should consist of algebra, plane and analytical geometry, and trigonometry.[8]

Emerson stated that an electronics technician usually uses college mathematics. The technician must be able to communicate specific engineering ideas mathematically, graphically, and linguistically.[9]

A study conducted by the Syracuse County School of Technology points out that a technician needs a functional understanding of

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[7]David L. Jelden, "Electrical Information Content Included in Industrial Arts-Teacher Education-versus-Knowledge Required of Electronics Teachers" (Unpublished Doctor's Dissertation, The University of Missouri, 1960), pp. 55-60.

[8]James E. Bowman, "A Study of the Basic Mathematical Skills Needed to Teach Industrial Arts in the Public Schools" (Unpublished Doctor's Dissertation, University of Michigan, 1958), pp. 2-3.

[9]Lynn A. Emerson, Vocational-Technical Education for American Industry, United States Department of Health, Education and Welfare, Circular 530 (Washington: Government Printing Office, 1958).

computing ratios, transposing equations, solving formulas, and interpreting reports. Electrical theory and mathematics will enable the technician to handle complex technical work.[10]

Stewart and Workman attempted to identify mathematical and scientific competencies needed by electronics and chemical technicians and to develop ways in which the necessary provisions for required competencies may be made in the curricula of training programs. The study was conducted in the San Francisco area under the direction of the University of California. The data were obtained from technicians and first line supervisors working in the several electronics firms and from technicians and supervisors working in different chemical companies. The technicians and supervisors were asked to indicate how much mathematical and specific training they considered necessary to prepare a technician for a job. One-fourth of the electronics technicians and their supervisors received training in elementary algebra. Sixteen per cent of these supervisors indicated that mathematical training from elementary arithmetic through trigonometry was necessary. Slightly more than one in five of the electronics technicians reported having taken calculus, and 28.9 per cent reported

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[10] Syracuse County Board of Education, Industrial Technician and Technical Education Needs (New York: Syracuse County Board of Education, 1960).

having received training in trigonometry. One out of ten technicians indicated mathematical training of a type more advanced than calculus as being necessary.[11]

In Barlow and Schill's study, technical workers, representing forty-four electronics industries in the Los Angeles and San Francisco areas, were personally interviewed for the purpose of identifying mathematical competencies. Similar interviews were made with twenty-nine junior college electronics instructors. The results of the investigation are shown on the following page.[12]

The United States Department of Labor reports that the electronics technician should have a knowledge of mathematics and physical science and their practical application. If the technician's background in electronics theory and mathematics is sufficient, the jobs can be performed above the routine operational, maintenance, and repair level.[13]

Bodine's study gives a detailed report of the specific activities for the technician. There were some notable conclusions regarding

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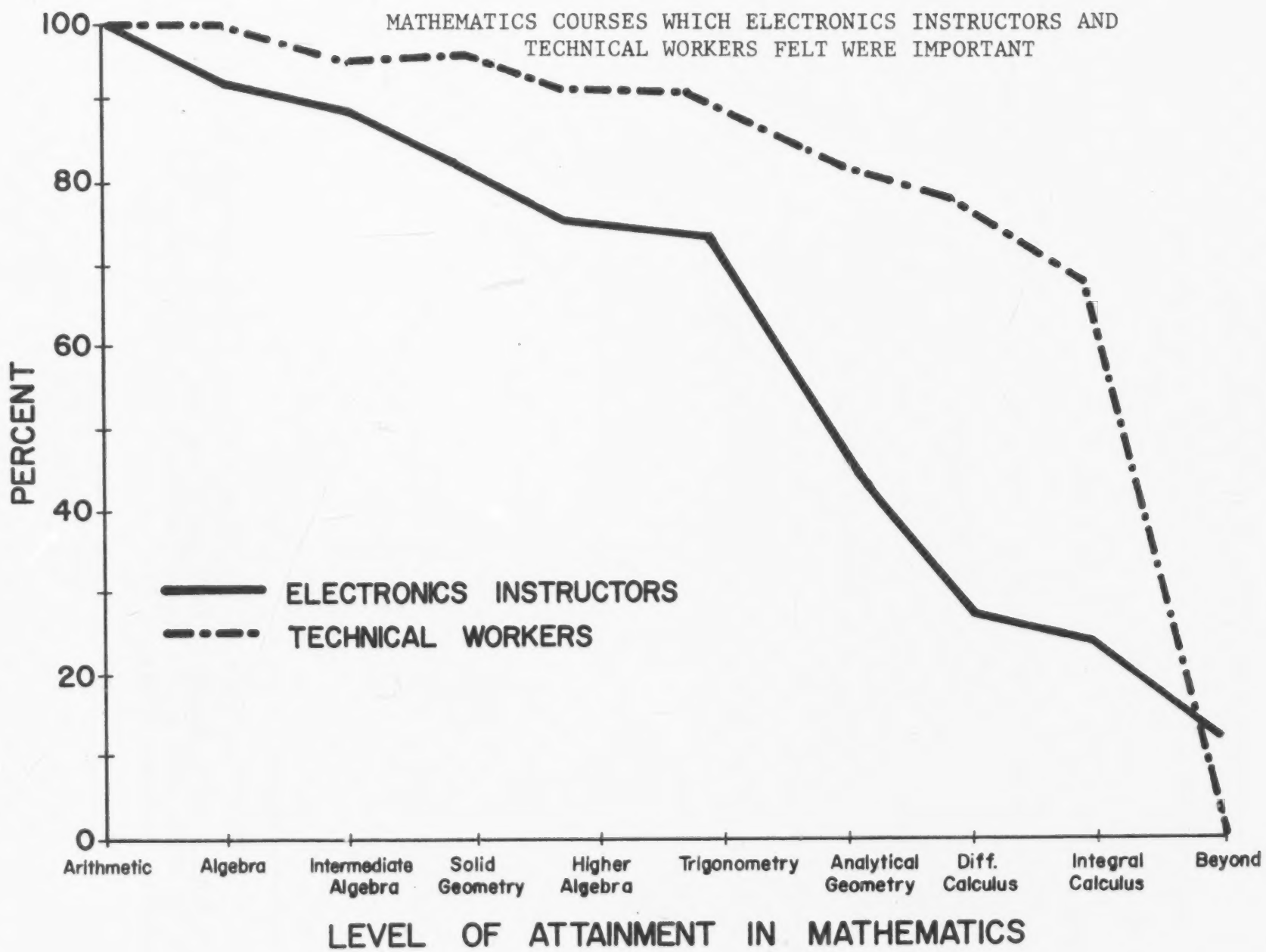
[11]Lawrence H. Stewart and Arthur D. Workman, Mathematics and Science Competencies for Technicians. California State Department of Education Volume 29, No. 19 (Sacramento: State of California Printing Office, 1960).

[12]Melvin L. Barlow and William J. Schill, The Role of Mathematics in Electrical-Electronics Technology, Division of Vocational Education, University of California, Los Angeles, 1962.

[13]U. S. Department of Labor, loc. cit.

Figure 1


MATHEMATICS COURSES WHICH ELECTRONICS INSTRUCTORS AND TECHNICAL WORKERS FELT WERE IMPORTANT
100
80
60
40
20
0
PERCENT
ELECTRONICS INSTRUCTORS
TECHNICAL WORKERS
Arithmetic
Algebra
Intermediate Algebra
Solid Geometry
Higher Algebra
Trigonometry
Analytical Geometry
Diff. Calculus
Integral Calculus
Beyond
LEVEL OF ATTAINMENT IN MATHEMATICS

the functional mathematical understanding needed by the technician. Based on data from the personal interviews of industrial representatives of the twenty-three participating firms, it was concluded that beginning algebra was of considerable importance. An especially strong need was expressed for the functions of computing ratios, solving equations, substituting in formulas, solving formulas, and interpreting reports.[14]

Because post-high-school institutions shoulder the primary responsibility for preparing the electronics technician to work within the technological society, there is definitely a need for the identification of the basic mathematical concepts which modern industry feels are necessary for an entry-level electronics technician. No research was found which indicates the specific mathematical skills needed by the technician.

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[14]Merle W. Bodine, Training Needs of Highly Skilled Technicians in Twenty-three Selected Manufacturing and Processing Firms. Kansas State Department of Vocational Education (Topeka: State of Kansas Printing Office, 1959).

CHAPTER III

DETERMINING AND TESTING MATHEMATICAL CONCEPTS NEEDED BY THE ENTRY-LEVEL ELECTRONICS TECHNICIAN

This investigation was divided into four major parts: (1) determining needed mathematical concepts, (2) constructing and revising a diagnostic achievement test, (3) selecting a national normative sample, and (4) administering and scoring of an achievement test.

Determining Needed Mathematical Concepts

The majority of the data used to isolate the basic mathematical concepts which are needed by the entry-level electronic technician were obtained through an analysis of electrical-electronics textbooks. Other data were obtained through an information checklist distributed to various electronics industries throughout the United States.

Textbook Analysis. The first phase of the investigation was directed toward the identification of the basic mathematical concepts. These concepts are those ordinarily used by the entry-level technician. For this purpose an analysis was made of electrical-electronics textbooks.

In selecting the electrical-electronics books for analysis, the textbook listings of Textbooks in Print--1965 for the years 1950

through 1965 were used.[1] Only books which were designed to be used as electronics technology textbooks or books which had been written primarily for use as supplementary, enrichment, or workbook-type materials were included.

After examining the textbook listings according to the criteria previously mentioned, forty-seven books were found to be suitable for the pruposes of the experiment. A list of the textbooks used in the analysis is located in Appendix A.

Each of the forty-seven electrical-electronics textbooks was then carefully examined. Each concept presented was considered according to Good's definition of a basic mathematical concept (given on page six of this study). If the concept could be identified on the basis of this definition as a basic mathematical concept, it was then listed on a three-inch by five-inch card under the code letter and number for the particular textbook and electronics area. After all the concepts had been listed on the cards in the manner described, each concept was carefully reviewed and compiled into a tentative list of basic mathematical concepts.

The resulting list of basic mathematical concepts was submitted to a jury composed of college instructors in mathematics, statistics, electronics, and education. A list of these instructors, their

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[1] Textbooks in Print (New York: R. R. Bowker Company, 1965), pp. 42, 253-256.

present positions and teaching experience is included in Appendix B. The members of the jury were asked to evaluate the list of concepts in terms of whether the concepts constituted basic mathematical concepts. As a result of this evaluation by the jury, modifications in wording were made, although all the concepts identified were accepted as basic mathematical concepts by all of the jury members. The list in its final form has been included in Appendix C.

Industrial Survey. Because the concepts derived from the textbooks analysis ranged from basic arithmetic to advanced calculus, it was necessary to select only those specific concepts which were needed by the entry-level technician. A survey was conducted with personnel from the various electronics companies that employed entry-level technicians.

The companies surveyed were selected from: (1) business and industrial directories, (2) telephone books from major cities, (3) state employment agencies, (4) manufacturer's registers, and (5) an electronic product master catalog. An attempt was made to include a representative sample of the industries throughout the United States which employed entry-level electronics technicians.

A contact letter was sent to the supervisory personnel of 972 industries employing electronics technicians. The letter requested the name and address of the person who was cognizant of the basic mathematical knowledge required of the electronics technician in the company and if the person would be willing to cooperate in the study.

The number of entry-level and advanced-level electronics technicians employed by the company was also requested.

There were 644 companies which agreed to participate in the study. However, seventy-six of the companies had to be rejected because they did not employ electronics technicians of the entry-level classification. The participant breakdown is shown in Table I.

TABLE I

COMPANIES PARTICIPATING IN STUDY

Companies Contacted	972
Companies Refusing to Participate	137
Companies Rejected	76
*Companies Which Did Not Reply	191
**Companies Participating In Study	568

*A follow-up letter was sent to all companies who had not replied by the second and fourth week after the original contact.

**Companies participating in the study represented thirty-seven of the fifty states.

The 568 electronics companies included in the study represented a cross section of both large and small manufacturing, research and development, and service industries. Some of the companies employed

only one entry-level electronics technician, while others employed as many as 2,000. A total of 6427 technicians was represented.

Mathematical Concept Checklist. A checklist composed of the mathematical concepts derived from the textbook analysis was prepared and sent with an accompanying letter to the cooperating industrial personnel. The entry-level electronics technician or the immediate supervisor was asked to check the appropriate column indicating the degree of importance of the various mathematical concepts in relation to the duties performed by the technician. Space was provided at the bottom of the checklist for the respondent to indicate additional mathematical concepts which were pertinent but which were not listed on the form. (See Appendix D.)

The criteria for evaluating each concept was as follows:

1. Required--Mathematical concepts which the entry-level technician must have mastered to perform his duties.
2. Preferred--Mathematical concepts not essential but those with which the technicians should have some familiarity.
3. Unnecessary--Mathematical concepts which have little or no bearing on the job responsibilities of the technician.

Checklists which were not returned by the participants were followed up with a letter or telephone call wherever necessary. The checklists were returned by 80.4 per cent, or 781 electronics industries.

Needed Mathematical Concepts. An analysis of the checklist results indicated that there are fifty-six basic mathematical concepts

which the entry-level electronics technician must know to perform his duties. In order to report the general rather than the specific needs of any particular company, only those concepts that were considered necessary by ten per cent or more of the sample were included. The following is a list of the mathematical concepts which were considered necessary:

1. Addition of common fractions.
2. Subtraction of common fractions.
3. Multiplication of common fractions.
4. Division of common fractions.
5. Addition of decimal fractions.
6. Subtraction of decimal fraction.
7. Multiplication of decimal fractions.
8. Division of decimal fractions.
9. Ratio.
10. Percentages.
11. Square root of perfect square.
12. Long-hand square root process.
13. Square root of fractions.
14. Algebraic symbol-substitution for unknown.
15. Positive numbers.
16. Negative numbers.
17. Imaginary numbers or j-operators.
18. Addition of monomials and polynomials.
19. Subtraction of monomials and polynomials.

20. Multiplication of monomials and polynomials.

21. Division of monomials and polynomials.

22. Algebraic grouping and sign change.

23. Graphical representation of equations.

24. Addition of exponents.

25. Subtraction of exponents.

26. Multiplication of exponents.

27. Division of exponents.

28. Zero exponents.

29. Multiplication of powers of tens.

30. Division of powers of tens.

31. Powers of ten.

32. Roots of algebraic expressions.

33. Interchange of metric units.

34. Solution of algebraic equations.

35. Construction of algebraic equations.

36. Addition of algebraic fractions.

37. Subtraction of algebraic fractions.

38. Division of algebraic fractions.

39. Multiplication of algebraic fractions.

40. Simultaneous equations.

41. Quadratic equations.

42. Rectangular coordinates.

43. Polar coordinates.

44. Quadrants.

45. Radians.

46. Trigonometric functions.

47. Trigonometrical solution of right triangles.

48. Use of trigonometry tables.

49. Addition of vectors.

50. Estimation.

51. Addition of logarithms.

52. Subtraction of logarithms.

53. Multiplication of logarithms.

54. Division of logarithms.

55. Factoring of monomials and polynomials.

56. Pythagorean theorem.

Construction of Diagnostic Achievement Test

To determine relative understanding of essential mathematical concepts, it was necessary to develop an achievement test which could be used to diagnose mathematical weaknesses.

The second step in the investigation was the construction of an instrument designed to test understanding of the identified mathematical concepts. This test was labeled form X. Because the purpose of the instrument was to determine understanding, the test items were constructed in such a way that requirements for computational skill and direct recall of mathematical terminology were kept at a minimum.

Because the instrument was not primarily designed to measure difficulty, the major purpose was to test understanding of the specific concepts that are necessary for the entry-level electronics technician. For purposes of the present study, an assumption was made that prospective electronic technicians should understand the concepts tested, and their failure to solve an item correctly was presumed to demonstrate a lack of understanding of the particular concept in question.

The instrument was submitted to the previously-mentioned jury of college instructors. They were asked to evaluate the test in terms of whether each item would actually test understanding of the concept under consideration. As a result of the evaluation by the jury members, some test items were reconstructed to remove ambiguities.

The revised instrument was administered to a group of sixty-eight advanced students at the Texas A&M Institute of Electronics. An item analysis was made of the responses to the test items. The responses of the upper twenty-seven per cent of the students, the lower twenty-seven per cent, and the middle forty-six per cent were compared for each test item to determine whether the items consistently discriminated among the students who either scored high, low, or average. In addition, each of the sixty-eight students was interviewed in an effort to determine whether some of the test items were of questionable value and whether the test item and/or directions were free from ambiguity.

The reliability of the test was estimated by using the split-half method and the Kuder-Richardson inter-item consistency method.

Table II is a summary of the statistical data derived from the item analysis of the test: form X.

TABLE II

ITEM ANALYSIS OF TEST--FORM X

Kuder-Richardson estimate of reliability	.7550*
Pearson-Product moment split-half estimate of reliability	.8201*
Spearman-Brown split-half estimate of reliability	.8364*
Average item discrimination power	.1988**
Average item difficulty level	.2966***

*Ideal estimate of reliability = 1.000

**Ideal discrimination power of a three group analysis = .3333

***Ideal difficulty level = .5000

Following the analysis of the test form X, an alternate instrument was developed: form Y. The alternate test was submitted to the jury of college instructors for their evaluation. The instrument was then modified and administered to the same control group of sixty-eight students that had taken test form X four weeks earlier. An item

analysis was made of the responses to test form Y. Table III is a summary of the analysis of test form Y.

TABLE III

ITEM ANALYSIS OF TEST--FROM Y

Kuder-Richardson estimate of reliability	.7874
Pearson-Product moment split-half estimate of reliability	.8269
Spearman-Brown split-half estimate of reliability	.8277
Average item discrimination power	.2102
Average item difficulty level	.3060

Following the analysis of test form Y, both tests (forms X and Y) were submitted again to the jury of college instructors for further suggestions. Each test item was again considered in the light of the results from the pilot study. In making the final selection of test items for the present study, some of the items from form Y were used, some of the items from form X were used, and some of the items from forms X and Y were modified. The instrument composed of items from forms X and Y was called form Z.

Test form Z was administered to the same sixty-eight student control group who had taken both forms X and Y. Three weeks had elapsed between the administering of forms Y and Z. An item analysis

was made of the responses to the items of test form Z. A summary of the item analysis is in Table IV.

TABLE IV

ITEM ANALYSIS OF TEST--FORM Z

Kuder-Richardson estimate of reliability	.9333
Pearson-Product moment split-half estimate of reliability	.8321
Spearman-Brown split-half estimate of reliability	.8932
Average item discrimination power	.2875
Average item difficulty level	.4393

A copy of the achievement test, form Z, in its final form is in Appendix E.

Selection of National Normative Sample

In order to interpret the results of an achievement test, it is necessary to use some type of comparative norm. The third part of the investigation was concerned with the selection of a nation-wide cross sectional sample of graduating electronic technology students to establish state and national norms for test form Z.

Selecting the Sample. The names and addresses of public post-high-school electronic technology institutions were obtained from: (1) state vocational education agencies, (2) college and university catalogs, (3) junior and senior college directories, and (4) vocational and specialized school directories.[2] Only those institutions which offered at least fifteen semester hours of electronics courses were considered.

A letter requesting the electronic instructors to administer the mathematical achievement test, form Z, to their senior or graduating students was sent to the 124 institutions. The instructors from seventy-three two-year institutions and fifty-one four-year institutions agreed to administer the test to their graduating class of students.

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[2] College and Specialized Schools, 4th edition, Porter Sargent Publication Co., Boston, Mass.; 1966--Junior College Directory, American Association of Junior Colleges, Washington, D.C.; Lovejoy's Vocational School Guide, Simon & Schuster Co., New York; National Directory-Schools & Vocations, Miller Brown, Inc., Springfield, Pa.

TABLE V

POST-HIGH-SCHOOL INSTITUTIONS PARTICIPATION SUMMARY

State	Agreed to Participate: Two-Year Institutions	Agreed to Participate: Four-Year Institutions	Refused to Participate	No Response	State Total
Alabama	2				2
Alaska				1	1
Arizona	1	1		1	3
Arkansas	1				1
California	6	4			10
Colorado	1	1		1	3
Connecticut	1		1		2
Delaware*					0
District of Columbia	1			1	2
Florida	2	2			4
Georgia	2				2
Hawaii		1		1	2
Idaho		1		1	2
Illinois	3	2	2	1	8
Indiana	1	2	1		4
Iowa	1	1			2
Kansas		1		2	3
Kentucky	2	2			4
Louisiana		1			1
Maine				1	1
Maryland	1	1	2		4
Massachusetts	2	1			3
Michigan	5		1	2	8
Minnesota	1	2	1	1	5

TABLE V (Continued)

State	Agreed to Participate: Two-Year Institutions	Agreed to Participate: Four-Year Institutions	Refused to Participate	No Response	State Total
Mississippi	2	1	1	5	9
Missouri		2	1	2	5
Montana*					0
Nebraska		1			1
Nevada*					0
New Hampshire	1				1
New Jersey	1	1		2	4
New Mexico	1	1		1	3
New York	7		1		8
North Carolina		1		3	4
North Dakota				1	1
Ohio	3		1	2	6
Oklahoma	2		1	5	8
Oregon		1		2	3
Pennsylvania	2	2	2	2	8
Rhode Island				1	1
South Carolina				1	1
South Dakota	1	2			3
Tennessee	1	3			4
Texas**	17	4			21
Utah		1		1	2
Vermont				1	1
Virginia		2	1	1	4
Washington	1	3			4
West Virginia				1	1
Wisconsin	1	3			4

TABLE V (Continued)

State	Agreed to Participate: Two-Year Institutions	Agreed to Participate: Four-Year Institutions	Refused to Participate	No Response	State Total
Wyoming*					0
TOTAL	73	51	16	44	184

*No institutes reported in the state.

**The large number of Texas participants is the result of a research grant from the Texas Education Agency.

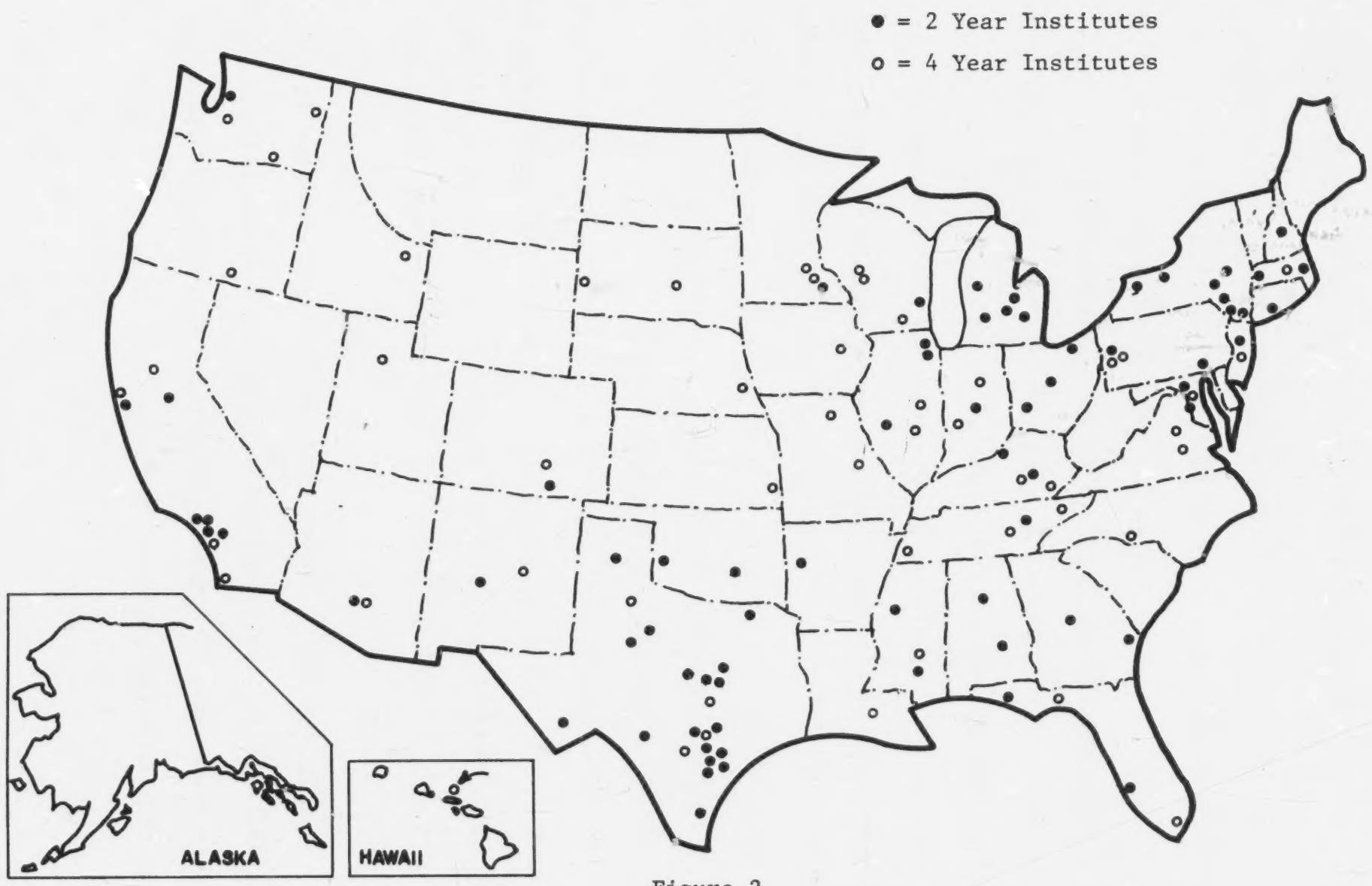

Figure 2

POST-HIGH-SCHOOL INSTITUTES ADMINISTERING
ACHIEVEMENT TEST - FORM Z

Administration and Scoring of Mathematics Achievement Test

The fourth part of the investigation was the administration and scoring of the tests. All of the tests were administered by the instructors or the author and scored by an electronic scanner.

Administering the Test. The test was administered to 3479 electronics technology students. The test booklet, answer sheets, and a detailed instruction sheet were mailed to each participating instructor. (Appendix F). There was a two-hour time limit; although according to the instructors, none of the students required more than this time to complete the test. A special information sheet was attached to the test booklet for each participant to list all of the pre-high-school and post-high-school mathematics and electronics courses that he had successfully completed. (See Appendix G.)

After carefully checking the courses listed by the participant, the author found seven hundred eighty-seven of the 3479 students to be ineligible for participation in the study and thus they were eliminated. There were 2672 eligible students who participated in the study, as illustrated in Table VI.

Scoring the Test. Because the booklets were retained by the participating instructors, only the answer sheet and the information sheet were returned. The answer sheets were so constructed that they could be scored on IBM's optical scanner.

TABLE VI

POST-HIGH-SCHOOL ELECTRONIC TECHNICIAN STUDENTS PARTICIPATION SUMMARY

State	Two-Year Institutions		Four-Year Institutions	
	Number of Eligible Participants	Number of Ineligible* Participants	Number of Eligible Participants	Number of Ineligible* Participants
Alabama	39	2	-	-
Alaska	-	-	-	-
Arizona	26	6	30	11
Arkansas	14	1	-	-
California	119	11	81	41
Colorado	19	2	27	21
Connecticut	14	-	-	-
Delaware	-	-	-	-
District of Columbia	13	-	-	-
Florida	43	12	42	30
Georgia	31	1	-	-
Hawaii	-	-	17	8
Idaho	-	-	21	12
Illinois	49	3	33	13
Indiana	14	-	63	33
Iowa	21	2	15	3
Kansas	-	-	16	10
Kentucky	47	3	32	2
Louisiana	-	-	13	-
Maine	-	-	-	-
Maryland	12	-	17	8
Massachusetts	39	6	13	-
Michigan	96	11	-	-

TABLE VI (Continued)

State	Two-Year Institutions		Four-Year Institutions	
	Number of Eligible Participants	Number of Ineligible* Participants	Number of Eligible Participants	Number of Ineligible* Participants
Minnesota	14	-	54	41
Mississippi	44	6	16	10
Missouri	-	-	26	-
Montana	-	-	-	-
Nebraska	-	-	16	4
Nevada	-	-	-	-
New Hampshire	19	2	-	-
New Jersey	37	10	15	11
New Mexico	26	4	14	7
New York	141	19	-	-
North Carolina	-	-	25	17
North Dakota	-	-	-	-
Ohio	54	4	-	-
Oklahoma	48	7	-	-
Oregon	-	-	23	17
Pennsylvania	29	2	40	16
Rhode Island	-	-	-	-
South Carolina	-	-	-	-
South Dakota	11	1	37	23
Tennessee	22	-	93	59
*Texas	479	91	179	99
Utah	-	-	19	12
Vermont	-	-	-	-
Virginia	-	-	30	11
Washington	16	1	58	40

TABLE VI (Continued)

State	Two-Year Institutions		Four-Year Institutions	
	Number of Eligible Participants	Number of Ineligible* Participants	Number of Eligible Participants	Number of Ineligible* Participants
West Virginia	-	-	-	-
Wisconsin	20	1	51	20
Wyoming	-	-	-	-
Total	1556	208	1116	579

*These students' tests were rejected because they had not completed high school algebra, or had not taken at least fifteen semester hours of electronics courses, or were not about to graduate from their institute.

203

C H A P T E R I V

ANALYSIS OF TEST RESULTS

The data obtained through the administration of the achievement test were analyzed to ascertain state and national norms and to determine the relative understanding of needed mathematical concepts by those students graduating from electronics technology programs.

Analysis Procedure

An analysis of the test results was made for each of the two-year institutions and four-year institutions. Code numbers rather than institution name have been used in the report of the analysis.

Central Tendency of Variability. The highest possible raw score was identified as sixty, which was one point for each correct response. The median, the mean, the standard deviation, and the standard error of the measure were computed for each of the two-year institutions and for each of the four-year institutions.

In Tables VII and VIII the number of eligible participants, mean, median, standard deviation, and standard error of the measure are indicated.

TABLE VII

MEASURE OF CENTRAL TENDENCY & VARIABILITY OF TEST FORM Z FOR TWO YEAR INSTITUTIONS

Institution Code No.	Number of Participants	Number Rejected*	Mean	Median	Standard Deviation	Standard Error of Measure
1	15	-	38.25	37.27	8.35	2.75
2	24	2	27.24	29.02	7.44	2.31
3	26	6	32.53	32.50	8.24	3.15
4	14	1	27.87	17.31	5.80	1.83
5	29	4	40.23	39.37	8.58	3.39
6	13	-	26.93	26.43	7.62	1.74
7	22	2	36.37	34.83	9.88	1.12
8	17	-	29.85	27.56	8.86	1.25
9	12	-	27.72	27.06	7.19	1.30
10	26	5	23.91	22.81	9.04	1.28
11	19	2	20.26	20.39	9.93	1.93
12	14	-	40.18	40.15	8.08	1.99
13	13	-	21.17	20.84	7.79	2.21
14	21	4	22.27	22.45	7.08	1.39
15	22	8	41.76	41.82	6.63	2.22
16	15	-	31.88	30.04	8.71	1.55
17	22	3	32.47	31.18	9.02	1.02
18	12	-	18.12	19.33	8.50	2.42
19	14	-	41.07	42.92	6.81	1.43
20	21	2	37.59	37.48	9.65	2.15
21	19	1	30.81	32.66	5.59	2.60
22	28	2	33.93	31.85	8.21	1.65
23	12	-	29.94	29.68	7.08	1.40
24	20	2	31.77	31.27	8.76	3.24
25	19	4	31.15	32.59	9.21	1.24
26	19	-	26.51	26.61	5.42	1.58

TABLE VII Continued

Institution Code No.	Number of Participants	Number Rejected*	Mean	Median	Standard Deviation	Standard Error of Measure
27	24	5	37.01	27.17	5.74	1.56
28	18	-	18.36	15.45	8.40	2.77
29	18	6	34.31	33.11	9.24	2.90
30	17	-	26.60	26.26	7.72	1.01
31	14	-	28.75	27.48	9.09	1.79
32	20	5	25.53	28.06	7.94	2.15
33	24	1	34.66	18.15	9.28	1.83
34	19	2	35.36	34.56	5.39	1.19
35	37	10	24.31	24.10	7.98	1.49
36	26	4	27.54	27.27	8.79	2.30
37	16	2	36.60	35.06	9.11	1.85
38	29	7	28.75	28.89	6.98	2.52
39	24	3	18.53	15.24	7.97	2.46
40	21	1	26.10	28.21	9.24	2.65
41	13	1	26.45	26.14	5.36	2.33
42	18	-	29.45	29.33	6.12	1.84
43	20	2	19.74	20.38	7.07	2.27
44	16	-	19.95	19.37	8.29	1.59
45	14	-	27.10	27.44	8.65	2.88
46	24	4	30.50	30.81	6.91	1.12
47	21	1	33.77	35.21	8.25	1.25
48	27	6	19.25	21.50	9.97	1.81
49	9	-	17.01	30.35	7.05	1.76
50	20	2	30.10	30.87	8.90	1.70
51	11	1	22.75	22.26	6.92	2.33
52	22	-	21.82	23.09	8.81	2.26
53	78	24	39.00	40.31	5.58	2.32
54	59	17	26.32	27.66	7.02	1.71

TABLE VII Continued

Institution Code No.	Number of Participants	Number Rejected *	Mean	Median	Standard Deviation	Standard Error of Measure
55	29	5	29.86	29.07	8.36	3.17
56	14	-	33.02	22.71	7.23	2.36
57	25	3	33.61	32.16	6.41	1.42
58	21	4	33.00	32.52	7.17	1.34
59	22	7	29.87	30.99	8.82	1.14
60	27	3	26.92	26.61	5.65	1.87
61	19	-	34.36	34.72	7.31	1.08
62	22	2	38.53	38.92	8.71	2.90
63	17	1	25.75	24.01	8.89	2.21
64	36	7	31.40	33.67	9.56	1.60
65	24	4	30.82	29.80	8.77	1.09
66	19	1	31.36	27.98	8.50	1.26
67	27	8	29.19	31.14	6.96	1.18
68	19	2	27.53	31.09	8.36	1.02
69	21	6	29.98	28.32	7.91	1.49
70	16	1	24.68	24.48	8.73	1.55
71	20	1	19.70	19.87	7.66	1.61
72	14	1	42.45	42.47	6.76	1.37
73	17	-	21.10	22.98	5.09	1.93
2-Year Institute TOTAL OR AVERAGE	1556	208	29.45	28.93	8.97	2.83

*These students' tests were rejected because they had not successfully completed high school algebra, or had not taken at least fifteen semester hours of electronics courses, or were not about to graduate from their institution.

TABLE VIII

MEASURE OF CENTRAL TENDENCY AND VARIABILITY OF TEST FORM Z FOR

FOUR-YEAR INSTITUTIONS

Institution Code No.	Number of Participants	Number Rejected*	Mean	Median	Standard Deviation	Standard Error of Measure
74	30	11	29.93	28.80	8.03	3.06
75	16	7	30.03	30.61	6.19	2.60
76	30	16	29.03	30.23	9.42	2.32
77	26	18	17.84	19.33	8.76	1.03
78	9	-	19.81	20.94	6.46	2.38
79	27	21	25.59	25.21	7.18	2.64
80	22	14	31.87	31.87	9.44	3.91
81	20	16	31.87	31.61	7.81	1.02
82	17	8	25.35	24.86	7.65	2.28
83	21	12	24.55	24.22	8.08	2.91
84	15	4	33.82	36.69	5.70	2.79
85	18	9	26.51	27.23	8.37	2.37
86	43	32	25.10	25.22	8.96	3.17
87	20	1	18.79	14.42	6.10	3.30
88	15	3	30.16	30.38	9.26	2.77
89	16	10	27.55	27.17	6.63	1.95
90	11	-	19.65	21.81	8.45	2.81
91	21	2	19.49	21.39	5.95	2.48
92	13	-	28.60	27.45	6.95	2.89
93	17	8	34.31	34.43	6.45	1.87
94	13	-	34.81	33.18	8.71	3.13
95	31	25	28.47	28.59	8.64	2.70
96	23	16	31.99	30.44	7.27	3.05
97	16	10	25.79	29.01	8.70	2.41

TABLE VIII Continued

Institution Code No.	Number of Participants	Number Rejected*	Mean	Median	Standard Deviation	Standard Error of Measure
98	16	2	34.48	37.50	7.92	2.80
99	10	-	25.75	25.79	6.10	3.61
100	16	4	24.82	24.14	9.26	3.27
101	15	11	20.07	20.01	6.63	1.35
102	14	7	22.03	22.56	8.45	1.83
103	25	17	35.54	34.25	5.96	3.19
104	23	17	25.97	25.76	6.95	3.59
105	24	8	35.85	34.23	6.45	1.10
106	16	8	33.84	34.07	7.27	2.12
107	17	12	31.45	36.27	6.60	3.20
108	20	11	24.83	24.37	7.96	2.09
109	33	21	28.05	27.60	9.66	2.19
110	45	31	28.42	28.50	5.35	3.41
111	15	1	27.25	28.36	7.29	2.79
112	84	49	29.60	28.02	6.85	3.21
113	10	-	33.33	31.90	7.95	1.88
114	48	27	32.94	34.35	8.02	2.78
115	37	21	26.92	26.45	6.70	2.91
116	19	12	22.41	22.67	9.04	1.24
117	14	7	27.35	29.96	7.26	2.15
118	16	4	34.66	34.32	6.79	3.14
119	8	2	27.27	28.08	8.63	1.30
120	27	20	35.36	36.02	5.84	2.40
121	23	18	25.75	25.21	6.57	2.28
122	17	6	29.93	30.93	7.48	2.84
123	12	-	30.03	31.51	8.97	2.79

TABLE VIII Continued

Institution Code No.	Number of Participants	Number Rejected*	Mean	Median	Standard Deviation	Standard Error of Measure
124	22	14	29.03	31.60	8.44	2.40
4-Year Institute TOTAL OR AVERAGE	1116	579	28.31	28.42	7.93	2.56

*These students' tests were rejected because they had not completed high school algebra, or had not taken at least fifteen semester hours of electronics courses, or were not ready to graduate from their institution.

The mean and median scores were computed and are presented as the measure of central tendency. The standard deviation is presented as the measure of variability or deviation from the mean. With the mean, median, and standard deviation computed, it is possible to compare groups either by observation of the data or statistical tests. Inter-group statistical comparisons fall outside the objectives of this investigation; therefore, none were made.

The test scores reveal a substantial difference in school performance, as the mean scores of the two-year institutions ranged from 17.07 to 48.25 and four-year institutions ranged from 17.84 to 35.85. The schools also differ considerably in variability, as standard deviation ranged from 5.09 to 9.97 for the two-year institutions and from 5.35 to 9.66 for the four-year institutions. Generally, as is to be expected, the larger groups show more variability than the smaller groups.

Standard Error of Measurement. The standard error of measure is "an analysis" of a single score used to predict the range of fluctuation likely to occur in a single individual's score.[1] The standard error of measurement can be estimated by the formula:

$$\sigma_{meas.} = \sigma \sqrt{1 - r}$$

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[1] Anne Anastasi, op. cit., p. 105.

in which $\sigma_{meas.}$ equals the standard error of an obtained score, σ equals the standard deviation of the test scores and r equals the reliability coefficient.

The standard error of measurement ranged from 1.01 to 3.39 for the two-year institutes and from 1.02 to 3.91 for the four-year institutes, as shown in Tables VII and VIII. The average standard error of measurement for the two-year institutions was 2.83, and 2.56 for the four-year institutions.

From the standard error of measurement, confidence intervals can be established on the test scores. For example, it is possible to be sixty-eight percent confident that a true score falls within the interval bounded by one standard error of measurement above and below obtained score. The use of the standard error of measurement prevents too much emphasis from being placed on small score differences.

Test Reliability. The reliability of a test refers to the "consistency of scores obtained by the same individual on different occasions or with different sets of equivalent items."[2] Reliability is commonly thought of in reference to consistency of measurement.

The Spearman-Brown and Kuder-Richardson methods of estimating reliability were used in this investigation. The Kuder-Richardson estimate methods determine the interitem consistency of the test. The

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[2]Ibid., p. 5.

Spearman-Brown estimate methods were used to determine the split-half correlation of the test. The estimates of reliability for both the two-year and four-year institutes are shown in Tables IX and X.

TABLE IX

ESTIMATES OF RELIABILITY FOR TWO-YEAR INSTITUTIONS

Institute Code Number	Kuder-Richardson	Spearman-Brown
1	.8931	.8752
2	.6329	.6481
3	.7168	.7504
4	.9051	.8893
5	.7058	.7632
6	.7983	.8716
7	.8099	.8050
8	.9061	.9335
9	.9394	.9304
10	.6499	.6996
11	.8639	.8168
12	.8720	.8506
13	.8247	.8035
14	.7477	.7130
15	.7744	.7499
16	.8580	.8022
17	.8694	.8905
18	.8230	.8337
19	.8753	.8705
20	.7612	.7096
21	.8832	.8193
22	.6139	.6047
23	.7172	.7793
24	.7380	.7809
25	.6273	.6483
26	.7075	.7983
27	.7454	.7809
28	.9243	.9083
29	.7564	.7845
30	.7301	.7207
31	.8341	.8914
32	.8500	.8955

TABLE IX Continued

Institute Code Number	Kuder-Richardson	Spearman-Brown
33	.8721	.8695
34	.8365	.8659
35	.7884	.7279
36	.8455	.8961
37	.8590	.8439
38	.8830	.8963
39	.7711	.7589
40	.8851	.8576
41	.8589	.8439
42	.9351	.9240
43	.7979	.8972
44	.7463	.7546
45	.7995	.7378
46	.9396	.9324
47	.8171	.8284
48	.8189	.8961
49	.8388	.8608
50	.8050	.8449
51	.7920	.7329
52	.7396	.7424
53	.8814	.8499
54	.9132	.8585
55	.7837	.6315
56	.8802	.8218
57	.8564	.8706
58	.7384	.7405
59	.7526	.7775
60	.9044	.8010
61	.8121	.8828
62	.6909	.6014
63	.7446	.7045
64	.7152	.6067
65	.9401	.9516
66	.7441	.7499
67	.8450	.8675
68	.7801	.7646
69	.6992	.6983
70	.7949	.7665
71	.8554	.8539
72	.8352	.8243
73	.9582	.9551
AVERAGE	.8165	.8077

TABLE X

ESTIMATES OF RELIABILITY FOR FOUR-YEAR INSTITUTIONS

Institute Code Number	Kuder-Richardson	Spearman-Brown
74	.8753	.8613
75	.7192	.7299
76	.7416	.7050
77	.9446	.9686
78	.7721	.7668
79	.8959	.8383
80	.7961	.7563
81	.7641	.7973
82	.6843	.6271
83	.8479	.8417
84	.8801	.8631
85	.8595	.8664
86	.7543	.7565
87	.9601	.9347
88	.8321	.8944
89	.7087	.7989
90	.6297	.6772
91	.7429	.7592
92	.7388	.7076
93	.6701	.6521
94	.7984	.7045
95	.9245	.9536
96	.7833	.7424
97	.6591	.6180
98	.9201	.9012
99	.6816	.6754
100	.8126	.8142
101	.7661	.7109
102	.8515	.8742
103	.8744	.8214
104	.7895	.7945
105	.8607	.8808
106	.8099	.8583
107	.8805	.8516
108	.6925	.6708
109	.7731	.7369
110	.8131	.7434
111	.8312	.8249
112	.7939	.7013
113	.9123	.8574
114	.7664	.7738

TABLE X Continued

Institute Code Number	Kuder-Richardson	Spearman-Brown
115	.8378	.8670
116	.7040	.6538
117	.9002	.8212
118	.8450	.8451
119	.7936	.7158
120	.9540	.9516
121	.7313	.7431
122	.8741	.8984
123	.8223	.8245
124	.9124	.8378
AVERAGE	.8134	.7875

The Kuder-Richardson estimate of reliability varied from .6139 to .9582 for the two-year institutes and from .6591 to .9601 for the four-year institutes. The Spearman-Brown estimates of reliability varied from .6014 to .9551 for the two-year institutes and from .6180 to .9536 for the four-year institutes. The average Kuder-Richardson estimate of reliability was .8165 for the two-year institutes and .8134 for the four-year institutes. The average Spearman-Brown estimate of reliability was .8077 for the two-year institutes and .7875 for the four-year institutes.

In Table XI the reliability coefficient of test Form Z and the Stanford-Binet coefficients were used for comparison because they are widely accepted as the standard for psychological testing.

TABLE XI

AVERAGE RELIABILITY COEFFICIENTS FOR TEST FORM Z, WESCHLER AND STANFORD-BINET INTELLIGENCE SCALES, ARMY GENERAL CLASSIFICATION TEST, SCHOLASTIC APTITUDE TEST, AND MILLER ANALOGIES TEST

Test	Average Reliability Coefficient
Test Form Z	.80
Weschler	.95
Stanford-Binet	.94
Army General Classification Test	.82
Scholastic Aptitude Test	.81
Miller Analysis Test	.81

Garrett states that the reliability coefficient should be at least .75 in order to make individual diagnoses.[3] The overall national reliability of achievement test form Z for both two- and four-year institutes is above .75.

Test Validity. According to Thorndike and Hagen, test validity refers to "the extent to which a test measures what it is supposed to measure. . . . and of the many forms of test validity, content validity is the most appropriate for an achievement test."[4]

Content validity involves a systematic examination of the test content, usually by a jury of experts in the particular field, to determine whether it covers a representative sample of the subject being measured. As was mentioned in Chapter III, the achievement test form Z was examined three times by a jury of experts in the field of electronics, mathematics, statistics, and education in order to validate the content of the test.

Test Norms. To interpret test data it is necessary to establish some type of test norm. In the past the percentile system was probably the most widely used method of presenting test norms. However, the percentile system has a serious drawback due to the unequal distance between units, especially at the extremes of the

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[3]Henry E. Garrett, Statistics in Psychology and Education (New York: Longmans, Green and Co., 1958), p. 356.

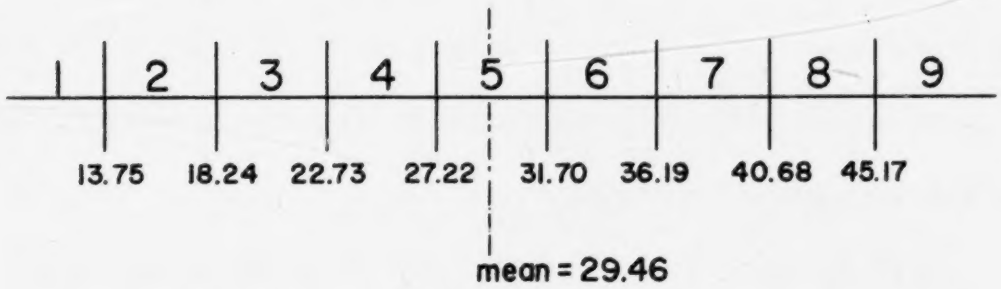
[4]Robert L. Thorndike and Elizabeth Hagen, op. cit., p. 160.

distribution. Many achievement tests now use the standard score or stanine system rather than the percentile system. In the stanine system each division is spaced one-half standard deviation apart.[5] The stanine normative method was used in this investigation.

In Table XII and Table XIII the national norms for the two- and four-year post-high-school electronics technician institutions are illustrated.

TABLE XII

NATIONAL NORMS FOR TWO-YEAR POST-HIGH-SCHOOL INSTITUTIONS OFFERING ELECTRONICS TECHNOLOGY

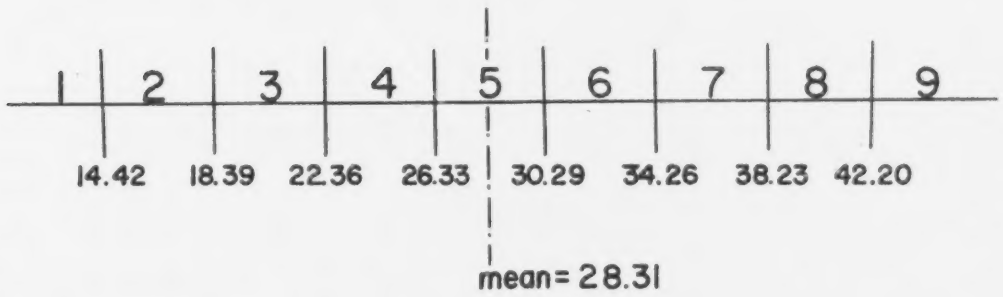


[5] Ibid. p. 137.

TABLE XIII

NATIONAL NORMS FOR FOUR-YEAR POST-HIGH-SCHOOL INSTITUTIONS

OFFERING ELECTRONICS TECHNOLOGY



Norms were also determined for each of the states which had at least two schools participating in the study. In Table XIV and Table XV the state norms for two and four-year institutions are shown respectively.

Determining Relative Understanding of Essential Mathematical Concepts

The relative understanding of the needed mathematical concepts was determined by an item analysis. Each answer sheet for both the two and four-year institutions was analyzed.

Analysis of Test Items. The number of errors, percentage of errors and rank order of understanding were determined for the participants and are listed in Tables XVI and XVII. The rank order was determined by the percentage of incorrect responses made to each concept tested.

TABLE XIV

STATE NORMS FOR TWO-YEAR POST-HIGH-SCHOOL INSTITUTIONS

OFFERING THE ELECTRONICS TECHNOLOGY CURRICULUM

State	State Standard Deviation	State Mean	Stanine Scores								
			1	2	3	4	5	6	7	8	9
Alabama	7.90	32.76	18.93	22.88	26.83	30.78	34.74	38.69	42.64	46.59	
California	8.53	28.01	13.10	17.36	21.62	25.88	30.32	34.58	38.84	43.10	
Florida	6.85	32.01	20.01	23.44	26.87	30.30	33.72	37.15	40.58	44.01	
Georgia	7.52	22.19	9.03	12.79	16.55	20.31	24.07	27.83	31.59	35.35	
Illinois	8.86	34.37	18.83	23.27	27.71	32.15	36.59	41.03	45.47	49.91	
Kentucky	7.62	32.25	18.91	22.72	26.53	30.34	34.16	37.97	41.78	45.59	
Massachusetts	8.98	31.93	16.22	20.71	25.20	29.69	34.17	38.66	31.15	47.64	
Michigan	7.32	25.72	12.91	16.57	20.23	23.89	27.55	31.21	34.87	38.53	
Mississippi	8.61	30.10	15.02	19.33	23.64	27.95	38.70	36.55	34.40	32.25	
New York	7.46	26.18	13.16	16.88	20.60	24.32	28.04	31.76	35.48	39.20	
Ohio	7.78	29.13	15.52	19.41	23.30	27.19	28.12	32.01	35.90	39.79	
Oklahoma	9.11	28.36	12.40	16.96	21.52	26.08	30.64	35.20	39.76	44.32	
Pennsylvania	7.87	30.52	16.80	20.72	24.64	28.56	32.48	36.40	40.32	44.24	
Texas	7.72	30.29	16.78	20.64	24.50	28.36	32.22	36.08	39.94	43.80	

TABLE XV

STATE NORMS FOR FOUR-YEAR POST-HIGH-SCHOOL INSTITUTIONS

OFFERING THE ELECTRONICS TECHNOLOGY CURRICULUM

State	State Standard Deviation	State Mean	Stanine Scores								
			1	2	3	4	5	6	7	8	9
California	7.81	24.17	10.52	14.42	18.32	22.22	26.12	30.02	33.92	37.82	
Florida	8.62	31.87	16.78	21.09	25.40	29.71	34.03	38.34	42.65	46.96	
Illinois	6.88	25.80	13.76	17.20	20.64	24.08	27.52	30.96	34.40	37.84	
Indiana	7.43	18.32	5.30	9.02	12.74	16.46	20.18	23.90	27.62	31.34	
Kentucky	7.20	21.61	9.01	12.61	16.21	19.81	22.96	26.25	30.16	33.76	
Minnesota	8.95	30.23	14.55	19.03	23.51	27.99	32.47	36.95	41.43	45.91	
Missouri	6.81	31.65	19.75	23.15	26.55	29.95	33.35	36.75	40.15	43.55	
Pennsylvania	6.86	34.04	22.04	25.47	28.90	32.33	35.75	39.18	42.61	46.04	
South Dakota	7.28	26.44	13.70	17.34	20.98	24.62	28.26	31.90	35.54	39.18	
Tennessee	7.43	27.92	14.78	18.54	22.30	26.06	29.78	33.54	37.30	40.76	
Texas	7.38	30.18	13.53	20.93	24.63	28.33	32.03	35.73	39.43	43.13	
Virginia	6.97	31.00	18.82	22.30	25.78	29.26	32.74	36.22	39.70	43.18	
Washington	7.01	29.46	17.21	20.71	24.21	27.71	31.21	34.71	38.21	41.71	
Wisconsin	8.29	29.53	15.46	19.48	23.50	27.52	31.54	35.56	39.58	43.60	

TABLE XVI

RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS FOR STUDENTS FROM TWO-YEAR INSTITUTIONS

Mathematical Concept	Number of Errors (1556 Possible)	Percent of Errors	Relative Rank of Understanding
Addition of common fractions	220	14.13	1
Subtraction of common fractions	386	24.80	4
Multiplication of common fractions	231	14.84	2
Division of common fractions	318	22.19	3
Addition of decimal fractions	439	28.24	7
Subtraction of decimal fractions	492	31.62	9
Multiplication of decimal fractions	550	35.30	11
Division of decimal fractions	848	54.41	25
Ratio	628	40.33	15
Percentages	720	46.25	19
Square root of perfect square	607	39.06	13
Long-hand square root process	1318	84.69	43
Square root of fractions	986	63.41	31
Algebraic symbol-substitution for unknown	412	26.45	6
Positive numbers	393	25.65	5
Negative numbers	419	38.14	12
Imaginary numbers or j-operators	1430	91.99	48
Addition of monomials and polynomials	529	29.42	8
Subtraction of monomials and polynomials	657	42.25	16
Multiplication of monomials and polynomials	741	47.64	21
Division of monomials and polynomials	788	50.73	23
Algebraic grouping and sign change	877	56.40	27
Graphical representation of equations	624	40.24	14
Addition of exponents	1112	71.66	36
Subtraction of exponents	1248	80.13	38

TABLE XVI Continued

Mathematical Concept	Number of Errors (1556 Possible)	Percent of Errors	Relative Rank of Understanding
Multiplication of powers of tens	1263	81.25	39
Division of exponents	1346	86.57	44
Zero exponents	1454	93.50	49
Multiplication of powers of tens	690	44.39	18
Division of powers of tens	846	54.39	24
Powers of ten	761	48.97	22
Roots of algebraic expressions	1237	79.46	37
Interchange of metric units	891	57.35	28
Solution of algebraic equations	734	47.24	20
Construction of algebraic equations from a practical situation	858	55.25	26
Addition of algebraic fractions	1021	65.75	34
Subtraction of algebraic fractions	1036	66.61	35
Division of algebraic fractions	1065	88.48	45
Multiplication of algebraic fractions	1004	64.51	32
Simultaneous equations	1020	65.65	33
Quadratic equations	1286	82.77	41
Rectangular coordinates	1464	94.18	51
Polar coordinates	1470	94.53	52
Quadrants	665	42.79	17
Radians	1279	82.20	40
Trigonometric functions	1302	83.76	42
Trigonometrical solution of right triangles	1458	93.69	50
Use of trigonometry tables	1413	90.82	47
Addition of vectors	1511	97.00	55

TABLE XVI Continued

Mathematical Concept	Number of Errors (1556 Possible)	Percent of Errors	Relative Rank of Understanding
Estimation	259	60.21	30
Addition of logarithms	1390	99.37	56
Subtraction of logarithms	1398	89.82	46
Multiplication of logarithms	1496	96.12	54
Division of logarithms	1490	95.81	53
Factoring of monomials and polynomials	905	58.07	29
Pythagorean theorem	506	32.49	10
AVERAGE	810.58	54.58	

TABLE XVII

RELATIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS FOR STUDENTS FROM FOUR-YEAR INSTITUTIONS

Mathematical Concept	Number of Errors (1556 Possible)	Percent of Errors	Relative Rank of Understanding
Addition of common fractions	201	18.03	2
Subtraction of common fractions	291	26.12	7
Multiplication of common fractions	138	12.33	1
Division of common fractions	328	29.42	9
Addition of decimal fractions	321	28.76	8
Subtraction of decimal fractions	377	33.75	14
Multiplication of decimal fractions	407	36.48	15
Division of decimal fractions	583	52.26	26
Ratio	472	42.32	19
Percentages	494	44.23	21
Square root of perfect square	354	31.71	12
Long-hand square root process	937	83.95	47
Square root of fractions	718	64.31	34
Algebraic symbol-substitution for unknown	289	25.94	6
Positive numbers	225	20.15	3
Negative numbers	423	37.91	16
Imaginary numbers or j-operators	894	80.15	43
Addition of monomials and polynomials	252	22.57	5
Subtraction of monomials and polynomials	361	32.35	13
Multiplication of monomials and polynomials	549	49.16	23
Division of monomials and polynomials	537	48.08	22
Algebraic grouping and sign change	593	53.17	27
Graphical representation of equations	341	30.58	10

TABLE XVII Continued

Mathematical Concept	Number of Errors (1556 Possible)	Percent of Errors	Relative Rank of Understanding
Addition of exponents	780	69.87	37
Subtraction of exponents	873	78.27	42
Multiplication of exponents	808	72.36	39
Division of exponents	993	88.96	49
Zero exponents	1072	96.10	55
Multiplication of powers of tens	483	43.29	20
Division of powers of tens	661	59.26	31
Powers of ten	468	41.91	18
Roots of algebraic expressions	855	76.63	41
Interchange of metric units	652	58.45	30
Solution of algebraic expressions	462	41.42	17
Construction of algebraic equations from a practical situation	625	55.96	29
Addition of algebraic fractions	671	60.13	32
Subtraction of algebraic fractions	747	66.95	36
Division of algebraic fractions	906	81.14	44
Multiplication of algebraic fractions	565	50.64	25
Simultaneous equations	708	63.43	33
Quadratic equations	737	66.03	35
Rectangular coordinates	852	76.36	40
Polar coordinates	1025	91.87	53
Quadrants	1017	91.08	52
Radians	344	30.86	11
Trigonometric functions	789	70.72	38
Trigonometrical solution of right triangles	934	83.73	46
Use of trigonometry tables	949	85.03	48

TABLE XVII Continued

Mathematical Concept	Number of Errors (1556 Possible)	Percent of Errors	Relative Rank of Understanding
Addition of vectors	1008	90.29	51
Estimation	598	53.54	28
Addition of logarithms	1080	96.79	56
Subtraction of logarithms	929	83.20	45
Multiplication of logarithms	1005	90.02	50
Division of logarithms	1048	93.95	54
Factoring of monomials and polynomials	560	50.16	24
Pythagorean theorem	227	20.34	4
AVERAGE	634.19	56.81	

The percentage of errors made for each basic mathematical concept tested was computed by dividing the number of errors for each item by the number of possible correct responses for that item. The rank order of the relative degree of understanding of the concepts tested was determined by the percent of correct responses made to each concept tested, with the concepts having the highest percent of correct responses being ranked first. (The percentage of correct responses was computed by subtracting the percentage of error figure from one hundred percent.)

Understanding of Mathematical Concepts. For purposes of this investigation each mathematical concept which was missed by fifty per cent or more of the participants was considered as being "not understood." Those concepts which were missed by fewer than fifty per cent of the participants were considered as being "understood."

There were thirty-four mathematical concepts which were "not understood" by students from the two-year institutions. Thirty-two of the same thirty-four "not understood" concepts were also "not understood" by the students from the four-year institutes. In Table XVIII the mathematical concepts which are not understood by students from both the two and four-year institutes are listed.

There were twenty-two mathematical concepts which were understood by students from two-year institutions and twenty-three concepts which were understood by students from four-year institutions. In Table XIX the mathematical concepts which were understood by students from two and four-year institutes are listed.

TABLE XVIII

MATHEMATICAL CONCEPTS WHICH ARE LEAST UNDERSTOOD BY STUDENTS FROM TWO AND FOUR-YEAR POST-HIGH-SCHOOL INSTITUTIONS WHICH OFFER THE ELECTRONICS TECHNOLOGY CURRICULUM

Mathematical Concepts Which Are Not Understood by Students From Two-Year Institutions	Mathematical Concepts Which Are Not Understood by Students From Four-Year Institutions
Division of decimal fractions	Division of decimal fractions
Long-hand square root process	Long-hand square root process
Square root of fractions	Square root of fractions
Imaginary numbers or j-operators	Imaginary numbers of j-operators
Division of monomials and polynomials	Algebraic grouping and sign change
Algebraic grouping and sign change	Addition of exponents
Addition of exponents	Subtraction of exponents
Subtraction of exponents	Multiplication of exponents
Multiplication of exponents	Division of exponents
Division of exponents	Zero exponents
Zero exponents	Division of powers of tens
Division of powers of tens	Roots of algebraic expressions
Roots of algebraic expressions	Interchange of metric units
Interchange of metric units	Construction of algebraic equations from a practical situation
Construction of algebraic equations from a practical situation	Addition of algebraic fractions
Addition of algebraic fractions	Subtraction of algebraic fractions
Subtraction of algebraic fractions	Division of algebraic fractions
Division of algebraic fractions	Multiplication of algebraic fractions
Multiplication of algebraic fractions	Simultaneous equations
Simultaneous equations	Quadratic equations
Quadratic equations	Rectangular coordinates
Rectangular coordinates	Polar coordinates
Polar coordinates	Quadrants

TABLE XVIII Continued

Mathematical Concepts Which Are Not Understood by Students From Two-Year Institutions	Mathematical Concepts Which Are Not Understood by Students From Four-Year Institutions
Radians	Trigonometric functions
Trigonometric functions	Trigonometrical solution of right triangles
Trigonometrical solution of right triangles	Use of trigonometry tables
Use of trigonometry tables	Addition of vectors
Addition of vectors	Estimation
Estimation	Addition of logarithms
Addition of logarithms	Subtraction of logarithms
Subtraction of logarithms	Multiplication of logarithms
Multiplication of logarithms	Division of logarithms
Division of logarithms	Factoring of monomials and polynomials
Factoring of monomials and polynomials	

TABLE XIX

MATHEMATICAL CONCEPTS WHICH ARE UNDERSTOOD BY STUDENTS FROM TWO AND FOUR-YEAR POST-HIGH-SCHOOL INSTITUTIONS WHICH OFFER THE ELECTRONICS TECHNOLOGY CURRICULUM

Mathematical Concepts Which Are Understood by Students From Two-Year Institutions	Mathematical Concepts Which Are Understood by Students From Four-Year Institutions
Addition of common fractions	Addition of common fractions
Subtraction of common fractions	Subtraction of common fractions
Multiplication of common fractions	Multiplication of common fractions
Division of common fractions	Division of common fractions
Addition of decimal fractions	Addition of decimal fractions
Subtraction of decimal fractions	Subtraction of decimal fractions
Multiplication of decimal fractions	Multiplication of decimal fractions
Ratio	Ratio
Percentages	Percentages
Square root of perfect square	Square root of perfect square
Algebraic symbol-substitution for unknown	Algebraic symbol-substitution for unknown
Positive numbers	Positive numbers
Negative numbers	Negative numbers
Addition of monomials and polynomials	Addition of monomials and polynomials
Subtraction of monomials and polynomials	Subtraction of monomials and polynomials
Multiplication of monomials and polynomials	Multiplication of monomials and polynomials
Graphical representation of equations	Division of monomials and polynomials
Multiplication of powers of tens	Graphical representation of equations
Powers of ten	Multiplication of powers of tens
Solution of algebraic equations	Powers of ten
Quadrants	Solution of algebraic equations
Pythagorean theorem	Radians
	Pythagorean theorem

Summary of Test Analysis

The mathematical achievement test form Z was developed in order to provide a valid and reliable measure which could be used to isolate deficiencies of essential mathematical concepts. An analysis of the test data has shown that the instrument is valid and reliable, that state and national norms have been established and that strengths and weaknesses of essential mathematical concepts can be detected.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this investigation was (1) to identify the mathematical concepts which are needed by the entry level electronics technician and (2) to develop and standardize an achievement test for the purpose of determining the relative understanding of such concepts by students graduating from public-post-high school electronics technology institutions. It was hypothesized that essential mathematical concepts could be determined and such an achievement test could be developed and standardized.

The execution of the investigation was divided into five major parts: (1) determining needed mathematical concepts, (2) constructing and revising a diagnostic achievement test, (3) selecting national normative sample, (4) administering and scoring of achievement test, and (5) analyzing the test results. The first part of the investigation was directed toward the identification of the basic mathematical concepts which are ordinarily used by the entry-level electronics technician. Forty-seven electrical-electronics textbooks were examined and all basic concepts presented by each of the textbooks were listed. All of the textbooks were published during the years 1950 through 1965. The concepts which were identified were submitted to a

jury of college instructors of courses in electronics, mathematics, statistics, and education. These instructors were asked to evaluate each concept listed in terms of whether it was a basic mathematical concept.

A checklist containing all the identified concepts was constructed and distributed to 568 electronics industries throughout the United States. Qualified industrial personnel were asked to indicate which mathematical concepts were needed by the entry-level electronics technician. Fifty-six basic mathematical concepts were identified.

The second part of the study was concerned with the construction of an instrument designed to test the student understanding of the mathematical concepts identified. Two equivalent test forms were constructed--forms X and Y. Both instruments contained at least one problem which would test each of the needed concepts. Both forms X and Y were administered to a sixty-eight student pilot study group and an item analysis performed. They were submitted to the previously mentioned jury of college instructors for their evaluation. The final test, form Z, consisted of a compilation of the most valid and reliable test items from forms X and Y. Test form Z was administered to the pilot study group and evaluated by an item analysis and jury of instructors.

The third part of the research was concerned with the selection of a nation-wide cross sectional sample of graduating electronics technology students used to establish state and national norms. There were 1,556 eligible electronics technology students graduating from

two-year post-high-school institutes, and 1,116 students from four-year institutes agreed to participate in the study.

The fourth part of the investigation was the administration and scoring of the tests. All of the tests were administered by the instructors or the author and scored by an electronic scanner.

The fifth part was an analysis of the results of the test results. The mean, the median, the standard deviation, and the standard error of the measure were computed for both two and four-year post-high-school institutes which offered the electronics technology curriculum.

The Kuder-Richardson and Spearman-Brown reliability coefficients were determined as well as the number of errors, percentage of error, and rank order of understanding for each concept tested.

Conclusions

The conclusions drawn from this study are restricted by the limitation and assumptions used in the design of this investigation. The inferences and generalizations must be limited to two and four-year post-high-school institutes which offer the electronics technology curriculum.

The following conclusions are based upon evidence presented by this research:

1. The hypotheses, as stated in the first chapter, are accepted.

a. It is possible to determine which specific mathematical concepts are needed by the entry-level electronics technologist.

b. It is possible to develop and standardize a valid and reliable diagnostic-achievement test for the purpose of isolating those mathematical concepts which are least understood so that additional education may be provided for students to correct such weaknesses.

2. Six of the forty-seven electronics technology textbooks analyzed included all of the fifty-six essential mathematical concepts.

3. Electronics instructors are not placing enough emphasis on mathematical concepts which the personnel from the electronics industries consider essential for the entry-level electronic technician.

   a. Thirty-four of the fifty-six essential mathematical concepts were not understood by students graduating from two-year post-high-school institutes which offered the electronics technology curriculum.

   b. Thirty-three of the fifty-six essential mathematical concepts were not understood by students graduating from four-year post-high-school institutions which offered the electronics technology curriculum.

Recommendations

In the light of this analysis and of suggestions from industrial and education personnel the following recommendations are made:

1. More emphasis should be placed upon the development and use of curriculum guides designed to teach essential mathematical concepts.
2. Electronics technology educators should have a working knowledge of essential mathematical concepts.
3. A follow-up study of the electronics technology graduates should be conducted to determine the extent to which their mathematical background is meeting their vocational needs.
4. Studies should be made to determine how the basic mathematical concepts that are needed can be best taught to electronics technology students.

It is believed that these findings will provide a sound basis for updating the mathematical content of the electronics curriculum attuned to the needs of industry.

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APPENDICES

APPENDIX A

TEXTBOOKS USED TO DETERMINE MATHEMATICAL CONCEPTS

TEXTBOOKS USED TO DETERMINE MATHEMATICAL CONCEPTS

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APPENDIX B

JURY MEMBERS

JURY FOR ELECTRONICS MATHEMATICS TEST

Years of Experience	Name	Present Position
		Electronics Specialists
23	Howard Gerrish	Professor, Industrial Education, San Jose State College
21	George Huebner	Ph.D. Electrical Engineering, Texas A&M University
2	Charles Schuler	Electronics Institute, State College, California, Pennsylvania
19	James L. Boone, Jr.	Associate Professor of Electronics, Texas A&M University
14	Donald Smith	Assistant Professor of Electronics, Long Beach State, California
		Mathematics Specialists
17	Gene Hays	Director of Programming, LTV Corporation, Santa Anna, California
22	Douglas Leavenworth	Mathematician, Nortronics (Division of North American Aviation)
9	Don Koffman	Mathematics Department, Orange Coast College, Garden Grove, California
11	David Graham	USAF Mathematician

JURY OF ELECTRONICS MATHEMATICS TEST (Continued)

Years of Experience	Name	Present Position
	Education and Psychological Testing Specialists	
16	Donald Barker	Associate Professor of Education, Texas A&M University
8	Arthur Roach	Assistant Professor of Education, Texas A&M University
	Statistical Specialists	
3	Lyle Broemeling	Institute of Statistics, Texas A&M University
7	Homer Jenkins	Institute of Statistics Texas A&M University

Average number of years teaching experience = 11 years

APPENDIX C

MATHEMATICAL CONCEPTS DETERMINED FROM TEXTBOOK ANALYSIS

MATHEMATICAL CONCEPTS DETERMINED FROM TEXTBOOK ANALYSIS

Addition of common fractions
Subtraction of common fractions
Multiplication of common fractions
Division of common fractions
Addition of decimal fractions
Subtraction of decimal fractions
Multiplication of decimal fractions
Division of decimal fractions
Ratio
Percentages
Square root of perfect square
Long hand square root process
Square root of fractions
Algebraic symbol substitutions for unknown
Positive numbers
Negative numbers
Imaginary numbers or j-operators
Addition of monomials and polynomials
Subtraction of monomials and polynomials
Multiplication of monomials and polynomials
Division of monomials and polynomials
Algebraic grouping and sign change
Graphical representation of equations
Addition of exponents
Subtraction of exponents
Multiplication of exponents
Division of exponents
Zero exponents
Multiplication of powers of ten
Division of powers of ten
Powers of ten
Roots of algebraic expressions
Interchange of metric and English units
Solution of algebraic equations
Construction of algebraic equations
Addition of algebraic fractions
Subtraction of algebraic fractions
Division of algebraic fractions
Multiplication of algebraic fractions
Simultaneous equations
Quadratic equations
Rectangular coordinates
Polar coordinates

Quadrants
Radians
Trigonometric functions
Solution of right triangles, with trigonometry
Use of trigonometric tables
Addition of logarithms
Subtraction of logarithms
Multiplication of logarithms
Division of logarithms
Factoring of monomials and polynomials
Conversion of fractions to decimals
Changing percentage to decimal
Addition of minutes and degrees
Graphical interpretation
Estimation of arithmetic problems
Determinants
Application of sine function of acute angles
Application of cosine function of acute angles
Application of tangent function of acute angles
Interpolation of tables
Law of tangents
Identities
Series and progressions
Use of natural logs
Slope-point form for equations
Differential of higher order derivatives
Curve analysis
Fundamental integral theorem
Binary arithmetic
Boolean algebra
Pythagorean theorem

APPENDIX D

INFORMATION CHECKLIST

GENERAL INFORMATION

1. Name of Company_____
2. Address_____City_____
3. Name of Interviewee_____Title_____Personnel
4. Company established since_____. _____Indust. Relations
5. Nature of work_____manufacturing _____Plant Manager
   _____service _____Supervisor
   _____engineering _____Foreman
   _____Others
6. Estimated number of electronics technicians employed by the firm_____.
7. Is there an electronics technician in-service educational program sponsored by the firm? Yes_____ No_____.

ELECTRONICS TECHNICIAN (Beginning or Entry Level)

8. Education required for entry level _____High School
   _____2 Yr. College
   _____4 Yr. College
   _____Trade School
   _____Military
9. Would your firm hire a high school graduate for entry level technician if qualified? Yes_____ No_____.
10. Mathematical courses needed by entry level technician.
    _____Geometry
    _____Algebra I
    _____Algebra II
    _____Trigonometry
    _____Analytical Geometry
    _____Calculus
    _____Differential Equations
11. Age limits of entry level technician.
    Min._____ Max._____
12. Should the entry level technician have a usable knowledge of a slide rule? _____Yes _____No.
13. What are the general duties and skills of the entry level technician in your firm?
    _____
    _____
    _____
    _____
    _____
14. Is a written exam given before an entry technician is employed? Yes_____ No_____
15. May I have a copy of the entry technician test?
    Yes_____ No_____
16. May I look at a copy of the entry technician test?
    Yes_____ No_____
17. Does the entry technician need a knowledge of fundamental computer switching circuits? Yes_____ No_____

18. Which of the following mathematical concepts are Required "R"; Preferred "P"; or Unnecessary "blank" for the entry level technician?

MATHEMATICAL CONCEPTS	REQUIRED	PREFERRED	UNNECESSARY
Addition of common fractions			
Subtraction of common fractions			
Multiplication of common fractions			
Division of common fractions			
Addition of decimal fractions			
Subtraction of decimal fractions			
Multiplication of decimal fractions			
Division of decimal fractions			
Ratio			
Percentages			
Square root of perfect square			
Long hand square root process			
Square root of fractions			
Algebraic symbol substitutions for unknown			
Positive numbers			
Negative numbers			
Imaginary numbers or j-operators			
Addition of monomials and polynomials			
Subtraction of monomials and polynomials			
Multiplication of monomials and polynomials			
Division of monomials and polynomials			
Algebraic grouping and sign change			
Graphical representation of equations			
Addition of exponents			
Subtraction of exponents			
Multiplication of exponents			
Division of exponents			
Zero exponents			
Multiplication of powers of ten			
Division of powers of ten			
Powers of ten			
Roots of algebraic expressions			
Interchange of metric and English units			
Solution of algebraic equations			
Construction of algebraic equations from a practical situation			
Addition of algebraic fractions			
Subtraction of algebraic fractions			

MATHEMATICAL CONCEPTS	REQUIRED	PREFERRED	UNNECESSARY
Division of algebraic fractions			
Multiplication of algebraic fractions			
Simultaneous equations			
Quadratic equations			
Rectangular coordinates			
Polar coordinates			
Quadrants			
Radians			
Trigonometric functions			
Solution of right triangles, with trigonometry			
Use of trigonometric tables			
Addition of logarithms			
Subtraction of logarithms			
Multiplication of logarithms			
Division of logarithms			
Factoring of monomials and polynomials			
Conversion of fractions to decimals			
Changing percentage to decimal			
Addition of minutes and degrees			
Graphical interpretation			
Estimation of arithmetic problems			
Determinants			
Application of sine function of acute angles			
Application of cosine function of acute angles			
Application of tangent function of acute angles			
Pythagorean theorem			
Interpolation of tables			
Law of tangents			
Identities			
Series and progressions			
Use of natural logs			
Slope-point form for equations			
Differential of higher order derivatives			
Curve analysis			
Fundamental integral theorum			
Binary arithmetic			
Boolean algebra			

19. Additional Concepts not listed:

20. Remarks:

APPENDIX E

MATHEMATICS ACHIEVEMENT TEST

(Photo Reduced)

Mathematics Achievement Test

for: **ELECTRONICS TECHNOLOGY**

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Instructions :

This test consists of 60 mathematics problems. Each problem contains one or more mathematical concepts which is important to the electronics technologist. Read each question and its lettered answers. When you have decided which answer is correct, blacken the corresponding space on the answer sheet with a No. 2 pencil. Make your mark as long as the pair of lines, and completely fill the area between the pairs of lines. If you change your mind, erase your first mark COMPLETELY. Make no stray marks; they may count against you. Work each problem as rapidly as possible. Do not spend too much time on any one problem. Work first the problems which are most familiar to you. You will have two hours to complete the entire test. There are logarithms, squares, square roots, reciprocals and trigonometric tables in the back of the test booklet. SLIDE RULES MAY NOT BE USED. REMEMBER: DO NOT WRITE ON TEST BOOKLET. If you have any questions, raise your hand. When you have finished reading the instructions, close the test booklet and look up. Do not proceed on to page 2 until told to do so.

Read problems carefully —

1. Holes that measure 7/16 inches are to be reamed twenty-four ten thousandths of an inch oversize. What will be the diameter of the reamed holes?

(A)	.4490	(C)	.4423
(B)	.4362	(D)	.4399
(E)	None of these		

2. The alternating current capacitive reactance of a circuit, or capacitor, is given by $X_C = \frac{1}{2\pi fc}$ in which "X_C" is the capacitive reactance in ohms, "F" is the frequancy of the alternating current in cycles per second* and "C" is the capacitance of the circuit, or capacitor, in farads. Compute the capacitive reactance if "F" = 28,000,000 cycles per second and "C" = 0.000000000025 farad.

(A)	2275 ohms	(C)	2.275 ohms
(B)	227.5 ohms	(D)	22.75 ohms
(E)	None of these		

3. Find the sum of $\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$ if C_1 = 17 MFD, C_2 = 4 MFD and C_3 = 5 MFD.

(A)	.51 MFD	(C)	.48 MFD
(B)	.38 MFD	(D)	.26 MFD
(C)	None of these		

---

*CYCLES PER SECOND is the same unit of measure as HERTZ.

GO ON TO NEXT PAGE

4. The resonant frequency (f_o) of a circuit is given by $f_o = \frac{1}{2\pi\sqrt{LC}}$ cps. Where "L" = inductance of circuit in henrys, "C" = capacitance of circuit in farads, compute the resonant frequency when: $L = 160 \times 10^{-6}$ henrys and $C = .00025 \times 10^{-6}$ farad.

(A) 13640 cps
(B) 52160 cps
(C) 25120 cps
(D) 79600 cps
(E) None of these

5. The signal voltage (e_g) of an amplifier tube as read on a peak to peak volt meter is +1 volt. The bias is -2 volt (E_g). What is the bias voltage during the positive swing of the signal voltage (e_s), if $e_s = e_g + E_g$?

(A) -3 volts
(B) -1 volt
(C) -1.5 volts
(D) + 3 volts
(E) None of these

6. The resistance of a bus bar can be found by using the formula $R = \frac{\rho \times L}{A}$ where "ρ" (Greek letter rho) is the resistivity, "L" = the length, "A" = the area of the cross section and "R" = the resistance of the whold bus bar. Solve this formula for L.

(A) $L = \frac{R}{A} - \rho$
(B) $L = AR - \rho$
(C) $L = AR + \rho$
(D) $L = \frac{R}{A} + \rho$
(E) None of these

7. Simplify: $R^4 - \{-2WL - 2[-3R^3 - (WL - 6R^3)]\}$

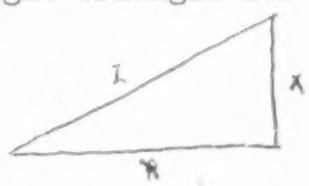
(A) R^4
(B) $R^4 - 3R^3 + WL$
(C) $R^4 + 6R^3$
(D) $R^4 + 4WL - 6R^3$
(E) None of these

GO ON TO NEXT PAGE

8. An amplifier has an input of 6 milli-watts and an output of 72 watts. Calculate the gain in decibles (N_{db}) if the power gain (C_1) is equal to 1.2 kilo-watts. ($N_{db} = \log G_p$).

(A) 10.0792 db
(B) 30.0792 db
(C) 40.0792 db
(D) 20.0792 db
(E) None of these

9. Solve the following right triangle for Z. (Hint: Use trigonometry).
X = 44.0 Ω
R = 40.0 Ω



(A) 52 Ω
(B) 54 Ω
(C) 59 Ω
(D) 50 Ω
(E) None of these

10. How many degrees must the temperature of a resistor rise to change from 11 degrees F. below freezing, to 75 degrees F.?

(A) 64 degrees
(B) 71 degrees
(C) 54 degrees
(D) 36 degrees
(E) None of these

11. Change 12 $\angle -53^{\circ}$ into rectangular form.

(A) 7.2 - j 9.6
(B) 12 - j 53
(C) 7 + j 4.6
(D) -0 + j 6.9
(E) None of these

12. Simplify: 16 x 3 1/8 x 5/16 x 1/4

(A) 3.9
(B) 7.9
(C) 4.9
(D) 11.9
(E) None of these

GO ON TO NEXT PAGE

13. A company purchases a 5% tolerance 556 ohms resistor. Its actual value was found to be 530 ohms. Was the resistor out of its tolerance range? If so, how much?

(A) yes, 2 ohms
(B) no, resistor is in its tolerance range
(C) yes, 4 ohms
(D) yes, 6 ohms
(D) None of these

14. Find the voltage across a resistor of 215 ohms if the power is 1.18 watts. ($E=\sqrt{RP}$)

(A) 12 volts
(B) 15.3 volts
(C) 16 volts
(D) 18.2 volts
(E) None of these

15. The current through a meter movement is 52 micro-amps. If the D.C. resistance of the movement is 575 ohms, what is its power dissipation? ($P = I^2R$)

(A) 2.99 milli-watts
(B) 1.56 micro-watts
(C) .0612 micro-watts
(D) 2704 pico-watts
(E) None of these

16. Locate -4 on the scale.

(A) C
(B) A
(C) B
(D) D
(E) None of these

17. Reduce: $\sqrt{\frac{25}{64}}$

(A) .625
(B) .425
(C) .825
(D) .229
(E) None of these

GO ON TO NEXT PAGE

18. If P = IE, solve the following for I, if P = 18 14/25 watts & E = 6 3/7 volts.

(A) 3 amps (C) 2.3 amps
(B) 3.8 amps (D) 4.2 amps
(E) None of these

19. The alternating current inductive reactance of a circuit or an inductance is given by $X_L = 2\pi fL$, in which "X_L" is the inductance reactance in ohms, "f" is the frequency of the alternating current in cycles per second, and "L" is the inductance of the circuit or inductor measured in henrys. Compute the inductive reactance when: f = 400 cycles, L = .5 henry

(A) 125.6 ohms (C) 1256 ohms
(B) 12.56 ohms (D) 12560 ohms
(E) None of these

20. A circuit of a 10 ohms resistor (R_c) is connected across a variable voltage supply (E_v). Plot the current (I) through the resistor as E_v is varied in 10-volts steps from 0 to 50 volts. What conclusions do you draw from this graph?

(A) parabolic (C) linear
(B) "S" curve (D) hyperbola
(E) None of these

21. What is the ratio of 230 volts to 115 volts?

(A) 1.5: 3.5 (C) 1:2
(B) 3.5: 1.5 (D) 2:1
(E) None of these

GO ON TO NEXT PAGE

22. The total current of a parallel circuit is equal to sum of the current in each of the branches. Find the L_T if the following are the current measurements for each of the branches of the circuit: .00893 amps. 347 milliamps, 6.7 amps and 16.0 milliamps.

(A) 7.91221 amps
(B) 8.16193 amps
(C) 8.07193 amps
(D) 7.07193 amps
(E) None of these

23. Find the sine of 27 degrees.

(A) -.4877
(B) .4540
(C) -.8702
(D) .8910
(E) None of these

24. If $L_T = L_1 + L_2 + L_3$, solve for L_T if L_1 = 6 7/10 henry, L_2 = 13 1/2 henry, L_3 = 5 4/15 henry.

(A) 25.4 henry
(B) 26.1 henry
(C) 24.6 henry
(D) 27.8 henry
(E) None of these

25. Convert .000450 amps to micro-amps.

(A) 4.5 micro-amps
(B) 45 micro-amps
(C) .450 micro-amps
(D) 450 micro-amps
(E) None of these

26. Combine: $-32b^2y + 18\ by^2 + 16b^2y - 7by^2 - 11by^2$

(A) $-14\ by^2 + 2b^2y$
(B) $+16\ b^2y - 2by^2$
(C) $-16\ b^2y$
(D) $+12\ by^2$
(E) None of these

GO ON TO NEXT PAGE

27. Enclose the last three terms with parenthesis preceeded by a plus sign.

$$6WM + 3WL - \frac{1}{W-C} - Z + 3X$$

(A) $6WM + 3WL + (- \frac{1}{W-C} - Z + 3X)$

(B) $6WM + 3WL + (\frac{1}{W-C} + Z - 3X)$

(C) $6WM + 3WL + (\frac{1}{W-C} - Z + 3X)$

(D) $6WM + 3WL + (- \frac{1}{W-C} + Z - 3X)$

(E) None of these

28. If $T = \frac{2R}{C}$ is the formula for calculating the delay between the transmission of a radar pulse and the reception of its echo from the target where "T" is the delay time in seconds. "R" is the range in miles and "C" is the speed at which radio waves travel, which is 186,000 miles per second, what is the time between the transmission of a pulse and the reception of its echo from a target at the distance of 200 miles?

(A) $\frac{1}{200}$ sec.

(B) $\frac{1}{2000}$ sec.

(C) $\frac{1}{100}$ sec.

(D) $\frac{1}{1000}$ sec.

(E) None of these

29. A 117 volt, 60 cycle voltage source is connected across a series circuit consisting of a 27 ohm resistor and a 50 microfarad capacitor. Find the impedance (Z) of the circuit.

$$X_C = \frac{1}{2\pi f C} \qquad Z = \sqrt{R^2 + X_C^2}$$

(A) 77 ohms

(B) 59 ohms

(C) 47 ohms

(D) 352 ohms

(E) None of These

GO ON TO NEXT PAGE

30. If m = n, reduce $\frac{Z^m}{Z^n}$

(A) -1
(B) 0
(C) 1
(D) .5
(E) None of these

31. If $e = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, solve $3e^2 - 2 = 4e$.

(A) 6.32 & -12
(B) 1.7 & -.39
(C) -3.2 & +3.2
(D) -4.2 & .68
(E) None of these

32. Solve by substitution. $4s - 3t = 5$
$9s - 8t = 0$

(A) t = 11, s = 9
(B) t = 7, s = 6
(C) t = 4, s = 3
(D) t = 9, s = 8
(E) None of these

33. Divide: $\frac{5/7\ x^{-2}\ x^{1}z^{2}3^{-3}}{-3/4\ x^{-3}y^{-3}zB^{-3}}$

(A) $\frac{+20}{21}\ xyz^2B$
(B) $\frac{-20}{21}\ xyz^2$
(C) $\frac{-20}{21}\ xy^3z$
(D) $\frac{+20}{21}\ xy^7zB^6$
(E) None of these

34. Find the square root of 276.

(A) 16.4
(B) 16.8
(C) 16.2
(D) 16.6
(E) None of these

GO ON TO NEXT PAGE

35. Compute by logarithm the following: 7.24 x 38.6 x 462 (Show all work on the bottom of the answer sheet).

36. When "E" is the applied voltage to the circuit, find the value of "I" to three significant figures if E = 117 volts, L = 5 henry and f = 60 cycles per second. $E = IX_L$ or $X_L = 2 \quad fL$.

(A) .062 amps.
(B) .1274 amps.
(C) .1885 amps.
(D) .0439 amps.
(E) None of these

37. The perveance (K) of a diode is 1.5×10^{-3}. Find the plate current which will flow if the voltage on the plate is 50 volts (E_p) with respect to the cathode. $I = KE_p 3/2$

"I" = the plate current in amperes, "K" = the perveance (a constant determined by the geometry of the tube), and "E_p" = the place voltage with respect to the cathode.

(A) 2.25 amps.
(B) .0225 amps.
(C) 1.12 amps.
(D) .0112 amps.
(E) None of these

38. Factor: $\Delta^2 f^2 L^2 - 2fL + 36\,(fL)^3$

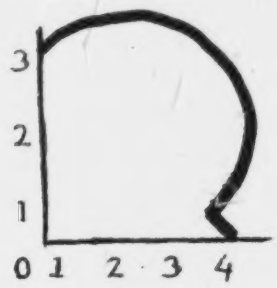
(A) $2fL\,(6fL-1+8f^2L^2)$
(B) $2fL\,(6fL-fL+18f^3L^3)$
(C) $2fL\,(2fL-1+18\,fL^2)$
(D) $2fL\,(2fL-fL+18fL)$
(E) None of these

39. If $i = \sqrt{-1}$, what does i^3 equal?

(A) $-\sqrt{1}$
(B) -1
(C) 1
(D) $-\sqrt{-1}$
(E) None of these

GO ON TO NEXT PAGE

40. What is the approximate area?



(A) 14 (C) 10
(B) 12 (D) 8
(E) None of these

41. Find the product of $-\frac{R_1 R_2}{R_1 + R_2}$ since R_1 = 15 ohms and R_2 = 26 ohms.

(A) 9.5 ohms (C) 8.5 ohms
(B) 10 ohms (D) 9 ohms
(E) None of these

42. Ch

(A) $2.5 \angle 1^\circ$ (C) $2.5 \angle 90^\circ$
(B) $2.5 \angle 45^\circ$ (D) $2.5 \angle 60^\circ$
(E) None of these

43. What quadrant will 710° lie?

(A) 3rd (C) 2nd
(B) 4th (D) 1st
(E) None of these

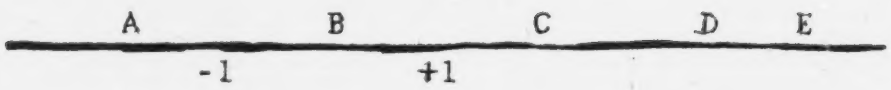
44. A circuit consists of 175 ohms resistance in series with a capacitor of 5 micro-farads. Both are connected across a source of 150 volts and 60 cycles per second. Determine the current through the circuit.

$X = \frac{1}{2\pi fC}$ $Z = \frac{E}{I}$ $\tan\theta = \frac{X_c}{R}$ $Z = \frac{X_c}{\sin\theta}$

(A) .270 amps. (C) .330 amps.
(B) .532 amps. (D) .558 amps.
(E) None of these

GO ON TO NEXT PAGE

45. Locate +5 on the scale.



(A) B
(B) E
(E) A
(C) C
(D) D

46. Find the algebraic formula which equals the following statement. "R" is equal to the product of "P" and "I" divided by "d" square.

(A) $R = P + \frac{I^2}{d}$
(B) $R = \frac{P+I}{d^2}$
(C) $R = \frac{PI}{d^2}$
(D) $R = \frac{PI}{d}^{2}$
(E) None of these

47. Subtract: .00032 amps from 680 amps.

(A) 10 milli-amps.
(B) .0001 amps.
(C) 100 micro-amps.
(D) 1 milli-amps.
(E) None of these

48. The resonant frequency (f_o) of a circuit is given by $f_o = \frac{1}{2\pi\sqrt{LC}}$ cps. Where "L" = inductance of the circuit in henrys and "C" = capacitance of circuit in farads, compute the resonant frequency when: L = 4 henry, C = .00000001 farad.

(A) 1256 cps
(B) 796 cps
(C) 1480 cps
(D) 960 cps
(E) None of these

GO ON TO NEXT PAGE

49. What must be subtracted from 16WL + 720 to obtain 8WL-162?

(A) -8WL+162
(B) 8WL-882
(C) 8WL+162
(D) -8WL-882
(E) None of these

50. Solve for R_T if R_1 = 2 ohms, R_2 = 10 ohms, and R_3 = 50 ohms.

$$R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

(A) 62 ohms
(B) 1.88 ohms
(C) 53 ohms
(D) 1.61 ohms
(E) None of these

51. Simplify: $-7i^2r + \{-3ei - (+i^2r - 4ei) - 5ei\} + 8i^2r$

(A) ei
(B) $-5ei + i^2r$
(C) $-4ei$
(D) $2i^2r - 9ei$
(E) None of these

52. A transmission line is made of #10 wire spaced 12 inches between centers. What is the characteristic impedance (Z_o) of the line? Diameter of #10 wire = .102 inches.

$Z_o = 276 \log \frac{d}{r}$ where d = spacing between wire centers, and r = the radius of the conductor

(A) 256 ohms
(B) 929 ohms
(C) 137 ohms
(D) 381 ohms
(E) None of these

GO ON TO NEXT PAGE

53. If a=2, b=3, c=4, reduce the following:

$$3\sqrt{8b^2c - 3a^2b - 27}$$

(A) 15
(B) 45
(C) 225
(D) 190
(E) None of these

54. Simplify: $\frac{L - C^2}{LC} \cdot \frac{de}{C}$

(A) $\frac{2L-C^2+de}{L2C}$
(B) $\frac{Lde-deC^2}{Le^2}$
(C) $\frac{L-C^2+deL}{LC}$
(D) $\frac{L-C+d^2}{LC+C}$
(E) None of these

55. How many radians are there in 924 degrees?

(A) 15.1
(B) 13.1
(C) 14.1
(D) 16.1
(E) None of these

56. Subtract the following logarithm. $\bar{6}.3217 - 4.6483$

(A) $\bar{1}.0700$
(B) 1.6734
(C) $\bar{3}.6734$
(D) 1.2734
(E) None of these

57. Solve by substitution: $5E + 2e = 16$
$3E - e = 3$

(A) E = -1, e = -2
(B) E = 2, e = 4
(C) E = 3, e = 2
(D) E = -6, e = -4
(E) None of these

GO ON TO NEXT PAGE

58. Combine the following fractions:

$$-37/40 + 1/8 + 4/5 - 19/20 + 13/40$$

(A) -5/8
(B) -41/40
(C) -39/40
(D) -7/8
(E) None of these

59. Find the cosine of 92 degrees.

(A) -.0349
(B) .9994
(C) .0349
(D) -.9994
(E) None of these

60. Divide: $\frac{22a^2b^3c}{11a^3b^2c^2}$

(A) 2bac
(B) $\frac{2a}{bc}$
(C) $\frac{1}{2bac}$
(D) $\frac{2b}{ac}$
(E) None of these

Re-check your work.

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SQUARES, SQUARE ROOTS, AND RECIPROCALS

no.	square	sq. root	reciprocal	no.	square	sq. root	reciprocal
1	1	1.0000	1.000000000	51	2,601	7.1414	.019607843
2	4	1.4142	.500000000	52	2,704	7.2111	.019230769
3	9	1.7321	.333333333	53	2,809	7.2801	.018867925
4	16	2.0000	.250000000	54	2,916	7.3485	.018518519
5	25	2.2361	.200000000	55	3,025	7.4162	.018181818
6	36	2.4495	.166666667	56	3,136	7.4833	.017857143
7	49	2.6458	.142857143	57	3,249	7.5498	.017543860
8	64	2.8284	.125000000	58	3,364	7.6158	.017241379
9	81	3.0000	.111111111	59	3,481	7.6811	.016949153
10	100	3.1623	.100000000	60	3,600	7.7460	.016666667
11	121	3.3166	.090909091	61	3,721	7.8102	.016393443
12	144	3.4641	.083333333	62	3,844	7.8740	.016129032
13	169	3.6056	.076923077	63	3,969	7.9373	.015873016
14	196	3.7417	.071428571	64	4,096	8.0000	.015625000
15	225	3.8730	.066666667	65	4,225	8.0623	.015384615
16	256	4.0000	.062500000	66	4,356	8.1240	.015151515
17	289	4.1231	.058823529	67	4,489	8.1854	.014925373
18	324	4.2426	.055555556	68	4,624	8.2462	.014705882
19	361	4.3589	.052631579	69	4,761	8.3066	.014492754
20	400	4.4721	.050000000	70	4,900	8.3666	.014285714
21	441	4.5826	.047619048	71	5,041	8.4261	.014084507
22	484	4.6904	.045454545	72	5,184	8.4853	.013888889
23	529	4.7958	.043478261	73	5,329	8.5440	.013698630
24	576	4.8990	.041666667	74	5,476	8.6023	.013513514
25	625	5.0000	.040000000	75	5,625	8.6603	.013333333
26	676	5.0990	.038461538	76	5,776	8.7178	.013157895
27	729	5.1962	.037037037	77	5,929	8.7750	.012987013
28	784	5.2915	.035714286	78	6,084	8.8318	.012820513
29	841	5.3852	.034482759	79	6,241	8.8882	.012658228
30	900	5.4772	.033333333	80	6,400	8.9443	.012500000
31	961	5.5678	.032258065	81	6,561	9.0000	.012345679
32	1,024	5.6569	.031250000	82	6,724	9.0554	.012195122
33	1,089	5.7446	.030303030	83	6,889	9.1104	.012048193
34	1,156	5.8310	.029411765	84	7,056	9.1652	.011904762
35	1,225	5.9161	.028571429	85	7,225	9.2195	.011764706
36	1,296	6.0000	.027777778	86	7,396	9.2736	.011627907
37	1,369	6.0828	.027027027	87	7,569	9.3274	.011494253
38	1,444	6.1644	.026315789	88	7,744	9.3808	.011363636
39	1,521	6.2450	.025641026	89	7,921	9.4340	.011235955
40	1,600	6.3246	.025000000	90	8,100	9.4868	.011111111
41	1,681	6.4031	.024390244	91	8,281	9.5394	.010989011
42	1,764	6.4807	.023809524	92	8,464	9.5917	.010869565
43	1,849	6.5574	.023255814	93	8,649	9.6437	.010752688
44	1,936	6.6332	.022727273	94	8,836	9.6954	.010638298
45	2,025	6.7082	.022222222	95	9,025	9.7468	.010526316
46	2,116	6.7823	.021739130	96	9,216	9.7980	.010416667
47	2,209	6.8557	.021276596	97	9,409	9.8489	.010309278
48	2,304	6.9282	.020833333	98	9,604	9.8995	.010204082
49	2,401	7.0000	.020408163	99	9,801	9.9499	.010101010
50	2,500	7.0711	.020000000	100	10,000	10.0000	.010000000

SQUARES, SQUARE ROOTS, AND RECIPROCALS (continued)

no.	square	sq. root	reciprocal	no.	square	sq. root	reciprocal
101	10,201	10.0499	.009900990	151	22,801	12.2882	.006622517
102	10,404	10.0995	.009803922	152	23,104	12.3288	.006578947
103	10,609	10.1489	.009708738	153	23,409	12.3693	.006535948
104	10,816	10.1980	.009615385	154	23,716	12.4097	.006493506
105	11,025	10.2470	.009523810	155	24,025	12.4499	.006451613
106	11,236	10.2956	.009433962	156	24,336	12.4900	.006410256
107	11,449	10.3441	.009345794	157	24,649	12.5300	.006369427
108	11,664	10.3923	.009259259	158	24,964	12.5698	.006329114
109	11,881	10.4403	.009174312	159	25,281	12.6095	.006289308
110	12,100	10.4881	.009090909	160	25,600	12.6491	.006250000
111	12,321	10.5357	.009009009	161	25,921	12.6886	.006211180
112	12,544	10.5830	.008928571	162	26,244	12.7279	.006172840
113	12,769	10.6301	.008849558	163	26,569	12.7671	.006134969
114	12,996	10.6771	.008771930	164	26,896	12.8062	.006097561
115	13,225	10.7238	.008695652	165	27,225	12.8452	.006060606
116	13,456	10.7703	.008620690	166	27,556	12.8841	.006024096
117	13,689	10.8167	.008547009	167	27,889	12.9228	.005988024
118	13,924	10.8628	.008474576	168	28,224	12.9615	.005952381
119	14,161	10.9087	.008403361	169	28,561	13.0000	.005917160
120	14,400	10.9545	.008333333	170	28,900	13.0384	.005882353
121	14,641	11.0000	.008264463	171	29,241	13.0767	.005847953
122	14,884	11.0454	.008196721	172	29,584	13.1149	.005813953
123	15,129	11.0905	.008130081	173	29,929	13.1529	.005780347
124	15,376	11.1355	.008064516	174	30,276	13.1909	.005747126
125	15,625	11.1803	.008000000	175	30,625	13.2288	.005714286
126	15,876	11.2250	.007936508	176	30,976	13.2665	.005681818
127	16,129	11.2694	.007874016	177	31,329	13.3041	.005649718
128	16,384	11.3137	.007812500	178	31,684	13.3417	.005617978
129	16,641	11.3578	.007751938	179	32,041	13.3791	.005586592
130	16,900	11.4018	.007692308	180	32,400	13.4164	.005555556
131	17,161	11.4455	.007633588	181	32,761	13.4536	.005524862
132	17,424	11.4891	.007575758	182	33,124	13.4907	.005494505
133	17,689	11.5326	.007518797	183	33,489	13.5277	.005464481
134	17,956	11.5758	.007462687	184	33,856	13.5647	.005434783
135	18,225	11.6190	.007407407	185	34,225	13.6015	.005405405
136	18,496	11.6619	.007352941	186	34,596	13.6382	.005376344
137	18,769	11.7047	.007299270	187	34,969	13.6748	.005347594
138	19,044	11.7473	.007246377	188	35,344	13.7113	.005319149
139	19,321	11.7898	.007194245	189	35,721	13.7477	.005291005
140	19,600	11.8322	.007142857	190	36,100	13.7840	.005263158
141	19,881	11.8743	.007092199	191	36,481	13.8203	.005235602
142	20,164	11.9164	.007042254	192	36,864	13.8564	.005208333
143	20,449	11.9583	.006993007	193	37,249	13.8924	.005181347
144	20,736	12.0000	.006944444	194	37,636	13.9284	.005154639
145	21,025	12.0416	.006896552	195	38,025	13.9642	.005128205
146	21,316	12.0830	.006849315	196	38,416	14.0000	.005102041
147	21,609	12.1244	.006802721	197	38,809	14.0357	.005076142
148	21,904	12.1655	.006756757	198	39,204	14.0712	.005050505
149	22,201	12.2066	.006711409	199	39,601	14.1067	.005025126
150	22,500	12.2474	.006666667	200	40,000	14.1421	.005000000

Common Logarithm Table

N	0	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152
62	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396

(*Cont.*)

Common Logarithm Table

N	0	1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8917
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996

Natural Sines, Cosines, and Tangents

Degs.	Function	0.0°
0	sin	0.0000
	cos	1.0000
	tan	0.0000
1	sin	0.0175
	cos	0.9998
	tan	0.0175
2	sin	0.0349
	cos	0.9994
	tan	0.0349
3	sin	0.0523
	cos	0.9986
	tan	0.0524
4	sin	0.0698
	cos	0.9976
	tan	0.0699
5	sin	0.0872
	cos	0.9962
	tan	0.0875
6	sin	0.1045
	cos	0.9945
	tan	0.1051
7	sin	0.1219
	cos	0.9925
	tan	0.1228
8	sin	0.1392
	cos	0.9903
	tan	0.1405
9	sin	0.1564
	cos	0.9877
	tan	0.1584
10	sin	0.1736
	cos	0.9848
	tan	0.1763
11	sin	0.1908
	cos	0.9816
	tan	0.1944
12	sin	0.2079
	cos	0.9781
	tan	0.2126
13	sin	0.2250
	cos	0.9744
	tan	0.2309
14	sin	0.2419
	cos	0.9703
	tan	0.2493
Degs.	Function	0'

Degs.	Function	0.0°
15	sin	0.2588
	cos	0.9659
	tan	0.2679
16	sin	0.2756
	cos	0.9613
	tan	0.2867
17	sin	0.2924
	cos	0.9563
	tan	0.3057
18	sin	0.3090
	cos	0.9511
	tan	0.3249
19	sin	0.3256
	cos	0.9455
	tan	0.3443
20	sin	0.3420
	cos	0.9397
	tan	0.3640
21	sin	0.3584
	cos	0.9336
	tan	0.3839
22	sin	0.3748
	cos	0.9272
	tan	0.4040
23	sin	0.3907
	cos	0.9205
	tan	0.4245
24	sin	0.4067
	cos	0.9135
	tan	0.4452
25	sin	0.4226
	cos	0.9063
	tan	0.4663
26	sin	0.4384
	cos	0.8988
	tan	0.4877
27	sin	0.4540
	cos	0.8910
	tan	0.5095
28	sin	0.4695
	cos	0.8829
	tan	0.5317
29	sin	0.4848
	cos	0.8746
	tan	0.5543
Degs.	Function	0'

Degs.	Function	0.0°
30	sin	0.5000
	cos	0.8660
	tan	0.5774
31	sin	0.5150
	cos	0.8572
	tan	0.6009
32	sin	0.5299
	cos	0.8480
	tan	0.6249
33	sin	0.5446
	cos	0.8387
	tan	0.6494
34	sin	0.5592
	cos	0.8290
	tan	0.6745
35	sin	0.5736
	cos	0.8192
	tan	0.7002
36	sin	0.5878
	cos	0.8090
	tan	0.7265
37	sin	0.6018
	cos	0.7986
	tan	0.7536
38	sin	0.6157
	cos	0.7880
	tan	0.7813
39	sin	0.6293
	cos	0.7771
	tan	0.8098
40	sin	0.6428
	cos	0.7660
	tan	0.8391
41	sin	0.6561
	cos	0.7547
	tan	0.8693
42	sin	0.6691
	cos	0.7431
	tan	0.9004
43	sin	0.6820
	cos	0.7314
	tan	0.9325
44	sin	0.6947
	cos	0.7193
	tan	0.9657
Degs.	Function	0'

Degs.	Function	0.0°
45	sin	0.7071
	cos	0.7071
	tan	1.0000
46	sin	0.7193
	cos	0.6947
	tan	1.0355
47	sin	0.7314
	cos	0.6820
	tan	1.0724
48	sin	0.7431
	cos	0.6691
	tan	1.1106
49	sin	0.7547
	cos	0.6561
	tan	1.1504
50	sin	0.7660
	cos	0.6428
	tan	1.1918
51	sin	0.7771
	cos	0.6293
	tan	1.2349
52	sin	0.7880
	cos	0.6157
	tan	1.2799
53	sin	0.7986
	cos	0.6018
	tan	1.3270
54	sin	0.8090
	cos	0.5878
	tan	1.3764
55	sin	0.8192
	cos	0.5736
	tan	1.4281
56	sin	0.8290
	cos	0.5592
	tan	1.4826
57	sin	0.8387
	cos	0.5446
	tan	1.5399
58	sin	0.8480
	cos	0.5299
	tan	1.6003
59	sin	0.8572
	cos	0.5150
	tan	1.6643
Degs.	Function	0'

Degs.	Function	0.0°
60	sin	0.8660
	cos	0.5000
	tan	1.7321
61	sin	0.8746
	cos	0.4848
	tan	1.8040
62	sin	0.8829
	cos	0.4695
	tan	1.8807
63	sin	0.8910
	cos	0.4540
	tan	1.9626
64	sin	0.8988
	cos	0.4384
	tan	2.0503
65	sin	0.9063
	cos	0.4226
	tan	2.1445
66	sin	0.9135
	cos	0.4067
	tan	2.2460
67	sin	0.9205
	cos	0.3907
	tan	2.3559
68	sin	0.9272
	cos	0.3746
	tan	2.4751
69	sin	0.9336
	cos	0.3584
	tan	2.6051
70	sin	0.9397
	cos	0.3420
	tan	2.7475
71	sin	0.9455
	cos	0.3256
	tan	2.9042
72	sin	0.9511
	cos	0.3090
	tan	3.0777
73	sin	0.9563
	cos	0.2924
	tan	3.2709
74	sin	0.9613
	cos	0.2756
	tan	3.4874
Degs.	Function	0'

Degs.	Function	0.0°
75	sin	0.9659
	cos	0.2588
	tan	3.7321
76	sin	0.9703
	cos	0.2419
	tan	4.0108
77	sin	0.9744
	cos	0.2250
	tan	4.3315
78	sin	0.9781
	cos	0.2079
	tan	4.7046
79	sin	0.9816
	cos	0.1908
	tan	5.1446
80	sin	0.9848
	cos	0.1736
	tan	5.6713
81	sin	0.9877
	cos	0.1564
	tan	6.3138
82	sin	0.9903
	cos	0.1392
	tan	7.1154
83	sin	0.9925
	cos	0.1219
	tan	8.1443
84	sin	0.9945
	cos	0.1045
	tan	9.5144
85	sin	0.9962
	cos	0.0872
	tan	11.43
86	sin	0.9976
	cos	0.0698
	tan	14.30
87	sin	0.9986
	cos	0.0523
	tan	19.08
88	sin	0.9994
	cos	0.0349
	tan	28.64
89	sin	0.9998
	cos	0.0175
	tan	57.29
Degs.	Function	0'

(Photo Reduced)

MATHEMATICS ACHIEVEMENT TEST for: ELECTRONICS TECHNOLOGY

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NAME _____ (LAST / FIRST / MIDDLE) DATE _____ AGE _____ SEX _____ (M OR F) DATE OF BIRTH _____

SCHOOL _____ CITY _____ GRADE OR CLASS _____ INSTRUCTOR _____

DIRECTIONS: Read each question and its lettered answers. When you have decided which answer is correct, blacken the corresponding space on this sheet with a No. 2 pencil. Make your mark as long as the pair of lines, and completely fill the area between the pair of lines. If you change your mind, erase your first mark COMPLETELY. Make no stray marks; they may count against you.

SCORE _____

SAMPLE

I. CHICAGO is
I-A a country
I-B a mountain
I-C an island
I-D a city
I-E a state

	A	B	C	D	E
I				▬	

1	A	B	C	D	E	2	A	B	C	D	E	3	A	B	C	D	E	4	A	B	C	D	E
5	A	B	C	D	E	6	A	B	C	D	E	7	A	B	C	D	E	8	A	B	C	D	E
9	A	B	C	D	E	10	A	B	C	D	E	11	A	B	C	D	E	12	A	B	C	D	E
13	A	B	C	D	E	14	A	B	C	D	E	15	A	B	C	D	E	16	A	B	C	D	E
17	A	B	C	D	E	18	A	B	C	D	E	19	A	B	C	D	E	20	A	B	C	D	E
21	A	B	C	D	E	22	A	B	C	D	E	23	A	B	C	D	E	24	A	B	C	D	E
25	A	B	C	D	E	26	A	B	C	D	E	27	A	B	C	D	E	28	A	B	C	D	E
29	A	B	C	D	E	30	A	B	C	D	E	31	A	B	C	D	E	32	A	B	C	D	E
33	A	B	C	D	E	34	A	B	C	D	E	35						36	A	B	C	D	E
37	A	B	C	D	E	38	A	B	C	D	E	39	A	B	C	D	E	40	A	B	C	D	E
41	A	B	C	D	E	42	A	B	C	D	E	43	A	B	C	D	E	44	A	B	C	D	E
45	A	B	C	D	E	46	A	B	C	D	E	47	A	B	C	D	E	48	A	B	C	D	E
49	A	B	C	D	E	50	A	B	C	D	E	51	A	B	C	D	E	52	A	B	C	D	E
53	A	B	C	D	E	54	A	B	C	D	E	55	A	B	C	D	E	56	A	B	C	D	E
57	A	B	C	D	E	58	A	B	C	D	E	59	A	B	C	D	E	60	A	B	C	D	E

35

APPENDIX F

ACHIEVEMENT TEST ADMINISTRATION INSTRUCTION SHEET

Your participation in this study is greatly appreciated. The administering procedures are as follows: (Please follow directions carefully).

1. Only test your most advanced electronics students. DO NOT test anyone who has not successfully completed at least one semester of electricity-electronics.

2. Give each student one test booklet. Each booklet should have a "General Information" sheet and an "Answer" sheet between the front cover and page 1. Instruct students to open the booklet, remove both the general information sheet and the answer sheet and then close the booklet.

3. Next have the students fill out the "general information" sheet to the best of their knowledge. Also have them print their name, address, school, etc., on the answer sheet.

4. Collect the "general information" sheets. (These will be sent back with the Answer Sheets).

5. Open the test booklet to the first page and read aloud the "Instructions." Have the students follow along.

6. Ask for questions, open booklet to page two and start.

(EXAM TWO HOURS LONG)

7. Collect test booklets. (These are to be kept by you or your department).

8. Collect all Answer Sheets.

9. Place the "Answer Sheets" and "General Information" sheets in the stamped addressed envelop and mail.

The results of the test and test key will be mailed to you in January 1968.

SUMMARY

1. Fill out "Information Sheets and Answer Sheets."

2. Administer the 2 hour test to your most advanced students.

3. Mail the "General Information Sheets and Answer Sheets."

Thank you very much,

APPENDIX G

ACHIEVEMENT TEST GENERAL INFORMATION FORM

GENERAL INFORMATION

Name_____ Age_____
Address_____ College Status: Fresh._____
High School_____ Soph._____
College Name_____ Jr._____
Hobbies_____ Sr._____
_____ Grad._____
_____ College Major_____
College Minor_____

High School Mathematical Background
(Please check if completed with a passing grade.)

____Geometry
____1st Year Algebra
____2nd Year Algebra
____Trigonometry
____Analytical Geometry
____Calculus
____Others (Specify)
_____
_____

College Mathematical Background

_____Algebra
_____Trigonometry
_____Analytical Geometry
_____Calculus 1st Semester
_____Calculus 2nd Semester
_____Calculus 3rd Semester
_____Differential Equations
_____Others (Specify)
_____
_____

Formal Electronics Education
(List all courses taken in electronics in high school, college, trade school, military, industry, etc.)_____
_____
_____
_____
_____
_____
_____

Electronics Experience
(List all specific jobs held in the electronics field.)_____
_____
_____
_____
_____
_____
_____
_____

Indicate if you hold any of the following F.C.C. licenses.

_____Ham (General or Technician).
_____2nd class radio telephone.
_____1st class radio telephone.

VT 010 943
GIBSON, J.N., AND OTHERS
THE TACOMA PUBLIC SCHOOLS- DIVISION OF VOCATIONAL REHABILITATION. COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS.

WASHINGTON STATE DEPT. OF PUBLIC INSTRUCTION, OLYMPIA. RESEARCH OFFICE.
MF AVAILABLE IN VT-ERIC SET.
RESEARCH REPORT 10-02
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ABSTRACT - THE TACOMA SCHOOLS, IN COOPERATION WITH THE DIVISION OF VOCATIONAL REHABILITATION (DVR) OF THE WASHINGTON STATE OFFICE OF PUBLIC INSTRUCTION, DEVELOPED A PROGRAM FOR THE PURPOSE OF PROVIDING SPECIFIC PREVOCATIONAL AND VOCATIONAL SERVICES TO ELIGIBLE HANDICAPPED CLIENTS, AGES 14-20 IN GRADES 10-12. AS ORIGINALLY PLANNED, THE STAFF WAS TO INCLUDE 20 PREVOCATIONAL ADVISORS, 4 VOCATIONAL REHABILITATION SPECIALISTS, A DVR SUPERVISOR, COORDINATORS OF COMMUNITY RESOURCES AS WELL AS PSYCHOLOGICAL SERVICES AND MEDICAL SOCIAL WORK, AND A PART-TIME MEDICAL CONSULTANT AND COORDINATOR OF PREVOCATIONAL LEARNING. A CASELOAD OF 230 TO 240 PUPIL-CLIENTS WAS ANTICIPATED. CURRENTLY, 23 PREVOCATIONAL ADVISORS ARE ON THE STAFF, AND THE CASELOAD APPROACHES 280. IN ORDER TO RECEIVE THE SERVICES OF THE PROGRAM, THE PUPIL-CLIENT MUST FIRST BE REFERRED AND THEN HIS ELIGIBILITY IS DETERMINED. IF ACCEPTED, A TRAINING PROGRAM IS OUTLINED, SUCCEEDED BY JOB PLACEMENT AND FOLLOW-UP SERVICES. WHEN IT APPEARS THAT PLACEMENT IS SUCCESSFUL, THE CASE IS CLOSED. IF PLACEMENT IS UNSATISFACTORY, A REEVALUATION IS MADE OF THE CASE. FLOW CHARTS DIAGRAM EACH PHASE OF THE PROGRAM. THE COOPERATIVE AGREEMENT BETWEEN THE TACOMA SCHOOLS AND THE DVR IS APPENDED. (SB)

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A COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS

Prepared under supervision of the
State Office of Public Instruction

Ray E. Jongeward
Research Director

J. N. Gibson
Research Analyst

LOUIS BRUNO
State Superintendent of Public Instruction
Olympia, Washington

Research Report 10-02
July, 1966

VT010943

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THE TACOMA PUBLIC SCHOOLS - DIVISION OF VOCATIONAL REHABILITATION

COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS

A Descriptive Report of the Services Provided to the Pupil-Client in the Secondary School Program

by

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in consultation with

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and

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of Extended Services, DVR

Prepared under supervision of the Research Office of
The Department of Public Instruction

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FOREWORD

Vocational Rehabilitation usually operates from a state agency setting and focuses upon the needs of an adult population. Now in Washington State a habilitation program emerges. It is carried on in a school setting, directed toward the needs of an adolescent population.

The Cooperative Program of the Tacoma Public Schools and the Division of Vocational Rehabilitation departs in several ways from traditional services provided by education and vocational rehabilitation. In this program, the function of the teacher is uniquely enlarged to acquaint the pupil with the workday world. The vocational rehabilitation counselor helps the client acquire maximum competence as a high school graduate. The curriculum includes something of vocational rehabilitation while vocational rehabilitation services are adapted to promote the client's high school education.

Only in our State, I believe, and only under the imaginative leadership we have in education at the state level, could a forward-looking school district be enabled to bring education and vocational habilitation to its handicapped pupils to the maximum degree being accomplished under the Cooperative Program. We in Vocational Rehabilitation are thrilled indeed by the potential of this Program, and by the privilege of having a part in it.

E. M. OLIVER,
ASSISTANT SUPERINTENDENT
FOR VOCATIONAL REHABILITATION

The services described in this report

are provided through a program

based upon a Cooperative Agreement between

TACOMA PUBLIC SCHOOLS, DISTRICT NO. 10

ANGELO GIAUDRONE, SUPERINTENDENT

and the

STATE OFFICE OF PUBLIC INSTRUCTION

LOUIS BRUNO, STATE SUPERINTENDENT

DIVISION OF VOCATIONAL REHABILITATION

E. M. OLIVER, ASSISTANT SUPERINTENDENT

FOR VOCATIONAL REHABILITATION

TABLE OF CONTENTS

TITLE PAGE.....i

FOREWORD.....ii

PREFACE.....iii

TABLE OF CONTENTS.....iv

INTRODUCTION.....1

FLOW OF SERVICES TO THE PUPIL-CLIENT.....6

Phase I Referral as a DVR Client.....7

Flow Chart, Phase I.....8

Phase II Diagnostic Services and Evaluation.....10

Flow Chart, Phase II.....11

Phase III School and DVR Prevocational Services.....13

Flow Chart, Phase III.....14

Phase IV Vocational Objective, Job Training and Closure.....16

Flow Chart, Phase IV.....17

APPENDIX.....19

A COOPERATIVE PROGRAM FOR HANDICAPPED PUPILS

A Descriptive Report of the Services Provided to the Pupil-Client in the Secondary School Program

INTRODUCTION

School began in September, 1964 as usual, but not in the accustomed manner for 242 pupils in Tacoma's five high schools. For these pupils, class assignments were flexible. Teachers were "pre-vocational supervisors". A new kind of counselor, a "vocational rehabilitation specialist", introduced them to the idea and hope of a job -- and a regular paycheck -- when they graduated. For many of them, the firm expectation of remaining in school to graduate was also a new experience.

The 242 pupils were tenth, eleventh, and twelfth graders with one characteristic in common: they were variously handicapped individuals who were considered most likely to become dropouts.

The purpose of this report is to describe the progress of a typical pupil-client through the new combination of school and vocational rehabilitation services. These may be best seen in the perspective of earlier programs out of which they grew.

Special Education at the elementary and junior high school levels emerged during the mid-forties as an effort to aid the backward pupil to meet academic goals. This program is limited, if available at all, for senior highschoolers. The supportive services of special education which brought the handicapped pupil through the ninth grade may be absent when he enters the tenth. In competition, perhaps for the first time, with a self-sufficient community of academic achievers, the handicapped senior high school student may become a dropout.

Emphasis upon academic achievement was modified in Tacoma Public Schools for fifty handicapped high school students,

> ".....under an experimental program involving a half-day schedule of academic work and a half-day of community work experience. While successful as a departure from the totally academic approach, this program failed to achieve budgetary stability, presumably due in turn to its failure to achieve minimum goals of personality adjustment and community living --including vocational objectives--for the youths involved." (1)

Concern about the problem of high school dropouts grew in the Tacoma Schools and throughout the State as the dimensions became more clearly known.(2) In the Tacoma Public Schools,

> "A special study was made during the 1962-63 school year of the value of counseling for potential dropouts. This study identified dropouts on the basis of recent research findings. An unselected group of these potential dropouts were counseled regularly for a period of several months. Another group of students identified as potential dropouts within this sample were not counseled. Results of this study demonstrated that the holding power of the school can be increased significantly through counseling even when major curriculum changes are not made." (3)

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(1) From unpublished "Guidelines for Implementation of the Cooperative Agreement for an Integrated Rehabilitative Program for Handicapped Youth", Tacoma Public Schools, the Division of Vocational Rehabilitation of the State Board for Education, and the State Office of Public Instruction; pp. 5, 6.

(2) "Dropout Statistics", State Superintendent of Public Instruction, Research Report 02-5A, April 1966.

(3) Bertness, Henry J., and Bryan, Irvin F., "Alleviating or Correcting Non-Direction and Dislocation of Handicapped Students and Dropouts"; unpublished report of Planning Grant Project No. 1505; Vocational Rehabilitation Administration, Division of Vocational Rehabilitation of the Office of Public Instruction, and Tacoma Public Schools; July, 1964. P. 2.

Fifty dropouts from Tacoma high schools were assigned over a period of three years ending June 30, 1965, to a Vocational Rehabilitation Counselor of the Division of Vocational Rehabilitation, as part of his total caseload. These individuals received the typical services of the Division of Vocational Rehabilitation as required by each client: diagnostics and evaluation; remedial, medical, and related services; job training, maintenance, and transportation; job placement and follow up services. The underlying, supportive service was vocational guidance and counseling.

By the end of June, 1965, nineteen of the fifty were placed in appropriate employment. Three were receiving continuing services under a vocational rehabilitation plan as of June 30, 1965. Another fourteen had been found to be ineligible for DVR services under regulations existing at that time, and fourteen had "dropped out" in various ways and for various reasons.

The provision of vocational rehabilitation services to this group demonstrated, however, that a substantial proportion (40 percent or more) could benefit appreciably from such services. There was an indication also that the provision of services before the client acquired a dropout status could be expected to produce a higher rate of successful case closures.[4]

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(4) Rankin, L. S., and Gibson, J. N., "Vocational Rehabilitation Services for High School Dropouts"; State Office of Public Instruction, Research Report 10-01, June 1966.

The Tacoma Schools followed its special study (cited under footnote (3)) with a Planning Grant study, the purpose of which was:

> ".....to plan for more effective utilization of available school district, vocational rehabilitation and community resources in behalf of handicapped youth, many of whom may be potential or actual school dropouts. Concurrent with such planning will be the review and further documentation of need as well as arriving at better inter-agency understanding of available services, interrelationships, and modes of cooperative action. Furthermore, the culminating purpose is to design research and/or demonstration projects to be submitted to the Vocational Rehabilitation Administration for consideration." (5)

The Planning Grant study produced the desired objectives. The idea of a Federally aided research and demonstration project was abandoned in favor of an integrated program involving the state DVR and the TPS district. This was formalized in a cooperative agreement between the Tacoma Public Schools and the Division of Vocational Rehabilitation of the State Office of Public Instruction. (6)

Under terms of the cooperative agreement, the legal functions of both the schools and the Division are maintained. The total program, coordinated and supervised by the Division of Vocational Rehabilitation, has an overall objective of providing specific prevocational services to eligible clients, ages fourteen through twenty, in grades ten through twelve. These services culminate, as described in this report, in specific vocational rehabilitation services necessary for the placement of the client in continuing employment in terms of a definite job objective; however, the continuum of "prevocational" services may arrive earlier at the same objective.

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(5) Bertness, Henry J., and Bryan, Irvin F., op cit., p. 1.
(6) A copy of the agreement is attached to this report.

As originally planned, the staff for the integrated program was to include 20 Prevocational Advisors, 4 Vocational Rehabilitation Specialists (counselors), and a DVR Supervisor, a coordinator of community resources, a coordinator of psychological services, and a coordinator of medical social work, plus a part-time medical consultant and a part-time coordinator of prevocational learning. A caseload of 230 to 240 pupil-clients was anticipated. Currently, 23 Prevocational Advisors are on staff, and the caseload approaches 280 in total enrollment.

The budget was $390,543, about 58 percent of which was derived from Federal funds under Section II of the Vocational Rehabilitation Act, which provides for matching of Third Party (public) funds.

It is not the purpose of this report to describe in any detail the administrative structure of the integrated program, or to present information about the characteristics of the caseload, the services provided, or costs and results thereof. Such presentations are planned later as a continuing report regarding this unusual and far-reaching effort to provide maximum assistance to that part of our school population whose achievements have been at a minimum.

FLOW OF SERVICES TO THE PUPIL-CLIENT

The addition of a new dimension to the services heretofore provided by the TPS for problem pupils in the tenth, eleventh, and twelfth grades poses a challenge even for a school district which has always been sensitive to pupil needs and flexible and imaginative in meeting them. The provision of vocational rehabilitation services in the school setting requires adjustments in faculty, curriculum, and facilities.

At the same time, while the provision of vocational rehabilitation services through an inter-disciplinary approach is not new to DVR, the inclusion of secondary education goals and methods in a client's vocational rehabilitation plan is a new experience in inter-disciplinary practice. Of greatest importance, however, is the melding of the teaching and vocational rehabilitation processes in order to create a new continuum of services for the problem pupil.

From the point of view of the vocational rehabilitation agency--to which this report is somewhat slanted--the spectrum of services may be seen as occurring in four bands, or phases. There is the first phase, during which the pupil is referred to DVR as a potential client. In the second phase, there is the period of diagnostic and evaluative services which determine (under the current program) the pupil's eligibility, and the feasibility of providing VR services to him. For those who are found to be eligible and feasible, there is a third phase or period of time when school and pre-vocational services are provided concurrently.

The third phase of services is probably the outstanding characteristic of the TPS-DVR Program. While the pupil is progressively a client of DVR and becomes increasingly involved in the VR process, he is also a responsibility of the school and a candidate for a diploma. During the third phase, the pupil is in a curriculum adapted to his needs and capacity; he receives also whatever VR services are appropriate for him at that stage.

The fourth phase is characterized by emphasis upon completion of vocational rehabilitation services according to the plan evolved by the pupil-client and the VR Counselor. The establishment of a vocational objective--a regular, wage-paying job in the competitive labor market or as near thereto as the client's potential will permit--depends in great part upon what has been accomplished during Phase III. In Phase IV, the client's ability to profit from job training and related services has a direct relationship to the extent to which such ability was developed during Phase III.

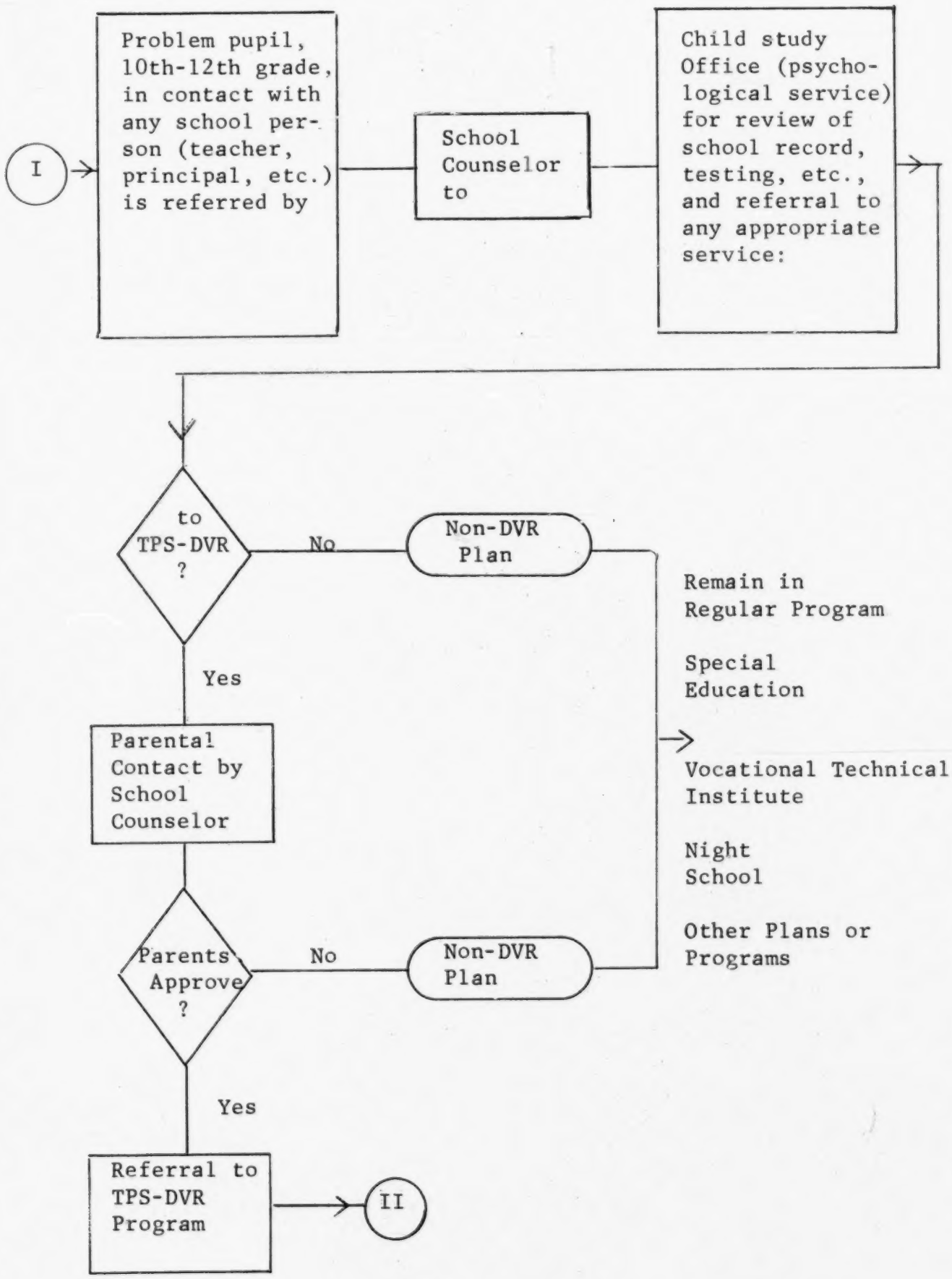
In order to describe the total process more in detail, four flow charts of services are used.

Phase I Referral as a DVR Client

A problem pupil in the tenth grade may have been in Special Education through the ninth grade. If so, he is referred to the TPS-DVR Program at the end of the ninth grade. If he has not been in Special Education and demonstrates an inability to function in the regular high school program, he comes to the attention of a member of the faculty. If the school counselor is not already involved, the pupil's situation is brought to his attention. Through the school counselor, the Child Study (Psychological Services) Office of the school is asked to intervene. Here the pupil's school record may be reviewed.

TPS-DVR COOPERATIVE PROGRAM--FLOW CHART OF SERVICES

PHASE I REFERRAL AS DVR CLIENT



Psychological tests may be given. The school psychologist is usually utilized at this point also; in short, the total resources of the Child Study Office are brought to bear when and as appropriate.

Several plans may be available to the pupil, one of which may involve the TPS-DVR Program and related VR services. The pupil may remain, with or without modification of courses, in the academic program. He may be assigned to the school's special education program. Transfer to the Tacoma Vocational Technical Institute may be effected, or a schedule of night school classes may be arranged. Other plans and programs may be made available to him.

If, however, the Child Study Office believes that the TPS-DVR Program is appropriate for the pupil, the School Counselor or another Program staff member contacts the parents. The Program is interpreted to them, a possible plan is discussed and in the end, the parents approve or disapprove of the referral of their child to the Program.

The parents may not approve of a referral to DVR. In this event, the Child Study Office must turn again to the other programs and plans which may be available for the pupil as part of the school's ongoing program, without recourse to VR services.

Parental approval, when given, opens the way for referral of the pupil to the TPS-DVR Program. This creates the possibility that the pupil will not only retain his identity as such, but may also acquire an identity as a DVR client.

The referral to DVR is a simple procedure. When certain minimum information about an individual is made available by the referring agency (the school), together with an indication that DVR's consideration of the individual for possible services is desired, the pupil is "referred".

Referral, however, does not constitute acceptance by DVR. Several factors must be considered. His eligibility under agency rules involves the presence of a disability which creates a vocational handicap. In addition, there must be a reasonable expectation that VR services will result in remunerative employment.

Phase II Diagnostic Services and Evaluation

Having received referral information, the VRS is responsible for determining the pupil's eligibility under DVR rules for vocational rehabilitation services. This step in the vocational rehabilitation process involves procurement of medical and related information about the client in order to establish the presence of a physical-mental-emotional disability which creates a vocational handicap. In addition, the VRS must evaluate the probability that VR services will enable the client to achieve his potential for employment and independent living.

It may be repeated here that in the TPS-DVR Program, the DVR client for whom a job objective is to be developed and accomplished is also a school pupil for whom there is a "diploma", or educational objective.

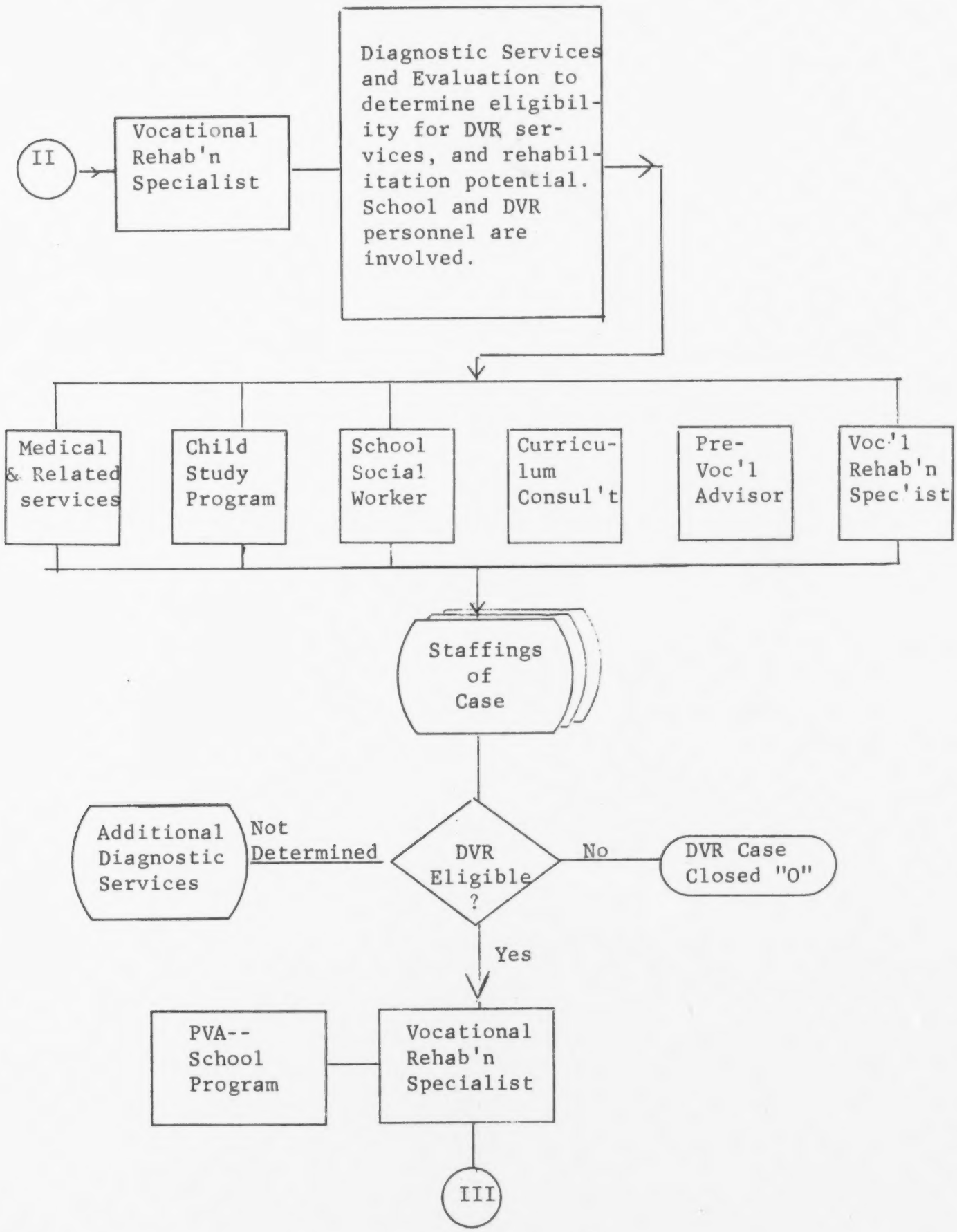
The total resources of school and DVR come together early in the pupil's DVR history. A team-and-consultation approach is used in diagnostics, as elsewhere in the process.

During Phase II the pupil is assigned to a teacher, a Pre-Vocational Advisor (PVA) and becomes a member of a small classroom group in which he pursues subjects consistent with a Pre-Vocational Plan.

He may also be assigned, through the school's Community Laboratory, to a quasi job placement in any one of several hundred work situations with employers in the Tacoma area.

TPS DVR COOPERATIVE PROGRAM--FLOW CHART OF SERVICES

PHASE II DIAGNOSTIC SERVICES AND EVALUATION



The Laboratory, developed by the school district over a period of years, makes work placements available through the cooperation of employers who not only assign tasks to youth placed with them, but also feed back to the school an evaluation of the pupil's work abilities and habits. In general, the Community Laboratory provides the pupils placed through it with a first-hand experience in the competitive labor market.

The referred pupil is assigned to a VRS, as noted previously. The VRS serves as the pupil's vocational counselor, and coordinates the total evaluative and diagnostic work of those who are involved in the process; hence the staffings depicted on the chart for Phase II as flowing from the various services indicated there.

In the flow chart for Phase II, the staffings may appear to be directed to the question of eligibility, and this is true; however, eligibility must be regarded as an appraisal of the extent to which the pupil needs, and may profit from the services which can be provided.

The boundaries between the several phases of the total Program are not always clear and distinct. More often than not, the client's eligibility--meaning the prospect for successful vocational rehabilitation--is determined only after repeated medical and other evaluations, plus class sessions with the PVA (several may be involved), plus repeated Community Laboratory assignments, and counseling by the VRS. A number of staffings for the purpose of understanding the pupil, his problem, and his potential are the rule rather than the exception.

Eventually, with respect to some pupil-clients, the conclusion is reached that the individual is not eligible. This may be the case of a pupil whose problem is minimal; i.e., the intensive services of the Program are not necessary. In fact, he may have responded so well to evaluation and consultation services that he is already established or re-established in his own plans for graduation, employment, and self-dependence. Again, there are those whose disability--physical, mental, or emotional--and resultant handicap is so severe that available services, comprehensive as they are, cannot be expected to accomplish results commensurate with the expense thereof. Such ineligible referrals are closed with respect to further DVR consideration.

Phase III School and DVR Prevocational Services

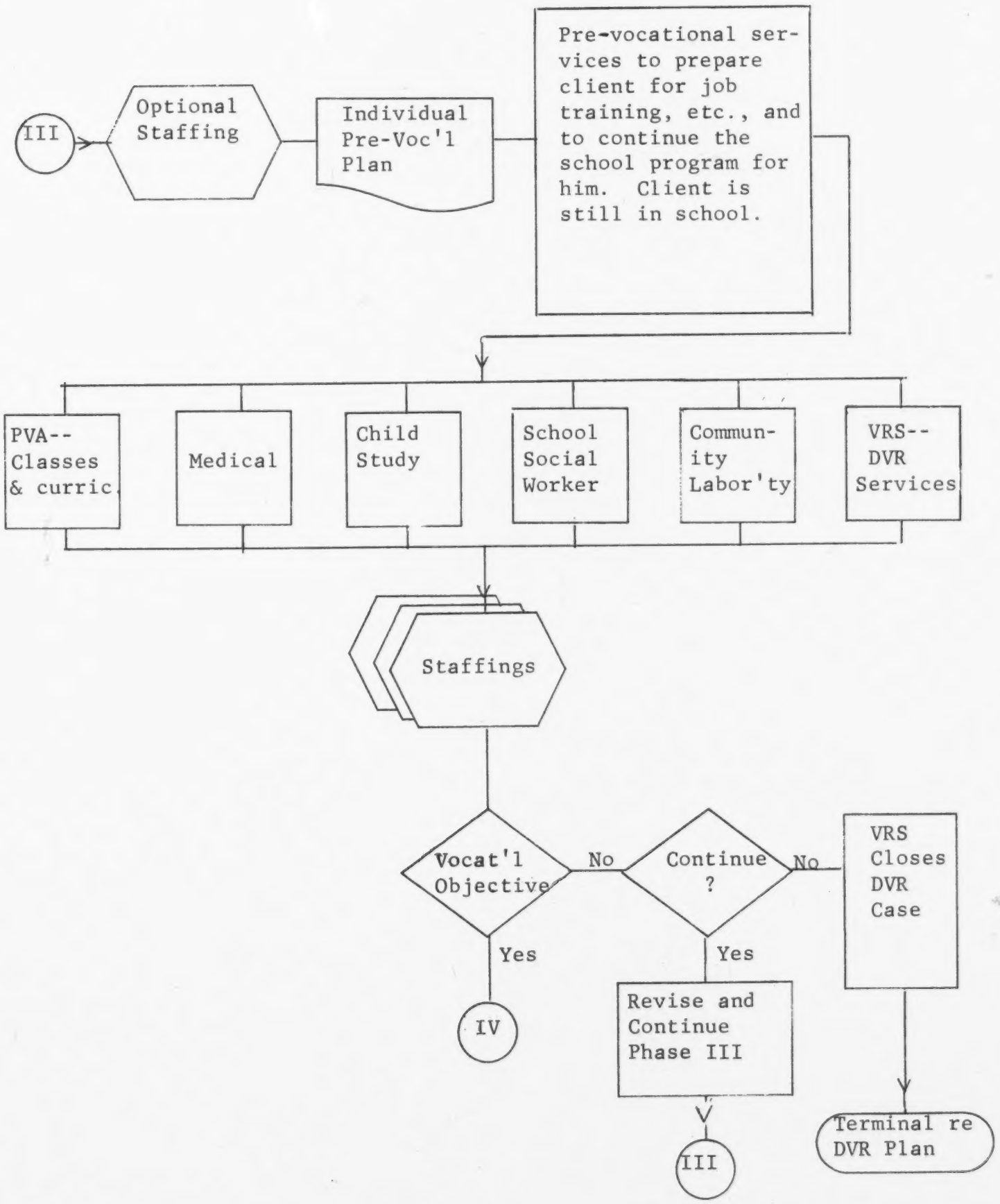
Phase III begins when the pupil is formally accepted for DVR services; still a pupil, he becomes also a client and a responsibility of DVR.

The usual course of DVR services to a client, following diagnostic services and acceptance, is a sequence of "physical restoration" (medical, surgical, prosthetic, hospital and convalescent care and related services) and job training (training courses and training materials, maintenance and transportation, tools, equipment, licenses and other necessary items). These are succeeded in turn by job placement and follow-up services until closure of the case.

The usual DVR services may also include "pre-vocational" services; i.e., instruction or training which is a prerequisite to the successful completion of training for a specific job. A client whose job objective is radio repair, for instance, may require a course in mathematics before he can deal with the electronics theory he encounters in specific training for radio repair.

TPS-DVR COOPERATIVE PROGRAM--FLOW CHART OF SERVICES

PHASE III SCHOOL AND DVR PREVOCATIONAL SERVICES



In the TPS-DVR Program, an unusual amount of pre-vocational training is necessary. Modified requirements for the high school diploma are to be met. Almost by definition, these are pupils who are failing academically and they are less qualified in terms of basic subjects.

By reason of the client's academic deficiencies, his lack of work experience, and the character of the disabling condition, the VRS must have more than the usual amount of time in which to provide appropriate and adequate VR services in coordination with the school's goals and efforts in behalf of the pupil.

The school and DVR goals for the pupil--which are actually indistinguishable in practice--are reviewed in staffings of the case. Out of these a pre-vocational plan is developed for each pupil-client. The resources of both the school and of DVR continue to be used. The difference during Phase III is perhaps one of emphasis, and of the degree to which the client has moved towards goals which are realistic for him.

Physical restoration services, referred to earlier, are provided as necessary according to medical advice. Not many of the Program cases require surgery and related care, or medical care, but such is available if needed as a matter of removing or alleviating a disabling condition.

Ultimately the team staffings of the case concentrate upon whether or not a vocational objective, leading to employment in the labor market, can be specified for the client. If not, and many team staffings lead to this conclusion, there is the question as to whether or not Program services should be continued for him.

Program services may be discontinued during Phase III for extreme opposite reasons; the client does not require services, or he is unable to benefit from them. In either such event, the DVR case is closed.

If the pupil is still in school he remains as a pupil but not as a DVR client.

If the staffing decision is to continue Program Services although a job objective cannot be established immediately, the pre-vocational plan is revised so as to serve better the client's immediate needs and the plan for his future.

When it becomes possible to designate a job objective for the client because of his progress in the pre-vocational program, he enters Phase IV.

The TPS-DVR Program is a melding of services. The academic side of it is modified in the direction of vocational objectives. The vocational rehabilitation aspects rest upon the best foundation of academic achievement the school can enable the pupil-client to reach. The matter of establishing a specific vocational objective for the client is therefore a Program goal and when this is in sight, the third phase of services has been completed.

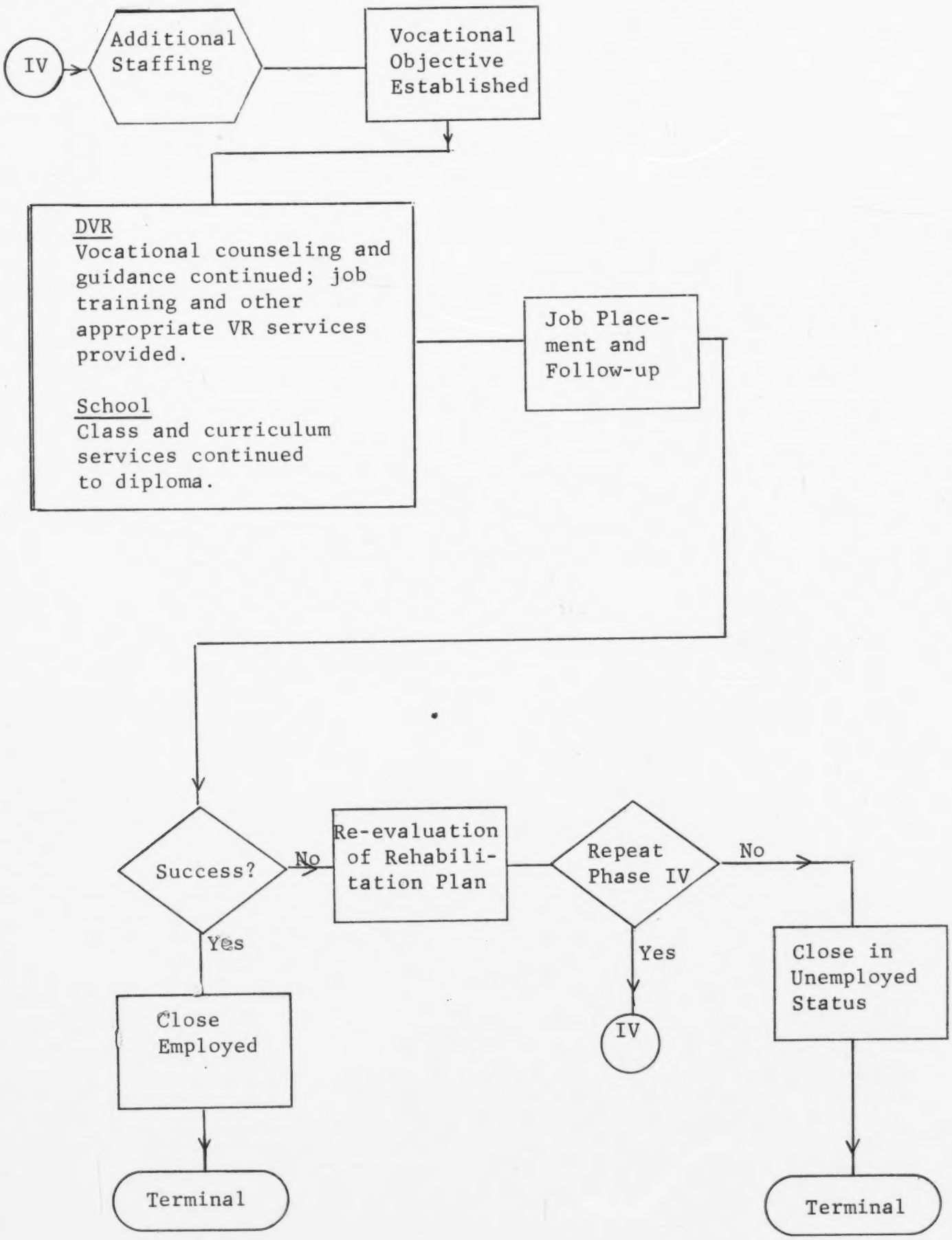
Phase IV Vocational Objective, Job Training, and Closure

The establishment of a vocational objective for the pupil-client may require an additional staffing session. However, additional information may become available at this point. Consultation and evaluation are then necessary with respect to possible changes in the VR plan and the job objective.

The nature and extent of training the client requires and receives varies according to the objective; in general, it is adequate for the intended purpose and is obtained from whatever source will best provide it.

TPS-DVR COOPERATIVE PROGRAM--FLOW CHART OF SERVICES

PHASE IV VOCATIONAL OBJECTIVE, JOB TRAINING, AND CLOSURE



308

Public and private vocational training schools, universities and junior colleges, and on-the-job training resources are typical of the kinds of training facilities used.

The flow chart for Phase IV may be misleading in that it appears to associate the obtaining of the school diploma with the event of the client's placement in a job situation. This will vary with individual clients; the diploma and the fact of placement are not mutually dependent.

When the client is placed in employment, according to the job objective previously established, the VRS continues the counseling relationship. It is essential that both the client's--the employee's--and the employer's reaction to the placement be observed and evaluated: is the client in a job which is satisfactory both to him and to his employer? If after a period of two or three months it appears that the placement is successful, the DVR case is then closed.

If the placement does not succeed, the rehabilitation plan is re-evaluated. The objective may be modified. Additional training may be given. Several job placements may be tried before a satisfactory one is found. If this is not possible, the only alternative is to close the case in the unemployed category.

APPENDIX

COOPERATIVE AGREEMENT

For An

Integrated Rehabilitative Program

For

Handicapped Youth

Pages 19 through 24

C O O P E R A T I V E A G R E E M E N T

For An

Integrated Rehabilitative Program

For

Handicapped Youth

Ages 14 to 20

BETWEEN

THE TACOMA PUBLIC SCHOOLS
DISTRICT NO. TEN
TACOMA, WASHINGTON

And

THE OFFICE OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION
STATE BOARD FOR VOCATIONAL EDUCATION
Division of Vocational Rehabilitation

State of Washington

COOPERATIVE AGREEMENT
For An
Integrated Rehabilitative Program
For
Handicapped Youth
Ages 14 to 20
Between
The Tacoma Public Schools
District No. Ten
Tacoma, Washington
And
The Office of the Superintendent of Public Instruction
State Board for Vocational Education
Division of Vocational Rehabilitation

The Office of the State Superintendent of Public Instruction, and the State Board for Vocational Education, through its Division of Vocational Rehabilitation, and the Tacoma Public Schools enter into this agreement to provide a basic vocational rehabilitation program to meet the needs of eligible handicapped pupils enrolled in grades ten through twelve.

I. Purpose of the Agreement

The purpose of this agreement is to establish and develop a unique complex of rehabilitative services at the secondary level, grades ten through twelve, presently not provided by the public schools. A close and effective working relationship between the Division of Vocational Rehabilitation and the Tacoma Public Schools will be developed in and through achieving the foregoing rehabilitative purpose for eligible handicapped youth.

II. Definitions

"Division of Vocational Rehabilitation" refers to the Office of the State Superintendent of Public Instruction, State Board for Vocational Education, Division of Vocational Rehabilitation, State of Washington.
"Tacoma Public Schools" refers to the Tacoma School District Number 10, its program and administration. "Students" hereinafter designated as "clients", refers to students in the rehabilitative program found to be eligible for Division of Vocational Rehabilitation services.
"Rehabilitative Program" refers to a new complex of school-home-community relationships in the rehabilitation of eligible youth, ages 14 to 20, jointly planned and operated by the Division of Vocational Rehabilitation and the Tacoma Public Schools, with authority for such operation established by the Division of Vocational Rehabilitation and within the framework of related laws, regulations, and the State Plan.
"Program Coordinator" refers to the State Supervisor or Director of the Division of Vocational Rehabilitation whose responsibility is the coordination of the rehabilitative aspects of the program with the Tacoma Public Schools.

"Eligibility" refers to the presence of the combination of three factors: (1) the presence of a physical or mental disability, and the resulting functional limitations or limitations of activities; (2) the existence of a substantial handicap to employment caused by the limitations resulting from such a disability; and (3) a reasonable expectation that vocational rehabilitation services may render the individual fit to engage in a remunerative occupation.

III. Program of Services

The services which are traditionally and legally the function of the schools and vocational rehabilitation will not be violated in operation of this program. A new and different complex of rehabilitative services will be developed to meet the identified needs of individual clients. This total program will be coordinated and supervised by the Division of Vocational Rehabilitation in keeping with policies, regulations, and procedures set forth in the State Plan of the Division of Vocational Rehabilitation. The program will make maximum use of available facilities and resources. The State Plan of the Division of Vocational Rehabilitation sets forth the provision which enables the Division to enter into cooperative agreements with school districts. Rehabilitation units will be developed at one or more of the high school locations of the Tacoma Public Schools.

IV. Program Objectives

General

1. To apply knowledge, new methods, and new techniques in a combined and coordinated program making maximum use of the resources of vocational rehabilitation, the public schools, and related community resources.
2. To extend the services of vocational rehabilitation to an increasing number of clients.
3. To effect a comprehensive and coordinated unit of new and different rehabilitative services through the joint efforts of the Tacoma Public Schools and the Division of Vocational Rehabilitation.

Specific

1. To give specific prevocational rehabilitative services to eligible clients, ages 14 through 20, and in grades ten through twelve.
2. To continue the identification and evaluation of clients who are believed to be in need of such services.
3. To give comprehensive rehabilitation diagnosis and evaluation of employment potential.
4. To arrange for a program of work experience and job training within the total prevocational experience.
5. To provide appropriate and supervisory placement services.
6. To work toward the development of a prevocational curriculum which will more adequately meet the individual needs of eligible clients.

V. Facilities and Resources

Private and public agencies will be used as appropriate. The Tacoma Vocational Technical Institute, Tacoma Public Schools, can contribute numerous services to meet the specific vocational rehabilitation needs of clients who have become prepared for such training through appropriate prevocational experience.

VI. Budget

The Tacoma School District in cooperation with the Division of Vocational Rehabilitation will certify availability of funds for matching purposes under Section II of the Vocational Rehabilitation Administration regulations in accordance with the Federal State formula. The Tacoma School District, in support of the budget for rehabilitative services, will prepare and submit their annual budget showing sources of funds, amounts available, purposes and amounts of proposed expenditures and such other items as the Division of Vocational Rehabilitation may require for fiscal control and auditing purposes. This budget of total program operation will be approved both by the Division of Vocational Rehabilitation and the Tacoma Public Schools in order and to assure an operational program which meets the standards of acceptability of both programs.

VII. Records, Reports, and Reviews

The Tacoma Public Schools and the Division of Vocational Rehabilitation will jointly maintain appropriate accounts and records for audit purposes, and make reports on progress as may be reasonably required. Program reviews will be made periodically for the purpose of ascertaining adequacy of service and to test operations against stated program purposes. These reports may serve as bases for recommendations to extend, modify, and/or evaluate the program.

VIII. Operation

Within the provisions governing the work of vocational rehabilitation, the Tacoma Public Schools and the Division of Vocational Rehabilitation cooperatively agree to:

1. Assign rehabilitation specialists who will perform the functions of this integrated rehabilitation program. Such personnel will meet the same or equivalent requirements regarding qualifications as other employees under the State of Washington Merit System. Hiring of such personnel will be approved by the Division of Vocational Rehabilitation as well as termination or separation of employees. All employees in this rehabilitative program are under the supervision and direction of the Division of Vocational Rehabilitation.

2. Approve the plan of operation, such approval to be based on a determination that the school district meets minimum standards as related to personnel, facilities, and program objectives.
3. Determine the nature and scope of services to be provided under the plan.
4. Determine eligibility of all clients receiving vocational rehabilitation services.
5. Approve all expenditures.
6. Approve all individual vocational rehabilitation plans.
7. Accept referral of those individuals who need and are eligible for vocational rehabilitation services over and above those provided by the school district, and to provide necessary services in accordance with the provisions of the approved State Plan for Vocational Rehabilitation.
8. Perform other duties and functions, such as administrative, technical and consultative, as may be necessary to program operation and control.

IX. Administrative Control and Organization

Both the Division of Vocational Rehabilitation and the Tacoma Public Schools are under the general supervision of the Office of Public Instruction, with the Division of Vocational Rehabilitation as the designated agency responsible for the administration and operation of the State Plan for Vocational Rehabilitation Services. In this cooperative agreement between the Division of Vocational Rehabilitation and the Tacoma Public Schools, the administrative control of all rehabilitative services and personnel rests with the Division of Vocational Rehabilitation.

X. Agreement Terms

This agreement may be terminated by either party upon 90 days' written notice. It may be revised or amended by mutual consent in conformity with the regulations of the Division of Vocational Rehabilitation and the Tacoma Public Schools.

Dated this_____day of_____, 19_____

Toney Shelton Secretary and Business Manager Tacoma Public Schools	E. M. Oliver Asst. Superintendent of Public Instruction Division of Vocational Rehabilitation
Angelo Giaudrone Superintendent Tacoma Public Schools School District No. 10 Tacoma, Washington	Louis Bruno Superintendent of Public Instruction State of Washington Olympia, Washington

VT 012 163
WEISSMAN, SHELDON
PRE-VOCATION PROGRAM.

ESPANOLA MUNICIPAL SCHOOLS, N. MEX. JOHN F. KENNEDY JUNIOR HIGH SCHOOL.
NEW MEXICO OCCUPATIONAL RESEARCH AND DEVELOPMENT COORDINATING UNIT, SANTA FE
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - SEP70 34P.

DESCRIPTORS - *PREVOCATIONAL EDUCATION; JUNIOR HIGH SCHOOLS; VOCATIONAL COUNSELING; JUNIOR HIGH SCHOOL STUDENTS; *GUIDANCE PROGRAMS; *PROGRAM DEVELOPMENT; *WORK EXPERIENCE PROGRAMS; WORK STUDY PROGRAMS; *CAREER PLANNING; CAREER OPPORTUNITIES; EXPENDITURES
IDENTIFIERS - OCCUPATIONAL EXPLORATION

ABSTRACT - A PREVOCATIONAL GUIDANCE PROGRAM WAS ESTABLISHED TO ACQUAINT JUNIOR HIGH STUDENTS WITH THE OCCUPATIONAL OPTIONS OPEN TO THEM. ON THE BASIS OF RECOMMENDATIONS GAINED FROM INTEREST SURVEYS ADMINISTERED TO STUDENTS, PARENTS, AND TEACHERS, THE PROGRAM EMPHASIZED A BROAD CAREER-DEVELOPMENT THEME AND WORK EXPERIENCE. ORGANIZATION OF THE PROGRAM, EXPENSES, AND STRATEGIES ARE DESCRIBED, AND SURVEY INSTRUMENTS, STUDENT PICTURES, AND REFLECTIONS ARE APPENDED. (SB)

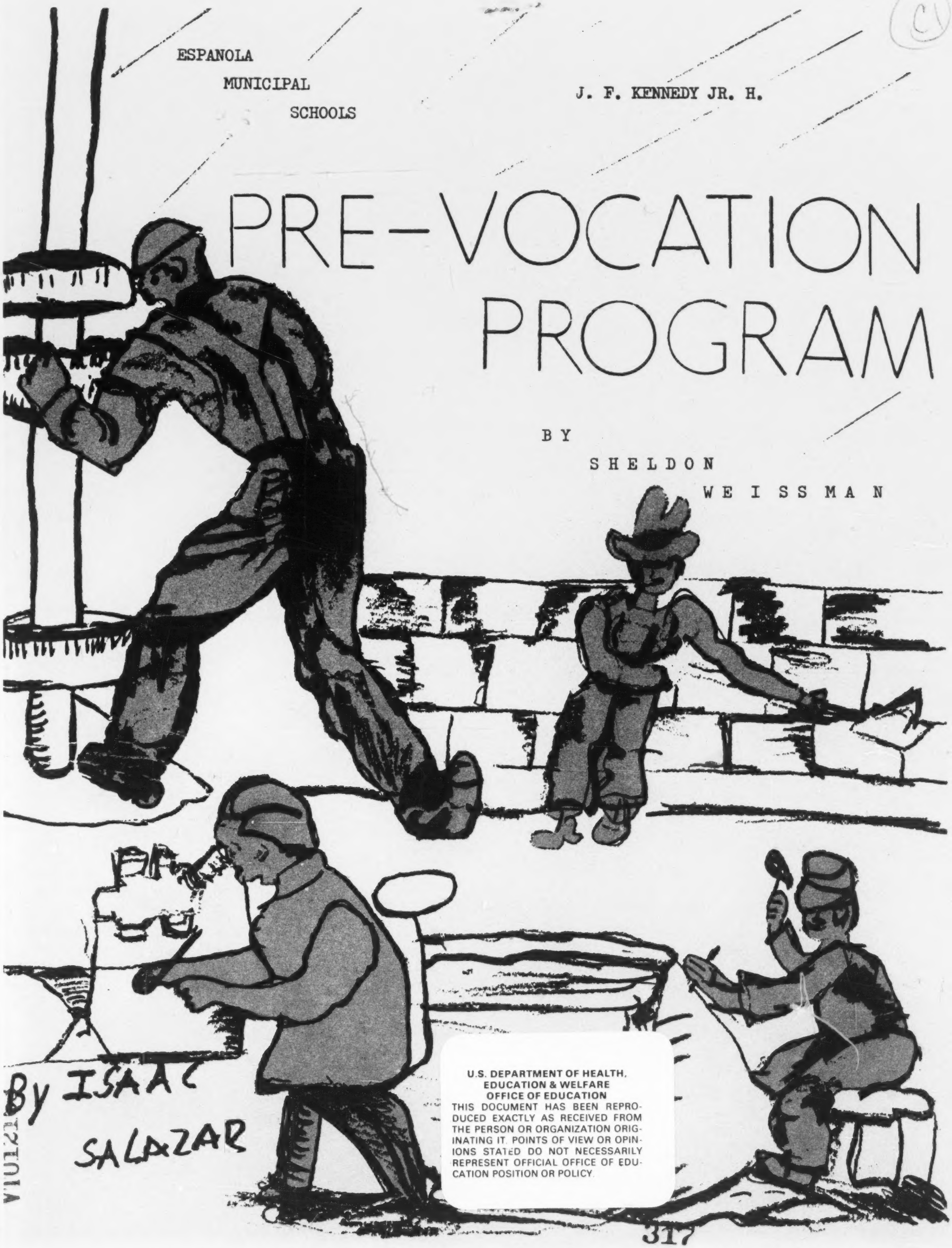
VT 012 163

ESPANOLA
MUNICIPAL
SCHOOLS

J. F. KENNEDY JR. H.

PRE-VOCATION PROGRAM

BY
SHELDON
WEISSMAN



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OFFICE OF EDUCATION
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PRE-VOCATION PROGRAM

Sheldon Weissman
Guidance Counselor
John F. Kennedy Junior High School
Espanola Municipal Schools
Espanola, New Mexico 87532

Published By
Research Coordinating Unit
State Capitol Building
Santa Fe, New Mexico 87501
Phone - 827-2329
Mini-grant # 6
September, 1970

TO: All Interested Persons

FROM: Hilda Majors, Director, Research Coordinating Unit

The Research Coordinating Unit Personnel and the New Mexico Research Coordinating Unit Advisory Committee need your reaction to this Mini-grant project in order to help us evaluate the total Mini-grant projects for the school year 1969-1970.

From your reactions, recommendations will be made by us to the State Director of Vocational Education as to the continued funding of Mini-grants.

After reading this report, will you please comment as to your reactions on the form below and return to:

Hilda Majors, Director
Research Coordinating Unit
Capitol Building
Santa Fe, New Mexico 87501

Your cooperation is appreciated.

- -

QUESTIONNAIRE

Title: Pre-Vocation Program

Yes ____ No ____ We would be interested in using this project for 1970-71 school year.

Yes ____ No ____ With advanced planning, we would be interested in using this project for the 1971-72 school year.

Yes ____ No ____ This project or a version of this project is being used in our school.

Yes ____ No ____ Should the Research Coordinating Unit continue to award Mini-grants?

Comments _____

_____

_____

NAME _____ POSITION _____

SCHOOL _____

The Mini-Grant for the Pre-Vocational Guidance Program at John F. Kennedy Junior High has made it possible to take the first step in the right direction in providing meaningful occupational orientation and exploration work experience.

Information derived from the various questionnaires is indicative of the apparent need in pre-vocational exploration. Teachers, parents, and students reflect limited knowledge of bona fide vocational programs outside the Espanola area. This should be kept in mind when analyzing the questionnaire results. It will be interesting to compare questionnaire responses as the program develops and becomes more sophisticated.

We believe this report reflects a major shift of philosophy towards Vocational Education in the Espanola School District. The State Department of Education will encourage and continue to work with this school district in what we consider a very worthwhile program.

James B. West

James B. West, State Supervisor
Special Needs
Vocational Education

TABLE OF CONTENTS

		Page No.
Section I.	Introduction to the Report	1
	Purpose	1
	Justification	2
Section II.	Interest Surveys	3
	Purpose	3
	Methodology	3
	Findings	4
Section III.	Program Organization	5
Section IV.	Pre-Vocational Guidance Course	6
	Pre-Vocational Exploratory Course	6
	Self-Exploration Segment	8
	Course for Alienated Youth	9
	Work-Study Program	9
	Exemplary Program	10
Section V.	Expenses	11
Section VI.	Long-Term Strategies	12
Section VII.	Summary	13

APPENDICES

Appendix A.	Work-Study Photos	15
Appendix B.	Work-Study Program	18
Appendix C.	Work-Study Student Reflections	20
Appendix D.	Student Work-Study Survey	21
Appendix E.	Letter to Businessmen	23
Appendix F.	Report on Student Worker by Employer	24
Appendix G.	Letter to Parents	25
Appendix H.	Parent Survey	26
Appendix I.	Teacher Survey	28

Pre-Vocational Guidance Program

John F. Kennedy Junior High School

I Introduction to the Report

One of the most important goals of counseling is to help students learn how to make decisions wisely. The decision making process includes considering a number of alternative directions of action, gathering information about various outcomes of each alternative, and evaluating the data obtained, regardless of personal value judgements, in order to arrive at some tentative decision.

Among the more critical decisions for a student, is the choice of an occupation. Students tend to reach a vocational decision on the basis of inaccurate information, usually obtained from unreliable sources. A broad, flexible exploratory vocational guidance program can help the student collect relevant information which is essential to good decision making.

Purpose

Through occupational orientation, children develop a personal sense of their present and future worth. The purpose of this pre-vocational program is to help a student perceive himself and the options open to him more accurately. The scope of the program encompasses pre-vocational exploration to all students and obtaining specific occupation skills to a segment of the student body.

All students will receive early orientation, which will stress wide ranging exploration with an emphasis on interpersonal relationships, and a smaller number of students will be identified as potential dropouts. Their program will involve special education classes for remedial assistance and vocational experiences to include the acquisition of the basic habits of industry and the assistance needed to enter and adjust to some type of work.

Justification

In 1968, Gilbert W. Bonem reported, "Despite the expansion of the U. S. economy in 1968, the New Mexico economy was not notably buoyant. Northern New Mexico has long been characterized by high rate of unemployment, low incomes, and steady emigration."[1] To combat the steady rise in unemployment (5.2% for the state, compared to 3.6% in the U. S.), the state has increased the number of technical and vocational schools. A continuous increase in monies, plant layouts, and equipment has come upon the scene, but establishing early orientation programs to stimulate student participation in these technical schools is lacking.

Students at the junior high level are ready to become active in the vocational decision making area. They are at the tentative choice-making level and are receptive toward the future. The issue at stake is one of guidance intervention. Much has been said about helping the child plan for his future, but the function should be to expand the child's awareness, even though that might postpone definitive planning.

Furthermore, a pre-vocational exploratory program has several distinct advantages over a high school program. It can be used to improve the achievements and attitudes of students before it's too late. Not involved with immediate employment, the junior high vocational program can focus on teaching academics, instill good work habits, and give students a feeling of accomplishment.

---

[1]Gilbert W. Bonem, "A Preliminary Report on New Mexico's Economy in 1968". Bureau of Business Research, University of New Mexico, Vol. XXII, Jan. 1968.

II Interest Surveys

Purpose

In order to meet the needs of the students, their parents, and the teachers at John F. Kennedy, designed three separate surveys. The purpose of the student survey was to examine the work-study experience offered with reference to:

1. The effectiveness of the counseling experience in preparing for entering the world of work.
2. The needs of students related to occupational decisions.
3. Gain recommendations by students on how to improve the decision making process.

The objective of the parent and teacher surveys was to communicate our needs as a school and increase their understanding of the career development process. Without the direct involvement and stimulation from the parents and the teachers, the primary source of occupational information has been dissipated.

Methodology

The student survey was eclectically woven from similar inventories in Gallup and Los Alamos. Forty-five work-study students were asked to honestly appraise their six-month experience.

On March 11, twelve parents met with me to form an advisory community committee. They represented six communities, which send their children to our school. The parents helped organize and design the items for the surveys and volunteered to go house to house and distribute 350 surveys.

A similar method was used in obtaining volunteers for the teachers' advisory committee. The two teacher volunteers submitted questions for the teacher survey and on March 18, twenty teachers responded to the objective questions.

Findings

The students recommended that we continue and improve the work-study program by offering it to more students, provide more school supervision and guidance to students in the program, and create courses geared to the job experience; specifically, office education, trade courses, and general occupation information.

The parents recommended that the school expand the program to only ninth graders and those graduating in the eighth grade, and offer it on a voluntary basis. They preferred nursing, office education, electronics, and drafting as new course offerings. The parents felt that only employers having a sincere and intelligent interest in the purpose of the program should be involved.

The teachers recommended that there should be a correlation between on-the-job experience, with the work they do in school. Students should be placed in only those jobs in which they have an interest and from which they can gain planned learning experience. In addition, the achievements of the work-study program should be communicated to parents through workshops, to teachers through regular meetings, and to other students through bulletins and business visitations.

Specific data may be obtained from the surveys located in the Appendix at the end of this report.

III Program Organization

Rather than just match student with employer, the school should assume responsibility for helping him clarify his abilities in terms of job opportunity, clarify his goals, and clarify his position in a fluctuating society. Along these lines, Donald Harrison generalized, "The culturally disadvantaged often brings to the training situation a history of long-term failure, negative reinforcement, long-term unemployment, and employment skills that are dead end."[2]

From this statement Mr. Harrison implied, "It is important that the counseling and training process focus attention immediately upon replacing the history of failure and lack of success with experiences that are likely to be immediately rewarding in order to sustain interest and motivation of the counselee. These success experiences should be very concrete, tangible, and readily viewed as something desirable by the trainee."[3]

Providing meaningful vocational education experiences is the task ahead. The pre-vocational exploratory program should be required for all junior high students. It can serve as a vehicle for teaching basic academic skills to all our students whose learning activities are less appropriate for highly abstract learning experiences. It can serve to train the alienated student in a variety of occupational skills.

In order to undertake such a diverse and purposeful program, two full-time guidance counselors, a special education teacher, and three parent aides would be necessary. A separate portable classroom should be used for remedial needs. A bus set aside for work-study students and an enrichment program would be desirable.

---

[2]Donald Harrison, "Retraining the Culturally Different for Work Adjustment". A.P.G.A. Convention, March 1970.

[3]Ibid.

IV Pre-Vocational Guidance Program

The program was developed from the committee's survey findings, and special emphasis was placed on two areas: a broad career development theme and work experience. The objective of the program should be exposure to the full range of occupational choices which will be available at a latter point and full knowledge of the relative advantages and the requirements of each.

The underlining nature of career development activity, which is the foundation of our pre-vocational guidance course, has been furnished by Robert Havighurst. A segment of his stages of vocational development applicable to the junior high level states:

Stage II - Acquiring the Basic Habits of Industry Learning to organize ones time and energy to get a piece of work done, school work, chores, etc. Learning to put work ahead of play in appropriate situations.

Stage III - Acquiring Identity as a Worker in the Occupational Structure Choosing and preparing for an occupation. Getting work experience as a basis for occupational choice and for assurance of economic independence.[4]

Pre-Vocational Exploratory Course

There are a number of strong curriculum guides for such a course. The criteria for free movement between the academic and vocational aspects of education should be dependent upon the student's needs, interests, readiness, and motivation.

The following content material should be used as a broad outline to provide an expression for a student's outlet of personal characteristics

---

[4]Robert J. Havighurst, "Youth in Exploration and Man Emergant". Man in a World at Work, Henry Borow, Chap. 10 p. 216-224.

important to career development. A detailed course content for this course can be found in the State Department's Handbooks under Vocational Education.

Course Content

A. Exploration Segment

1. S.R.A. Guidance Workbook "The Job Ahead"

   The purpose of the series is to introduce the student to the nature of work, work environment, earnings, preparation, attitudes, etc.

2. The Variety of Occupations

   To have the students realize and appreciate how the various occupations contribute to their lives and to society. Use of role models through on-the-job visits and "Father-Son Days" (students spend a full day with parents at their place of work).

3. Film Series-- "The Day in the Life of a Worker"

   To create a need for further exploration, the series will enable students to develop an awareness of their inadequate knowledge of the world of work.

4. Chronicle Guidance Unit

   To explore, in greater detail, the world of occupations, using the Occupational Kit, 3M Microfiche Reader, and Duplicator.

5. Guest Lectures from the Community

   Enable students to relate technical knowledge to practical and realistic positions, to gain insight into vocational development patterns of established businessmen.

6. Panel Discussion

   Pertaining to the relative importance of salary, prestige, and security in different occupations. Survey of student's attitudes

concerning these differences, emphasizing individual differences which occur in assessing attitudes. Making use of work-study students.

7. Simulation of Work Tasks

An action-oriented approach to reality testing and to job exploration. Setting up mock management trainee situations, life career games, and model stores.

8. Field Trips

To have students appreciate the number of different jobs necessary for the operation of a single industry.

9. Preparation of Vocational Newsletters

To increase the career development process for the benefit of parents, teachers, and non-participating students.

10. Work Groups

Students organized as work groups and rotating in roles of director, manager, foreman, etc.

B. Self-Exploration Segment

1. S.R.A. Guidance Workbook

Sections concerned with interest aptitudes, and personality development.

2. Autobiographies

Self-appraisals will enable the students to think about the kinds of jobs they would consider, identification of strengths and weaknesses, and consider self-actualizing statements.

3. Vocational Group Guidance

Further understanding of self-potentiality, interests, life values, goals, and aspirations. Groups should be designed to help launch each person on a lifelong quest for self-direction.

4. Human Relations

To stress the ability to get along with others and stress the development of leadership skills.

5. Students' Self-Appraisal

Administer the Kuder General Interest and Personal Survey to formulate and emphasize career possibilities.

C. Course for Alienated Youth

A block program in Special Education should be instituted focusing on remedial education. Enrichment should take the form of specific job skills. Phase I would offer the broad occupational introduction to work, and Phase II would offer the student an opportunity to explore specific occupational areas in greater depth.

D. Work-Study Program

The primary objective of this phase of the program is to enable the student to gain practical knowledge in a work role using Anne Roe's model. The student can relate his experiences with others in small group guidance sessions, focusing on questions like these: "How did I feel about myself while involved in the work role? What are other jobs in our society that might provide similar satisfaction? What value does the work role under question have economically as well as socially to society? What educational avenues could prepare one for a particular job?"[5]

---

[5]Anne Roe, The Psychology of Occupations, John Wiley & Son, New York, August 1965.

E. Exemplary Program

To augment our existing program of typing, arts and crafts, wood shop, and home economics, two new programs have been applied for with the Division of Vocational Education. A Trade and Industrial Education Program, emphasizing welding and drafting, and a Cooperative Office Education Program, emphasizing business machines and bookkeeping, have been submitted for approval. These programs will help us join educational technology to career development efforts.

V Expenses

The Research Coordinating Unit awarded a Mini-grant of five hundred dollars ($500) to Mr. Sheldon Weissman, guidance counselor, John F. Kennedy Junior High School, Espanola Municipal Schools. This small grant served to support the starting of the Pre-Vocational Program.

Listed are the estimated First-Year operational expenses for an enlargement of the Pre-Vocational Program at John F. Kennedy Junior High School. Funding would be from Federal, State, and Local monies.

First year operational expenses are estimated at $39,200.

a.	Counselor-Director for the project	$9,200
b.	Guidance Counselor	$8,000
c.	Clerical	$4,000
d.	Teachers salaries (1 position)	$6,000
e.	Special Education Classroom	$6,500
f.	Supplies-Equipment	$1,500
g.	Travel-Bussing work-study pupils	$3,000
h.	Printing and Promotion	$1,000

VI Long-Term Strategies

1. Ideas and procedures outlined in this program should be implemented at all levels with varying patterns so as to move toward a realistic developmental program of vocational education.
2. Develop summer placement service by coordinating efforts with state and local employment services.
3. Students' direct involvement with organizing, designing, and disseminating occupational materials.
4. Establish full-time work weeks alternating with equal full-time school attendance.
5. An Advisory Council containing representatives from interested parents, teachers, businessmen, and students to assist in determining priorities for program innovation, set standards and procedures, and promote new types of vocational programs.
6. Expand to full day work-study participation by having businessmen train students for specific job knowledge.
7. Develop a Career Information Center with small meeting rooms, occupational library, industrial exhibits, vocational tapes, films, video tapes of students on the job, microfiche equipment, etc.

VII Summary

The typical junior high school student exhibits a wide range of vocational development patterns as suggested by Eli Ginzberg (tentative choices), Donald Super (career patterns), Anne Roe (parent orientation), and John Holland (hereditary and personal forces). Students are not as concerned with specific occupations as they are with self-realization and exploration of experiences.

Our program is designed to motivate the student toward the "Formulation of Alternatives" as Tyler refers to it. She continues, "Following a general model, the client widens his vocational horizon and then narrows his field, eventually selecting a field of work or specific occupation".[6]

It is our intention to provide current and sound information about occupations, provide a model for decision making, for self-investigation, and for a practical application to the world of work.

---

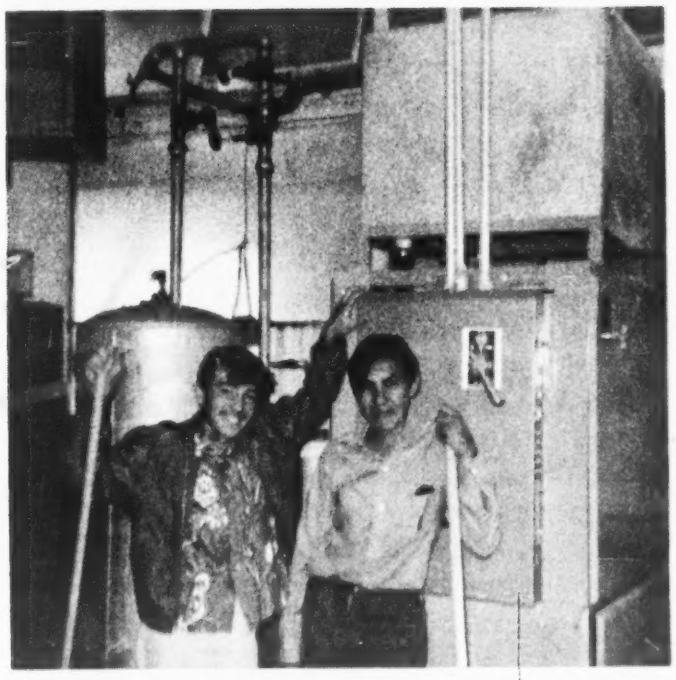
[6]Leona Tyler, Man in a World at Work, Henry Borow, Chap. 24, pg. 560.

APPENDICES

Appendix A

WORK-STUDY PHOTOS

Work-Study Group Returning
to J. F. Kennedy



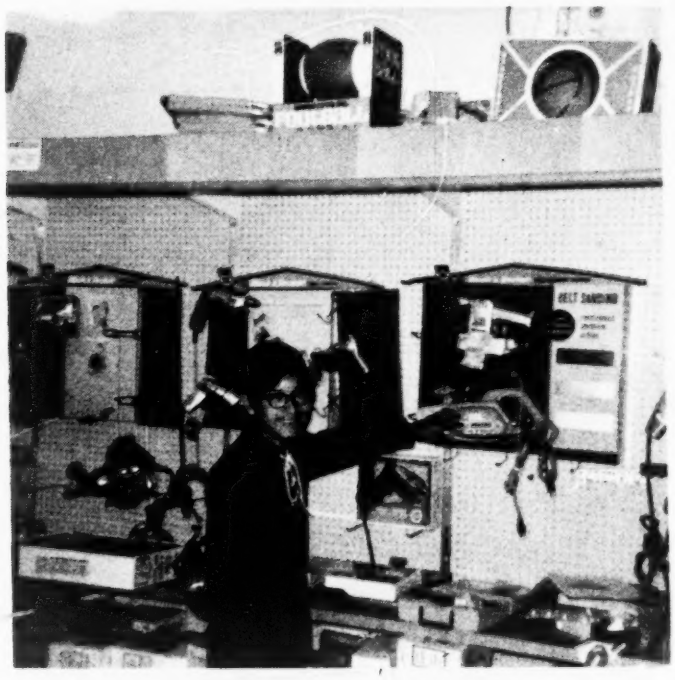
Eugene Trujillo and Charlie
Romero at Chevron Station

Elaine Valdez and Irene
Sanchez at A and W Drive-in

Anthony Moya at People's

Appendix A

Jimmy Leonard and Employer
Jake Saiz at Jake's Market



Leonard Suina at Yates
Hardware

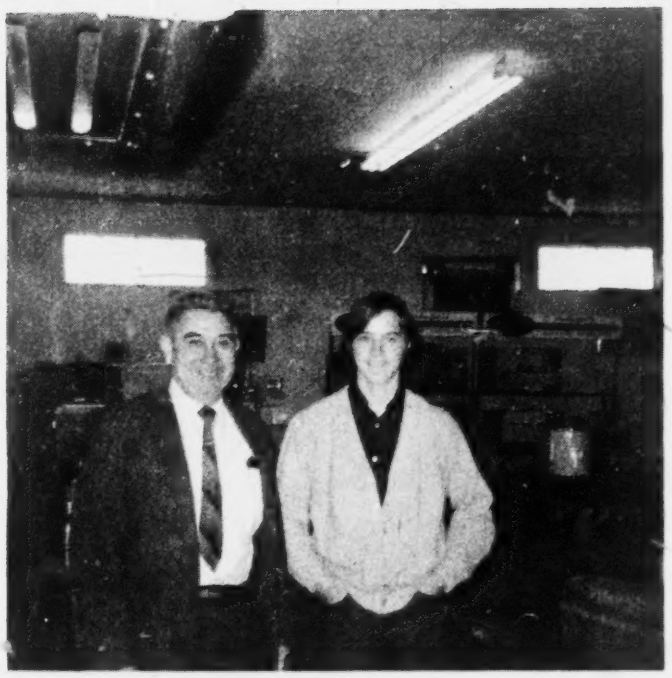
Orlando Sanchez at
Valley Cleaners

Fidel Gutierrez at
Becker's

Appendix A

Louis Barley at Farmway
Feed

Felix Salazar at
Valley Drug



Leslie Hoch and Employer
Mr. Trujillo at
United Furniture

Janet Salazar at
Espanola Hospital

Appendix B

Work-Study Program

	FIRM	EMPLOYER	STUDENT
1.	Master Printers	Mr. Carter	Katy Vialpando
2.	O.K. Tire	Mr. Red Johnson	Johnny Mascarenas
3.	Fairview Department	Mr. Al Griego	Sarah Martinez Laurel Baker
4.	Fairview Drug	Mr. Al Giron	Josephine Borrego
5.	Speedway 7-11	Mr. Bill Martinez	Luella Garcia
6.	United Furniture	Mr. Trujillo	Leslie Hoch
7.	A&W Drive Inn	Mr. Manuel	Irene Sanchez Evelyn Valdez
8.	KDCE	Mr. Richard Garcia	Rey Garcia
9.	Kelly's Insurance	Mr. June Kelly	Lucy Garcia
10.	Farmway Feeds	Mr. Johnny Montoya	Louis Baxley
11.	Pueblo Drugs	Mr. Ben Maestas	Evangeline Trujillo Susie Cordova
12.	Chevron Station-Big Rock	Mr. Roy Honstein	Charlie Romero Eugene Trujillo
13.	Evans Sportings	Mr. Frank Evans	Marvin Romero
14.	Western States Tec.	Mr. Shipley	Geraldine Roybal
15.	Jewel Box	Mr. Carl Freeman	Josephine Olivas
16.	Center Pharmacy	Mr. Gallegos	Ricardo Sanchez
17.	Espanola Hospital	Mr. Egli	Lawrence Herrera Connie Duran Janet Salazar
18.	People's	Mr. Manny Feder	Anthony Moya Wayne Oyenque Jeannie Whitted Dianna Martinez
19.	Western Holiday Motel	Mr. Erickson	Dixie Brown Lucille Dominguez
20.	Lure	Mr. Cates	Louie Esquibel

21.	Leo Chevron	Mr. John Rodriguez	Louie Burck Lawrence Atencio
22.	Law Office	Mr. Tony Scarborough	Louisa Herrera
23.	Harkin's Oil	Mr. Harkins	Rosie Valdez
24.	Jakes Market	Mr. Saiz	Jimmy Leon
25.	Napa Parts	Mr. Beck	Tony Chacon
26.	Chamber of Commerce	Mrs. Price	Judy Perez
27.	Mesa Market	Mr. Cielo	Roger Martinez
28.	Fairview Clinic	Mr. Wise	Ruth Mascarenas Diana Martinez
29.	Tewa Bowl	Mr. McDaniels	Jose Montoya Johnny Ortiz
30.	Valley Cleaners	Mr. Tony Sanchez	Kathy Sanchez Geraldine Romero
31.	Beckers	Mr. Joe Becker	Fidel Gutierrez
32.	Yates Hardware	Mr. Yates	Leonard Suina
33.	Valley Drug	Mr. A. Rael	Felix Salazar

Appendix C

Work-Study Student Reflections

Sarah Martinez - Fairview Department Store

"There are three very important things that I learned about working as a salesgirl. You have to be presentable, know the merchandise, and be friendly. I am very happy to know that I have learned these things and more."

Felix Salazar - Valley Drug

"While I was working in the Work-Study, I found it very rewarding and also exciting. I also learned how to deal with people."

Orlando Sanchez - Valley Cleaners

"Some of my experiences were: working with others, learning the trade, having responsibility, and being able to take orders."

Luella Garcia - Speedway 7-11

"Work-Study gives boys and girls the opportunity to put into actual use the knowledge and skills they learned in school."

Janet Salazar - Espanola Hospital

"While working at the hospital, I had to become a more responsible person when using the machines there. My job was to type I.B.M. cards, address envelopes, and to file cards."

Rey Garcia - KDCE Radio

"I feel that this program was worthwhile. It was really helpful to me in a sense, setting me towards higher goals of living. I was getting trained at the KDCE Radio Station in Espanola. This was a worthwhile experience, though I did not get as much attention as I desired, but I did know some duties of an announcer; working the turn table, working the microphone, setting the records, setting the tapes for commercials, and reading the hourly news and weather reports on the air."

Appendix D

JOHN F. KENNEDY JUNIOR HIGH SCHOOL

WORK-STUDY SURVEY

Instructions - Check off the line that best answers the following questions:

1. I am a male 46% female 54%

2. I am in the seventh year 4% eighth year 4% ninth year 92%

3. To what extent has counseling you received been helpful to you?

   a. 54% extremely helpful c. 45% some help

   b. 0% not helpful at all d. 1% very little help

4. Which of these statements best describes your feeling about going to school each day?

   a. 54% always look forward to it with enthusiasm

   b. 40% usually look forward to it with enthusiasm

   c. 4% frequently am indifferent about it

   d. 2% very often dread the prospect of school

   e. 0% always dislike having to go to school

5. How much do you feel the school influences you in the following:

   (circle one) 1=a great deal
   2=moderately
   3=not at all

a. Health Training	1 2 3	1=21% 2=62% 3=19%
b. Preparation for a career	1 2 3	1=55% 2=32% 3=14%
c. Preparation for your future family living	1 2 3	1=46% 2=32% 3=23%
d. Preparation for further education	1 2 3	1=51% 2=39% 3=12%
e. Use of leisure time	1 2 3	1=12% 2=70% 3=19%

6. Does this school have enough technical and vocational courses for you?

   a. 40% yes b. 60% no

   If your answer is no, list those courses you would like to take:

   example: bookkeeping, metal, electricity, salesmanship.

   a. Shorthand c. Drafting
   b. Welding d. Auto Mechanics

7. In general, how much do the subjects you are now taking seem meaningful for your future interests and needs?

a. 71% Considerably meaningful b. 29% somewhat c. 0% most seem unrelated

8. Which subject has helped you the most in your work-study job:

a. 27% math d. 27% woodworking g. 0% art

b. 8% science e. 2% typing h. 2% history

c. 13% home economic f. 25% english i. 9% civics

j. 14% other

9. Rank the five items below for their importance to you on a job (rank from 1 to five 1=high 5=low) in the future:

a. 1 security of steady work d. 4 opportunity for a rapid rise

b. 3 chance to help others e. 2 friendly people to work with

c. 5 high income

10. In the future I have:

a. 18% a definite plan for life

b. 68% sort of a plan

c. 14% no idea of what I want to do or be

11. The work-study program should include:

a. 9% money for training experience

b. 54% credit for participation toward the high school diploma

c. 23% a class to prepare you for the working experience

d. 14% continue as is

12. I plan to stay in high school until I graduate.

a. 98% yes b. 2% no

13. I am planning to go to college.

a. 76% b. 24% no

14. I am planning further training after high school (ex. nurses training, business college, technical school).

a. 82% yes b. 18% no

15. What comments good or bad do you have of the work-study program

1. Good job experience
2. Helpful toward the future
3. Understanding yourself and others
4. Jobs should be rotated during the year

Appendix E

John F. Kennedy Junior High School

M. A. Lopez, Principal

Dear Participant,

We at J. F. Kennedy wish to thank you on behalf of our students, for your cooperation and interest.

To complete this spring Work-Study Program, we would like you to take a few moments and complete the attached questionnaire. This will help us assist the student you have been training, by making him aware of his business strengths and weaknesses.

A self-addressed and stamped envelope is provided for a speedy return. Thank you once again for your time.

Sincerely,

Mr. Weissman
Guidance Counselor

Appendix F

WORK EXPERIENCE PROGRAM REPORT ON

STUDENT WORKER BY EMPLOYER

NAME OF STUDENT_____ DATE_____

NAME OF EMPLOYER_____ NAME OF BUSINESS

_____

Check the phrase which is most descriptive of student's performance:

1. Consider student's dependability in assuming and fulfilling job assignment:

_____Requires minimum of direction. _____Requires normal supervision.

_____Requires close supervision. _____Needs direction and frequent checking.

2. Consider student's judgement:

_____Frequently makes incorrect decisions. _____Consistantly makes sound decisions.

_____Sound judgement under normal conditions. _____Occasionally makes wrong decisions.

3. Consider student's attitude toward job supervision and other employees:

_____Occasionally indifferent and uncooperative. _____Generally interested and cooperative

_____Exceptionally enthusiastic and cooperative. _____Often disinterested and uncooperative.

4. Consider the amount of effort this student applies to the job:

_____Steady worker. _____Frequently wasted time.

_____Occasionally wasted time. _____Extremely industrious.

5. Consider the student's ability to learn:

_____Adequate learning ability. _____Has frequent difficulty in learning.

_____Learns rapidly. _____Has some difficulty in learning.

6. Consider quantity of acceptable work produced:

_____Output above requirements of job. _____Normal production required of job.

_____Output occasionally below requirements of job. _____Production frequently below job requirements.

7. Consider quantity of work produced:

_____Constantly below job requirements. _____Accurate and neat.

_____Somewhat below standard. _____Meets normal requirements.

Appendix G

John F. Kennedy Junior High School

M. A. Lopez, Principal

Dear Parents and Guardians,

Have you ever been invited to design an educational program in your school? If not, here is your opportunity to help us help your children.

This committee of parents, teachers, and administrators are trying to establish for the first time, a Vocational Guidance Program at Kennedy J. H. S. We would appreciate a few moments of your time to answer our questionnaire. Vocational Guidance will help our children understand themselves, their interests, their abilities and encourage them to make some very serious decisions about careers and jobs for their future.

The greater the number of parents who assist us, the greater the influence will be on our school board and state department to fund our program.

We are counting on your help.

Sincerely,

The Committee for Vocational Guidance

Parents:

Mrs. Angie Atencio - Dixon

Mr. Mrs. Louis Espinoza - Llano

Mr. Mrs. Ernestine Herrera - Alcalde

Mr. Mrs. Jenera Naranjo - Elguique

Mr. Ralph Trujillo - Chimayo

Mr. Mrs. Martin Martinez - Velarde

Teachers:

Miss Esther Pfiester - Typing

Mr. Jose Salazar - Spanish

Administrators:

Mr. Michael Lopez

Mr. Sheldon Weissman - Counselor

Appendix H

PARENT SURVEY

Vocational Guidance

Please do not place your name on this survey. Check off the answer that comes closest to your honest feelings.

1. The parent filling out this survey is _23%_ male _42%_ female _35%_ both

2. My occupation is _48%_ housewife, _55%_ Mechanic

3. Do you feel you are involved and have a direct influence on your child's career choices? _65%_ yes _8%_ no _27%_ I'm not sure

4. Have you ever talked with a school counselor? _34%_ yes _66%_ no

5. Are you aware of the requirements and opportunities for different kinds of careers? _36%_ very aware _51%_ somewhat aware _5%_ I am aware of only my field of work _8%_ not aware.

6. Have you talked about future careers with your children? _75%_ yes _25%_ no

7. Rank the five items below for their importance to you on a job (rank from 1 - highest to 5 - lowest).

   a. _1_ security for steady work
   b. _3_ chance to help others
   c. _2_ high income
   d. _4_ opportunity for a rapid rise
   e. _5_ friendly people to work with

8. Check off which area or areas you would like to see your child enter after high school:

   a. _67%_ college
   b. _42%_ technical and vocational school
   c. _8%_ get a job
   d. _1%_ the armed forces

9. Check off the courses you feel we should offer in our vocational program:

   a. _6%_ farm management
   b. _3%_ animal husbandry
   c. _11%_ automobile mechanics
   d. _14%_ nursing
   e. _12%_ stenography
   f. _13%_ bookkeeping
   g. _8%_ welding
   h. _14%_ electronics
   i. _10%_ drafting
   j. _9%_ carpentry
   k. ____ others (list them)

10. Which students should have this program?

a. 83% only ninth graders and those graduating in the eighth grade

b. 17% only seventh graders

11. The program should be offered as:

a. 21% a required class

b. 25% an elective class

c. 54% to all who volunteer

12. I believe the vocational program should be designed:

a. 4% for dropouts only

b. 8% for slow students

c. 3% for discipline cases only

d. 85% for all students

13. A work-study program allows a student to spend one morning in a business of their choice. Do you feel the work-study program should include:

a. 21% money for the training experience

b. 53% credit toward the high school diploma

c. 26% just the training and experience

14. Once a student is working, I feel:

a. 63% he should stay at the same job for the year

b. 24% he should stay at one job for half the year and then choose another job

c. 13% he should change his job experience every month

15. If a parent occupation workshop would be held at John F. Kennedy:

a. 35% I would attend

b. 2% I would not attend

c. 63% I would consider it

Appendix I

TEACHERS SURVEY

Vocational Guidance
Program

Vocational Guidance is a self-analysis and developmental process to enable the student to explore his interests and abilities and to channel them to given occupations.

Instructions-Check off the line that best answers the following questions:

1. I am a 70% male 30% female

2. To what extent has counseling had an effect on your students?

   a. 30% extremely helpful c. 65% some help

   b. 5% not helpful at all d. 0% very little help

3. In general, how much do the subjects you are teaching seem relevant to vocational guidance?

   a. 45% considerably meaningful

   b. 40% somewhat

   c. 15% seems unrelated

4. Does our school have enough technical and vocational courses for the students?

   a. 5% yes b. 95% no

5. Have you talked about future careers with your students?

   a. 90% yes b. 10% no

6. Do you feel you are involved and have a direct influence on your students career decisions?

   a. 55% yes

   b. 0% no

   c. 45% I'm not sure

7. Rank the five items below for their importance to you on a job (rank 1 - high, to 5 - low).

   a. 2 security of steady work d. 4 opportunity for advancement

   b. 1 chance to help others e. 3 friendly people to work with

   c. 5 high income

8. The work-study program enables our students to gain direct practical experience in the world of work. Do you feel the work-study program should:

   a. 28% provide money for training experience

   b. 18% provide high school credit toward the diploma

   c. 56% provide a class to prepare them for their work experience

9. The vocational guidance program should be offered as:

   a. 19% a required class

   b. 57% an elective class

   c. 24% to all who volunteer

10. I believe the vocational program should be designed:

    a. 0% for dropouts only c. 10% for discipline cases only

    b. 0% for slow students only d. 90% for all students

11. I feel an extensive occupational program could:

    a. 19% improve the students classwork

    b. 71% make the student more aware of himself and others

    c. 10% make no noticeable change on the student.

12. What suggestions would you make to make this new program more beneficial for everyone involved?

    1. Rotation of classes for work-study pupils
    2. Draw in the community for the program
    3. Follow-up to the high school
    4. Full day participation in work-study
    5. Practical instruction, and vocational training to emphasize self-awareness.

VT 012 492
FIRST ANNUAL REPORT OF THE STATE ADVISORY COUNCIL FOR VOCATIONAL EDUCATION IN COLORADO.

COLORADO STATE ADVISORY COUNCIL ON VOCATIONAL EDUCATION, DENVER.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - 24SEP70 12P.

DESCRIPTORS - *STATE PROGRAMS; *VOCATIONAL EDUCATION; *PROGRAM EVALUATION; ADVISORY COMMITTEES; ANNUAL REPORTS
IDENTIFIERS - COLORADO

ABSTRACT - THIS REPORT EVALUATES COLORADO'S VOCATIONAL EDUCATION PROGRAM IN TERMS OF STATE AND NATIONAL GOALS. THE REPORT DESCRIBES BOTH ACCOMPLISHMENTS AND SHORTCOMINGS AND MAKES RECOMMENDATIONS IN FOUR PROBLEM AREAS: (1) GUIDANCE AND COUNSELING, (2) PROGRAMS FOR THE DISADVANTAGED, (3) PROGRAM EFFECTIVENESS, AND (4) PUBLIC INFORMATION PROGRAMS. (BH)

VT 012 492

STATE OF COLORADO

First Annual Report

of the

State Advisory Council

For

Vocational Education

in

COLORADO

JULY 1970

VT012492

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
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STATE OF COLORADO

Advisory Council on Vocational Education

207 STATE SERVICES BUILDING
DENVER, COLORADO 80203

September 24, 1970

State Board for Community Colleges and Occupational Education
207 State Services Building
Denver, Colorado 80203

Gentlemen:

The Colorado State Advisory Council for Vocational Education has, through this past year, taken a hard "look see" at vocational education in our state.

Colorado has been fortunate in having a separate State Board for Vocational Education which has been able to direct its full attention to vocational education rather than concern itself with the total program of education.

The Advisory Council commends the State Board for Community Colleges and Occupational Education for its goals and farsighted views of the needs of vocational education for the citizens of Colorado.

The Advisory Council commends the Division of Occupational (Vocational) Education for its work and progress in the past in spite of limited funds available.

The Advisory Council has, however, noted specific problem areas which demand attention, and these are noted in this report.

Respectfully,

Irwin A. MacKay

Irwin A. MacKay, Executive Secretary
State Advisory Council
for Vocational Education

First Annual

Evaluation Report

of the

COLORADO STATE ADVISORY COUNCIL

FOR

Vocational Education

The first annual evaluation report of the Colorado State Advisory Council is based on state vocational programs as they relate to state and national goals. The report presents to the State Board comments and recommendations for improving the vocational education program in Colorado.

Four specific problems emerged in the study of the vocational education programs in Colorado by the State Advisory Council. Priority recommendations based on these problems are submitted to the State Board for consideration:

Problem One:

The Advisory Council is increasingly concerned over the lack of effective and meaningful vocational guidance and counseling for the youth in Colorado. There is a dire need for occupational guidance and counseling to aid the youth in matching their interests and capabilities with opportunities in the world of work.

Recommendation:

School administrators must take immediate steps to initiate and implement occupational guidance programs in the schools throughout the State of Colorado. The advice and counsel of parents, teachers and employers must be utilized in planning and developing vocational guidance programs. Meaningful pro-

grams of occupational orientation could begin in grade one, but must be initiated no later than grade seven (junior high). Vocational guidance and counseling services are also essential for high school students. All guidance counselors must become more occupationally minded through special training programs and/or work experience programs if they are to make an effective contribution to the total educational experiences of our youth.

Problem Two:

The image of vocational education, while perhaps improving, still has the stigma attached to it of being for "somebody else's children." Such an image results from a lack of information or from misinformation about vocational education programs.

Recommendation:

An honest, objective and factual information picture of vocational education must be continuously presented. Knowledge about vocational education is the key to understanding. Effective public information programs about opportunities in the world of work and about accomplishments of students in vocational education programs can aid in improving the image of vocational education. Parents, students, and other publics must be kept informed of the value of vocational education programs through press releases, orientation programs, civic programs, and special school activities.

Problem Three:

The Advisory Council is concerned that traditional methods of motivating and instructing youth of disadvantaged groups have not worked. These students leave school without sufficient education to obtain and/or advance in a job. As a result, they are unemployed or underemployed for many years. Re-entry into regular school programs often does not produce the desired results.

Recommendation:

Enrollment of the socio-economically and culturally disadvantaged persons and of the handicapped persons in vocational education programs should be strongly encouraged. Special projects such as work study and work incentive programs should be further developed since many persons will be more interested in the school situation if it is combined with work. Disadvantaged and handicapped individuals should be pictured in educational brochures and news releases, and, when qualified, employed as members of the staffs and faculties. Members of these groups can then see definite proof that there is a chance to participate and to strive for equal goals.

Problem Four:

Information about program efficiency and effectiveness is needed by policy-making bodies. Too often, such information is presented in vague, meaningless terms or is not available. This implies that specific objectives and goals of vocational education programs are vague, meaningless, and immeasurable. Much of the available information does not give facts and figures about results or outcomes of vocational education programs.

Recommendation:

Clear, concise, and measurable objectives and goals based on student needs for employment must be formulated for vocational education programs. Continuous evaluation of the vocational education programs in terms of specific objectives and goals is imperative.

Evaluation must involve parents and employers of students from vocational education programs. Evaluation must include follow-up of graduates and dropouts of vocational education programs.

Evaluative information must then be used in program development and improvement. This information will provide policy-making bodies with needed information about program efficiency and effectiveness to aid in the adjustment of available resources and in future planning.

Basis for Vocational and Technical Program Development

Vocational education programs are initially developed on the basis of the actual needs of the labor market, as revealed by local, regional and statewide manpower surveys. After the need for a program is established, specific curricula and the level of instruction are structured in terms of student aptitudes, interests, and capabilities. Occupational education programs in Colorado are evaluated in terms of students served, support by the public, jobs filled by graduates, and success of graduates.

The Colorado Cooperative Manpower Plan (FY 1970) reports that approximately 15 per cent of the secondary students and 35 per cent of the post-secondary students in Colorado are enrolled in vocational education programs.

It is estimated that 83 per cent, or 725,340, of the employed working force in Colorado are employed in occupations normally served by vocational education or those occupations which do not require a baccalaureate degree. The fastest growing areas of employment are government services, finance and insurance, and trade and manufacturing.

The size of the State's economic base is directly related to population change and labor force. Based on United States Census Bureau estimates, population growth in Colorado during the decade has been slightly above the national rate. Colorado's population is expected to grow by approximately 30,000 persons in 1970 to 2,102,000 persons.

The labor force growth is similar to the population picture. There has been an upward trend since 1966. Because of increased participation in the labor force by certain population groups, especially in the 15-19 age group, the actual rate of increase in the size of the labor force exceeds population growth. The average total labor force in the State for 1969 was estimated at 883,000 persons—a growth of 3.9 per cent over 1968. It is expected that the labor force will increase 26,000 persons to 909,000 persons during 1970. This represents an increase of 2.9 per cent over 1969.

To meet this growth in employment, enrollments in vocational-technical programs in Colorado during the past three years have increased 30 per cent from 78,027 in 1966 to 99,393 in 1970. Expenditures to support the programs from local, state, and federal sources have increased from 7.7 million dollars in 1967 to 11.1 million dollars in 1970. Recent state legislation appropriations for the fiscal year 1971 total 6 million dollars. This a 300 per cent increase over the 1.5 million dollars appropriated for fiscal year 1970. Added to this total is an additional 2 million dollars increase in appropriations for vocational education in junior colleges during 1970. This represents a 500 per cent increase in financing for vocational education in Colorado.

Goals and Accomplishments

The employment opportunities, as related to vocational education programs for 1970, were estimated under "Projected Labor Demands" in the Colorado State Plan for Vocational Education. Table 1 shows the labor demand compared with the output of vocational education programs to meet such demand during 1970. The greatest difference between demand and output is in the areas of the service-type occupations of Distributive and Business-Office Education and the Technical Occupations.

Table 1
Labor Demand and Completions of Vocational Education Programs During 1970

Vocational Program	Labor Demand	Vocational Program Completions		
		Total	Secondary	Post-Secondary
Agriculture	1,086	527	457	70
Distribution	14,554	2,958	2,058	900
Health	2,309	1,113	188	925
Home Economics	2,208	489	414	75
Business & Office	14,955	4,293	3,618	675
Technical	3,211	628	101	527
Trade & Industrial	10,829	3,702	2,237	1,465
TOTALS	49,152	13,710	9,073	4,637

Goals and Accomplishments (Cont'd)

Listed in Table 2 are the enrollment goals for the various levels of programs as indicated in the 1969-70 Colorado State Plan for Vocational Education. Actual student enrollments during the year are also listed. Enrollments in vocational education programs exceeded the goal by 13 per cent.

The State Plan also placed particular emphasis on expanding vocational programs for the disadvantaged and handicapped. Fifty-eight special programs were planned to serve 1,843 disadvantaged students. A total of 71 programs were conducted during the year with a total enrollment of 2,065 students.

To achieve greater depth in special program development and improvement, a cooperative arrangement contract was developed with the State Department of Education and the State Department of Rehabilitation. This arrangement has made possible a broader program to meet the needs of more disadvantaged and handicapped persons in the State during 1970.

Table 2

State Plan Goals for Enrollment and Actual Output During 1970

Program Level	Enrollment Goal	Enrollment Actual
High School	31,854	35,054
Post-Secondary	11,203	14,354
Adult	39,043	41,733
Disadvantaged	1,843	2,075
Handicapped	265	2,065
Coop G	865	58
Work Study	0	102
Exemplary	0	71
Guidance & Counseling	2,000	3,881
TOTALS	87,073	99,393

Cooperative programs were planned for 865 students using Cooperative G funds during 1969-70. However, during the regular

Goals and Accomplishments (Cont'd)

school year only 58 persons were enrolled in such programs. It was impossible to develop more Coop G programs during the regular school year due to late funding of this program. One summer program for 20 persons is planned for operation, and an additional 20 programs, enrolling 440 students, are scheduled for operation in the fall, using 1969-70 funds.

Work study and exemplary programs were not operated during the regular school year because expected federal funds were not forthcoming until late in the year. When funds did become available, numerous "mini grants" were funded using exemplary funds, and a summer work study program was organized in the State's area vocational schools.

SUMMARY

The Colorado State Advisory Council's recommendations are based upon the goals and accomplishments of vocational education for 1969-70. The recommendations encompass four general areas which need to be studied for improvement:

1. Vocational education guidance and counseling programs.
2. Programs for the disadvantaged and handicapped.
3. Program efficiency and effectiveness.
4. Public information programs.

Though considerable improvement and growth is needed in the above-mentioned categories, some bright spots about vocational education in Colorado are worthy of mention:

1. A dramatic new thrust for secondary level vocational education programs in the State has been brought about by new State legislation during 1970.

2. Expanding post-secondary vocational education programs are resulting from the State system of community colleges and the State legislation in 1969 for vocational education in the local junior colleges.

3. Increased emphasis has been placed on the development of more programs to serve the disadvantaged and handicapped.

4. Vocational program enrollments in the State increased 30 per cent during the past three years.

The staff of the State Division of Occupational Education has been reorganized during 1970. The new structure places more emphasis on planning, development, and evaluation of vocational programs. This, coupled with increased funds, and more effective leadership, should provide the foundation for continued improvement of vocational education programs in Colorado.

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for

Vocational Education

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Director of Occupational Education

22-101-600-10/70

VT 012 493
1970 ANNUAL EVALUATION REPORT TO THE STATE BOARD FOR VOCATIONAL AND TECHNICAL EDUCATION.

ALASKA STATE ADVISORY COUNCIL FOR VOCATIONAL EDUCATION, JUNEAU.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - AUG70 10P.

DESCRIPTORS - *STATE PROGRAMS; *VOCATIONAL EDUCATION; *PROGRAM EVALUATION; ADVISORY COMMITTEES; ANNUAL REPORTS
IDENTIFIERS - ALASKA

ABSTRACT - THIS REPORT EVALUATES VOCATIONAL EDUCATION IN ALASKA IN TERMS OF FUNDING, IMPACT, EMPLOYMENT OPPORTUNITIES, AND GENERAL PROVISIONS. OF MAJOR CONCERN ARE PROGRAM IMAGE AND AVAILABILITY TO PEOPLE WITHIN THE STATE. (BH)

VT 012 493

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1970 ANNUAL EVALUATION REPORT

by the

ALASKA

ADVISORY COUNCIL TO THE STATE BOARD

for

VOCATIONAL AND TECHNICAL EDUCATION

Vocational Education
Amendments of 1968
PL 90-576

August, 1970

VT012493

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EDUCATION & WELFARE
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Dr. Cliff R. Hartman
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Vocational and Adult Education

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Mr. Ronald Snodgrass
Mr. George Bell
Mr. Stanley D. Owen
Mr. Mike Freeman
Miss Elizabeth Beans
Mr. Ted Solberg
Mr. Frank Chapados
Mr. Jess Maynard

TO: Mrs. Doris Wilke, Chairman
Ala ska State Board of Vocational
Education

DATE: August 1970

FROM: Mr. Louis Licari, Chairman
The Alaska Advisory Council for
Vocational Education

SUBJECT: Evaluation Report of the
State Vocational Education
Programs

In compliance with Regulation 102.33 of the Office of Education, Rules and Regulations for State Vocational Programs, the Alaska Advisory Council for Vocational Education has conducted the following evaluation of the State's vocational programs, its effectiveness, services, and activities carried out under the State Plan for fiscal year ending June 30, 1970. The findings of the evaluation and the accompanying recommendations are respectively submitted as a responsibility of the Council to the Alaska State Board for Vocational Education in compliance with the following U.S. HEW regulation:

> "The State Board shall submit to the Commissioner (USOE) and the National Advisory Council on or before October 1 of each year an annual evaluation report prepared by the State Advisory Council pursuant to 102.23 (c) in accordance with procedures established by the Commissioner."

Summary Statement

The 1970 evaluation report of vocational education in Alaska has been conducted and finalized in the interest of assisting the total vocational effort to fulfill more effectively the objectives and purposes for which established. The Council is concerned with the fact that some people who could benefit from vocational instruction are deprived of that opportunity because their educational system does not offer such courses.

Another concern is the image which vocational programs may have in some of our educational systems. The Council has specifically directed that all persons in a position to enhance the image of vocational programs should do so, since this also may be a barrier which would restrict the availability of some programs to those who could benefit from the instruction.

Even though the funding for the new features of Vocational Admendments of 1968 were late in being approved by Congress the Council felt that these areas should have a preliminary evaluation to give guidance for future evaluations.

A special strength of the evaluation report is that every member participated in some phase of the evaluation. The reports from each Council member was presented to the Council proper before becoming a part of the overall report.

The Council was generally impressed with the total growth of vocational education in the State. However, this observation was tempered with the realization that there is still a long way to go before filling the objectives to be served by vocational education. The recommendations made in this report are directed toward this purpose.

Evaluation Areas

General Proyisions

a. Advisory Council

The twenty member Advisory Council meets the membership criteria of the State Plan.

The Council Members were officially appointed by the Governor of Alaska and held their first organizational meeting June 19-20, 1969 at which time the Council elected Mr. Bud Costello, Chairman; and Mrs. Charlie Mae Moore as Vice Chairman and Secretary. The State Plan for fiscal 1970 was reviewed and accepted.

At the November 4, 1969 meeting, Mr. Bud Costello resigned as Chairman and Mr. Louis Licari was elected to replace him. At this time the State vocational budget was reviewed and endorsed for presentation to the State Board and Legislature.

At the February 24, 1970 meeting, the Council established the criteria and schedule for its twelve on site evaluations of vocational program. The evaluation trips were conducted during April and May with the results compiled and presented at the June 23, 1970 meeting. Also, during this meeting the State Plan for fiscal 1971 was reviewed and approved.

b. State Administrative and Supervisory Personnel

The Council is genuinely impressed with the quality and productivity of the State Administrative and Supervisory personnel. The program adaptability to the new funding regulations can be attributed to the vocational staff. With the addition of the teacher educator this year and the projected hiring of an Industrial Arts Supervisor and a Post-Secondary Supervisor this coming year, Alaska should have adequate staffing to meet the needs of Vocational Education this coming year.

c. Vocational Guidance

With the greater need for vocational guidance it was recommended that State administrative staff explore the possibilities of a cooperative vocational guidance program be developed with Instructional Services, or if this is not feasible develop its own vocational guidance program.

d. Teacher Education

It was recommended that with the identified need for teacher education and new funding regulations greater emphasis be placed on teacher education directed to meet the curricular needs of changing program design.

e. Program Evaluation

Program evaluation by the State staff has been carried out adequately to meet the requirements of the State Plan.

f. Annual Reports

Annual reports by State staff have been reviewed by the Council and submitted as required by the State staff.

g. Cooperative Arrangements

The Division of Vocational and Adult Education has more than met the requirements of cooperative arrangements with other agencies. This is evidenced by the fine working relationships developed in funding the Alaska Skill Center. The agencies involved in this venture are: Bureau of Indian Affairs; OVR; MDT Labor; MDT Education and Vocational Education.

h. Research

The research project "Alaska Manpower Outlook for the 70's" being conducted by the Division in cooperation with MDT Education and Department of Labor is of such significant value that the State Division of Econimic Development is using the document for its economic labor projections.

Fiscal Control and Fund Accounting Procedures

The present funding formula which takes into account the district's ability to pay the cost of program development, the students' disadvangement and/or handicap, and the manpower projected needs has this year for the first time equalized the funding and development of secondary vocational programs.

As a result of the cost accounting approach, the legislature has gone from 10 to 20 per cent State Secondary funding in fiscal 1970, to 90 per cent funding in fiscal 1971. The 90 per cent funding now includes vocational education as well as the academic areas in the State school support foundation formula.

The requirements under the 1968 Vocational Admendments appeared to work to the inequity of the community colleges. However, the 15 per cent federal set aside for post-secondary education during fiscal 1970 placed the burden on the State to fund more fully post-secondary non-degree programs. Wherein fiscal 1971, the State has accepted its responsibility by increasing its previous allotments by 400 per cent, and considering full funding of post-secondary education in 1972.

Program Development

After twelve on site visitations by the Council it is the general opinion of the group that the reluctance of local education units to become involved in total education has overshadowed the efforts of the Department of Education and the Division of Vocational and Adult Education to provide the vehicle in which good programs could be developed.

a. Handicap Programs

Four handicap programs were developed this year and represents the first time that earmarked monies for handicap students was actually spent in the program for which it was designed. The State staff person worked closely with the local education agency in obtaining equipment and services directly related to the student.

b. Exemplary Programs

Five exemplary programs were developed directly related to identifiable student problem areas. These programs varied from drop-out work experience in large urban centers to a total school non-graded program in a local village. These programs above all else proved our previous point that in local districts where educators want to become involved, the programs perform a great service; but where community is less than totally involved, the program is just a stop gap one shot deal.

The Council recommends that the State staff continue its development of exemplary programs until all vocational programs are at this stage. This is primarily accepting the student at whatever level and give him adequate employable skills to experience self-realization.

c. Homemaking and Consumer

Homemaking and Consumer education did not have a supervisor during fiscal 1970. This was partly due to the fact that the 1968 Admendments allocated less than $20,000 for homemaking education. Therefore, when the Homemaking supervisor resigned, no one was immediately hired to take her place. The State is very fortunate that the programs did not deteriorate; however, this can be attributed to the rest of the supervisory staff which took up the promotion of homemaking education whenever possible. It was through them and the State administrative staff that the great need for homemaking and consumer education was identified, and a State supervisor was employed for fiscal 1971 with a substantial increase in budget.

d. Business Education

Business education has proven to be one of the outstanding secondary vocational programs in the State. Utilizing all available resources

each program is now using either cooperative or simulated work experience in its training.

We recommend that within fiscal 1971, the program will be greatly expanded into adult and post-secondary programs as well. The great need for tourism and mid-management training has been well identified, and with the increased post-secondary budget, we anticipate this program development will become a reality.

e. Industrial Education

Industrial education still remains our one area of critical development. The hiring of a well qualified supervisor has helped immensely. During fiscal 1970, the Division worked diligently in breaking down common misunderstanding between Industrial Arts and Industrial Education. They stopped funding nice to have programs in one hour block sequences, and developed programs in two and three hour blocks designed on known employment opportunities identified by the "Manpower Outlook for the 70's." Using the cost accounting approach to program development, the industrial education programs have grown from 35 in fiscal 1969 to 75 in fiscal 1970,

The Council recommends that greater emphasis be placed on developing cooperative, innovative, and post-secondary industrial programs to meet the training needs of our expanding industrial growth. That two additional supervisors be hired: one for Industrial Arts, and one for post-secondary vocational education, so that the industrial program can develop continuity from elementary through grade fourteen.

Impact of Vocational Education

During its evaluation, the Council was pleased with the growth of Vocational Education in fiscal 1970. However, there should be a greater acceptance of responsibility by local school administrators in meeting specific educational needs of students who are not benefitting from the conventional educational offering. Administrators should use their leadership to identify the needs of these students and to bring about the development of curricula to overcome these educational deficiencies. The prevailing objective should be to aid each student in developing his full potential and to provide each with a salable skill sc that he will become a contributing member of society.

The Council found several schools that were releasing their students after 1:00 p.m. so as to eleviate overcrowded classrooms. It appeared to the members that the schools should increase their vocational offerings, so that the students would receive at least three hours of additional training and supervision to enrich his human resource capabilities.

In the Council's evaluation of post-secondary programs, it was quite evident that the Alaska community colleges are undergoing a transistion stage from traditional junior college programs to actual community programs. Again we would like to recommend that the State staff be increased to include a post-secondary supervisor to assist in this transistion.

It has come to the attention of the Council that a number of the schools have not participated in vocationally approved programs because it wasn't administratively expedient. Some progress was made in this direction during fiscal 1970. The Council recommends that the State plan more program development time in the districts that experience scheduling difficulties. This is one of the reasons that earlier in this report the Council recommended a proposal that a unified system of vocational guidance and counseling be developed with Instructional Services. The Council sees this as primarily a selling job of getting secondary school administrators and guidance personnel to offer a realistic program to meet the needs of all students, instead of being just college entrance oriented.

Evaluation of Programs

Local schools should make a more concerned effort in the follow-up of former students. The State staff has taken steps to assist in solving this problem. However, the primary information resource will have to provide the raw data for processing.

The program evaluation conducted by the State staff has been a great assistance to the Council in evaluating the established goals of the State Plan. Local educational agencies should also solicit additional assistance from the Division of Vocational and Adult Education which has available documented research concerning every area of the State as to human resource needs, industrial needs projected to 1980, the twenty-five most needed employment areas, etc. to meet their specific needs.

The Council recommends that the State staff make a continuous self-evaluation with respect to its effectiveness in meeting the changing needs of vocational and adult training.

It was agreed that support should be given to the philosphy that vocational and adult education programs and services provided at the post-secondary level should be the primary responsibility of these institutions rather than of institutions granting the baccalaureate degree.

Employnent Opportunities

Actien taken by the Division of Vocational and Adult Education in initiating the "Manpower Outlook for the 70's" was most commendable.

valuable tool not only to educators, but to economic development, Department of Labor, industry economists, and others throughout the State. The research program should be continued and focus upon improvement and refinement of data for future publications.

The local and state educational systems should utilize this information to provide programs to guide young people into areas of high vocational need and to prepare them for the identified job openings in their area and throughout the State.

Public schools must evaluate and follow up the placement of students inorder to further justify a training program. If students are not being placed in their area of preparation in a justifiable number, then taxpayers should not be asked to provide the training.

Post-secondary institutions should reflect a broader curriculum to meet the specific needs of industry in all major sections of vocational education. Special consideration should be given to economic projections, and new or emerging technical occupational areas. Enrollments in vocational education have grown steadily since 1965-70 period, along with a corresponding increase of State and Federal leadership. Vocational enrollments indicate a shift to training in the growth occupations which is a strong indication that planning has been carefully following economic projections of the labor market. The planning will need to be continued.

A study should be conducted to determine the feasibility of area vocational centers for our large rural population. These centers should include diagnostic services, extensive guidance, occupational orientation, adult training, and extensive comprehensive vocational and academic education programs. Each rural student is entitled to an equal opportunity for vocational training regardless of his geographical location.

Suggested Guidelines

The educational system which is ultimately designed and established in the State of Alaska must provide vocational education K-14 and include continuing skill development programs for adults.

It was further decided that Adult Basic Education, and General Education Development Programs do not meet the needs of drop-out students. A State supported system of adult education needs be developed which would allow for continuing education based on individual achievement needs.

Specific Consideration

a. A statewide system of vocational guidance and counseling must be developed in the near future.
b. A greatly expaned in-service and pre-service teacher education program needs to be developed inorder to maintain our high quality of program development.
c. A teacher education program for training vocational school administrators needs to be developed.
d. A greatly expanded post-secondary program needs to be developed to meet the growing needs of our graduating secondary students.
e. All vocational programs must meet the new criteria as outlined in the 1968 Vocational Admendments.

VT 012 496
ANNUAL REPORT.

RHODE ISLAND STATE ADVISORY COUNCIL FOR VOCATIONAL AND TECHNICAL EDUCATION, PROVIDENCE.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - JUN70 9P.

DESCRIPTORS - PROGRAM PLANNING; *STATE PROGRAMS; *VOCATIONAL EDUCATION; *PROGRAM EVALUATION; ADVISORY COMMITTEES; ANNUAL REPORTS
IDENTIFIERS - RHODE ISLAND

ABSTRACT - THIS REPORT SUMMARIZES AN EVALUATION OF RHODE ISLAND'S VOCATIONAL PROGRAMS AND SERVICES. RECOMMENDATIONS ARE MADE TO IMPROVE PROGRAM PLANNING, VOCATIONAL GUIDANCE, STATE ADMINISTRATIVE STRUCTURE, AND IDENTIFICATION AND EDUCATION OF THE DISADVANTAGED. (BH)

VT 012 496

STATE OF RHODE ISLAND

ADVISORY COUNCIL ON VOCATIONAL EDUCATION

ANNUAL REPORT

JUNE, 1970

VT012496

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
STATE AGENCY FOR ELEMENTARY AND SECONDARY EDUCATION
ROGER WILLIAMS BUILDING
HAYES STREET, PROVIDENCE, R. I. 02908

WILLIAM P. ROBINSON, JR.
Director

August 1, 1970

Honorable Dennis J. Roberts, Chairman
Board of Regents for Education
405 Industrial Trust Building
Providence, Rhode Island 02903

Dear Governor Roberts:

Attached for your information is a summary of the State Advisory Council's annual evaluation report of vocational-technical education in Rhode Island. Such a yearly assessment of the State's overall training effort is required by provisions of Public Law 90-576.

The study and analysis of our State-wide program, which provided a basis for the report, was conducted during the spring of this year by the American Vocational Research Corporation under contract with the Council.

Should you have any questions or require further elaboration on factors considered by the researchers, please contact me.

Sincerely yours,

William F. Carroll, Jr.

William F. Carroll, Jr.
Chairman
Rhode Island Advisory Council
on Vocational Education

Enclosure

WFC/ljn

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THE FIRST ANNUAL REPORT

ON

VOCATIONAL EDUCATION

The State of Rhode Island's Advisory Council on Vocational Education was established as recommended by the Vocational Education Amendments of 1968. Members, selected by the Governor, have varied backgrounds and experience so as to best fulfill the broad functions and responsibilities of the Council.

A specific obligation of this group is to conduct an annual evaluation which assesses the effectiveness of the State's vocational programs, services, and activities and recommends such changes as may be warranted by the evaluation.

This is a summary of the Council's evaluation report. It is based on research conducted for the Council by the American Vocational Research Corporation. The researchers in analyzing status of the State's Vocational Education Program have incorporated with their findings the reactions and opinions of various skilled, experienced persons directly or indirectly involved in the program.

Five primary factors were considered and are presented in this report. They are:

I. Extent and Direction of the Vocational-Technical Education Program

II. Vocational Guidance in Rhode Island Public Schools

III. The Disadvantaged and Minorities in Rhode Island

IV. State Organization and Administration

V. Vocational Training of Special Populations

I. Extent and Direction of the Vocational-Technical Education Program

Growth in secondary vocational education enrollments in the State is occurring at a rate double that of secondary enrollments as a whole. The 1969 vocational enrollment of 12.7% tends to indicate the State's objective of 14.2% will be achieved in 1970 despite delayed expansion caused by late federal appropriations. The long-range goal of 20.5% enrollment by 1974 may be realistically anticipated.

The post-secondary vocational enrollment projections appear to be somewhat high although program expansion will receive a striking increase providing the Blackstone Valley Campus becomes a reality in 1974 as planned.

An unusual opportunity to coordinate economic, social and vocational education planning and to actively seek involvement of disadvantaged and handicapped students in the expansion process will exist in the State during the coming years.

Manpower Development and Training Act programs are of exceptionally high quality in terms of instructors, equipment, student reaction and efficiency, and are succeeding in educating and training hard-core disadvantaged individuals. Keys to this success appear to be the integrated pre-vocational training and highly individualized teaching methods.

Recommended that:

1. More comprehensive labor data be developed so that output and enrollments can be related to actual labor needs, thus insuring that graduate placement will be possible and that vocational program direction is in agreement with economic planning.

2. Increased attention be devoted to serving the disadvantaged and handicapped population with special attention to the needs of the minorities.

3. Post-Secondary vocational enrollment projections be continually reviewed to determine whether they may be high in light of contingencies affecting facility construction.

4. Consideration be given to developing a reporting system to include all enrollments in vocational programs regardless of whether such programs are federally supported.

5. Manpower programs be expanded especially in areas having large disadvantaged and economically depressed populations.

II. Vocational Guidance in Rhode Island Public Schools

Rhode Island has devoted considerable resources to insure the availability of adequate counseling services for its vocational-technical high school students. The State has already achieved the commendable ratio of one guidance counselor assigned to each 252 vocational students and is striving to further improve this ratio through its direct support for counselor salaries.

Desirable ratios, however, is but one of several factors influencing the effectiveness of any guidance program. Many significant improvements remain to be accomplished in the immediate future if the State is to maintain its commitment to the highest possible quality guidance services available to all of its vocational students.

Recommended that:

1. Adequate procedures be adopted to insure a suitable matching of an individual student's characteristics with a specific occupational program.

2. Counselor-student contact be increased to assist students in establishing realistic educational and/or occupational plans.

3. More effective dissemination of auxiliary guidance media and materials be established.

4. Coordination be improved for those guidance activities which are shared by teachers and counselors, such as: job information, placement, and follow-up.

5. Orientation effort be expanded to acquaint school personnel and others with the types of services carried on by the vocational facility and the guidance program.

6. The vocational guidance program be extended to reach students in the sixth and seventh grades.

7. In-service programs be introduced to improve competencies of all guidance personnel in the area of vocational counseling.

III. The Disadvantaged and Minorities in Rhode Island

The concept of the disadvantaged is relatively new in our society. It is, therefore, not surprising that there is little agreement on definition of the concept. Two questions are often raised regarding the population of the disadvantaged. They are: 1) Who are the disadvantaged, and 2) How many people in the population under consideration are disadvantaged?

By "Disadvantaged" we mean those who through poverty, misfortune, or discrimination are deprived of adequate food, shelter, and clothing, of medical care and education, of meaningful work which can lead to self-realization, and of full participation in all the humanly enriching activities our society has to offer.

Of the 24,830 individuals defined by the Department of Employment Security as disadvantaged, 23,136 or about 84% were represented to be employed full-time but with a family income set below or at the poverty level. Included in these figures are a large number of minority persons which in 1965 comprised 25,000 or about 4% of the total population of the State. Of this total 60% are concentrated in the City of Providence.

It is in the best interest of Rhode Island to see to it that the disadvantaged and members of minority groups get into vocational education programs so that they may broaden their career opportunities.

Recommended that:

1. The State Department of Education, Vocational Division, maintain a collection of data on the social, economic, and racial characteristics of students enrolled in the vocational programs of the State.

2. Teachers, guidance counselors, administrators and paraprofessionals from minority groups be employed by the Vocational Division and the local education agencies in order that these persons may serve as "psychological models" for disadvantaged, low income, and minority group youth and adults.

3. The evening vocational education program in the inner-city of Providence and in other cities be expanded so that socially and economically disadvantaged youth and adults may be trained and retrained for existing and new careers.

4. The Vocational Division and the Local Education Agency seek out members of minority groups as "contact" people to communicate with members of these groups.

IV. State Organization and Administration

At the present time Rhode Island is moving forthrightly in the expansion and improvement of vocational-technical programs to meet the needs of all citizens. The policy of establishing area vocational facilities in selected comprehensive high schools and junior colleges is well suited to Rhode Island's particular situation.

Recommended that:

1. The Division of Vocational Education be reorganized in accordance with the explicit purposes and functions of the Vocational Education Amendments of 1968, (P.L. 90-576). A new organization of this kind would require a one or two year phase-in and intensive, in-service training of present staff members.

2. A continuous vocational education leadership development program be instituted providing for recruitment and training of young potential leaders and including a period of internship at area schools operated by experienced, successful coordinators.

3. The present salary schedule of division staff members be analyzed in the light of comparable salaries at the local level and in similar or neighboring states with a view toward improving the recruitment and retention of qualified and competent staff.

V. Vocational Training of Special Populations

The following special recommendations are presented concerning the vocational education needs of disadvantaged and handicapped persons.

Recommended that:

1. Existing Vocational and Technical Schools be utilized to accommodate special populations.

2. Existing Vocational and Technical curriculums be modified to meet the needs of special populations.

3. Specialized supervisory staff be employed and reorientation of existing staff be accomplished to meet the needs of special populations.

4. Public School enrollment data relating to the handicapped be obtained and included in evaluation reports.

VT 013 089
ROVNER-PIECZENIK, ROBERTA
PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION.
A PROGRAM EVALUATION.

NATIONAL COMMITTEE FOR CHILDREN AND YOUTH,
WASHINGTON, D.C.
MANPOWER ADMINISTRATION (DOL), WASHINGTON,
D.C.
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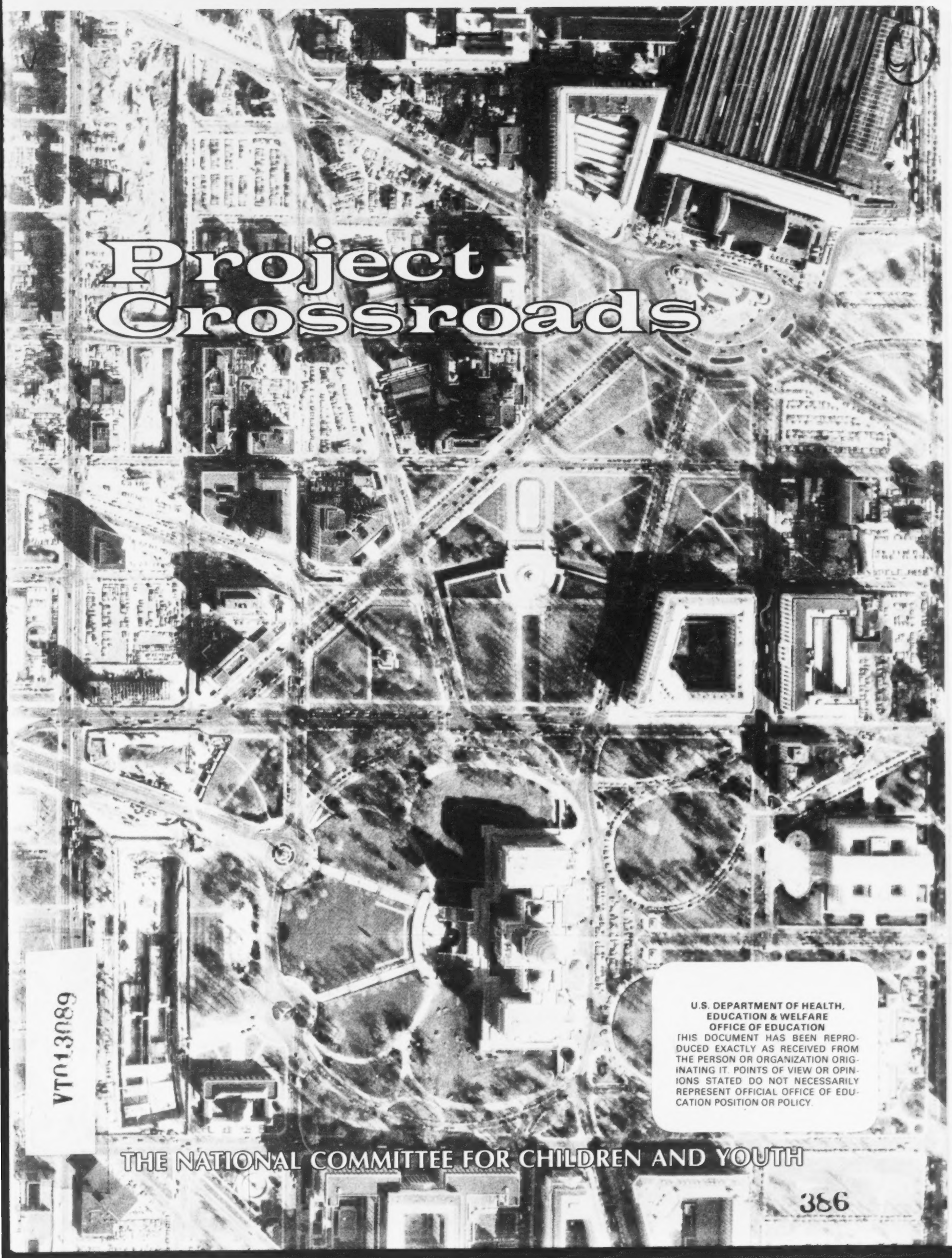
DEVELOPMENT; *JOB PLACEMENT; *PROGRAM
EVALUATION; PROBATIONARY PERIOD; CORRECTIONAL
REHABILITATION; RECIDIVISM; OUT OF SCHOOL
YOUTH; PRISONERS; SUCCESS FACTORS
IDENTIFIERS - PROJECT CROSSROADS

ABSTRACT - THIS REPORT EVALUATES A
DEMONSTRATION PROJECT IN WHICH A 90-DAY
PROGRAM OF COUNSELING, JOB PLACEMENT, JOB
TRAINING, AND REMEDIAL EDUCATION WAS PROVIDED
FOR YOUNG FIRST OFFENDERS. FOLLOW-UP OF A
SAMPLE OF PARTICIPANTS FOR ONE YEAR AFTER
TERMINATION OF THE PROGRAM PROVIDED THE DATA
USED TO DETERMINE THE PROJECT'S EFFECTS IN
TERMS OF EMPLOYMENT AND RECIDIVISM. THE
REPORT ALSO IDENTIFIES THE CHARACTERISTICS OF
SUCCESSFUL PARTICIPANTS. RELATED DOCUMENTS
ARE AVAILABLE AS VT 012 115 (ARM FALL 1971),
AND VT 013 088 AND VT 013 090 (ALSO IN THIS
ISSUE). (BH)

VT 013 089

Project Crossroads



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THE NATIONAL COMMITTEE FOR CHILDREN AND YOUTH

386

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NATIONAL COMMITTEE FOR CHILDREN AND YOUTH

PROJECT CROSSROADS AS PRE-TRIAL INTERVENTION

A PROGRAM EVALUATION

By

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Contract #82-34-68-15

DECEMBER 1970

This report on a special manpower project was prepared under Contract Number 82-34-68-15 with the Manpower Administration, U.S. Department of Labor, under the authority of the Manpower Development and Training Act.

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Foreword

An essential element in any experimental and demonstration (E & D) effort is the evaluation and analysis of what has taken place. The interpretation of the facts and materials gathered is particularly important when policy decisions are being made. The impact of the services on participants, their reactions and achievements must be recorded and evaluated clinically as well as the limitations that become apparent, whatever they may be, if the effort is to have meaning. This is a difficult task in any project and requires not only academic qualifications but also the ability to work with and understand people of widely differing backgrounds and orientation. We were fortunate in being able to include such a person as a member of our team.

The study written by Mrs. Roberta Rovner-Pieczenik raises questions, suggests actions, and makes a valuable contribution to the knowledge we must possess if we wish to better understand the dynamic factors underlying the economically motivated law violations of youthful offenders. They relate to the employment problems, job expectations and the desire of youth to become useful and productive, a goal increasingly difficult to achieve for those without resources and lacking the supportive assistance of interested persons at a critical time in their life.

Leon G. Leiberg
Project Director

TABLE OF CONTENTS

		Page
Foreword		v
I.	INTRODUCTION	1
II.	THE METHODOLOGY OF ASSESSMENT	3
	Record Keeping	3
	Selection of Crossroads Sample	4
	Follow-up Information	5
	Control Sample Selection	5
	Statistical Significance	6
	Summary	6
III.	PROJECT IMPACT ON EMPLOYMENT	7
	The Project Participant--A Profile	7
	The Employment Variable	9
	Employment at Project Termination	9
	Employment After Termination	12
	Summary	14
IV.	PROJECT IMPACT ON RECIDIVISM	15
	Note on First Offender Adult Status	15
	Disposition of Original Charge for Adult Sample	15
	Adult Recidivism	17
	Juvenile Recidivism	19
	Summary	20
V.	"PREDICTING" SUCCESS IN CROSSROADS	21
	Indicants of Favorable Project Termination	21
	Indicants of Recidivism	24
	Recidivism of the Favorably Terminated	29
	Summary	31
VI.	IMPLICATIONS OF PROJECT FINDINGS	33
	The Research Component	33
	The Employment Component	35
	The Counseling Service	35
	Differential Services	38
	Conclusion	39

I. INTRODUCTION

Statistically, crime in society increases each year. The criminal justice system, faced with crime it hasn't prevented and criminals it hasn't deterred, has proven limited in its ability to respond with speed, flexibility and relevance to the increased demand on its services. Juvenile and adult courts, already overburdened with the task of dispensing "justice" on a daily basis, represent one focal point in the administration of justice at which innovative experimentation should be encouraged.

Three years ago, in 1967, few alternatives were available to the courts in Washington, D.C., for the handling of criminally accused individuals--other than processing them, according to statute, from initial hearing to final disposition. Since then, Project Crossroads has experimented with and demonstrated the feasibility of working with the court and its personnel to provide a pre-trial intervention alternative for youthful first-time offenders. As a manpower approach to the rehabilitation of accused offenders prior to adjudication, a variety of intensive pre-trial manpower services was offered to approximately 800 participants.

Phase I of Project Crossroads bore the responsibility for:

1. Working with and obtaining the acceptance, support and cooperation of the police-court system in Washington, D.C., for a joint endeavor.

2. Utilizing "new careers" personnel as line staff: paraprofessionals, individuals with previous criminal records, community volunteers, VISTA volunteers.

3. Maintaining ongoing relationships with other social supportive services in the area, to achieve a coordinated attack on problems of employment, education, welfare, etc.

A descriptive summary of the project, including problems encountered and recommendations for future projects, is found in the Final Report for Phase I. Phase II, which continued project operations for another year and a half, was charged with the responsibility of providing an assessment of the impact of the project's services on its participants, specifically in the areas of recidivism and employment. The present paper attempts to provide such an assessment by analyzing quantitative information gathered in the course of project operations.

Project Crossroads, working closely with both the Juvenile Court and Court of General Sessions, provided a 90-day community-based program of manpower services--including counseling, job placement, job training and remedial education--to young men and women in the pre-trial stage of the criminal court process. Project participants had to meet the general criteria of:

1. 16 to 26 years of age,

2. no prior conviction record in that court,

3. unemployed, underemployed and/or tenuously employed or school enrolled,

4. charged with a crime specifically defined and accepted by both the court and the project.

The court, in supporting this endeavor, agreed to consider a "nol pros" of the charges pending against any project participant who was terminated with a favorable recommendation by the project after the successful completion of the three-month program. Alleviation of congested court calendars and flexibility in case processing were foreseen as relatively immediate benefits by the introduction of a pre-trial diversion program into the District of Columbia court system. Longer-range benefits anticipated, in addition to the reduction of costs incurred in the prosecution, detention, trial and incarceration of individuals 'processed" in the usual manner, included altering the image of the courts in the eyes of the accused and the community. It was the hope of all concerned that the court, in its willingness to aid the individual by providing him with a non-punitive opportunity for rehabilitation, would come to be viewed as an institution interested in the individual and oriented toward the treatment approach to crime prevention. The participant, for his part, was provided an alternative to a permanently recorded label of "delinquent" or "criminal," as well as an avenue through which to gain a foothold in the legitimate opportunity structure of society. Society and the community, of course, would benefit from more and better equipped men and women in its labor force as well as from a decrease in the number of potential recidivists. In short, the opportunity for mitigating some negative by-products of present-day routine case processing and replacing them with a relevant program of intervention and rehabilitation was seen as advantageous to all concerned.

Although sufficient time has not elapsed for a full assessment of long-term goals, the present paper explores the following questions:

1. What impact has Project Crossroads made on the court adjudication of its participants?

2. What are the measureable results of Project Crossroads in the spheres of participant recidivism and employment?

3. What are the characteristics of project participants who achieve "success" by Project Crossroads standards?

According to the April 1970 Report of the President's Task Force on Prisoner Rehabilitation, a need was stated for programs which could divert an offender from adjudication and incarceration. Specific recommendations of the Task Force included:

1. Community facilities to provide pre-adjudication services to defendants and information about defendants to prosecutors and judges, with the object of diverting as many defendants as possible from the full criminal process;

2. An experimental program to determine the effectiveness of pretrial counseling and supervision of defendants, and of deferred adjudication of certain defendants.

The report also endorsed the community-based program and the use of ex-offenders as staff for these programs.

Project Crossroads, under a grant from the Manpower Administration in 1968, began implementation of some of these recommendations to the President. The present paper utilizes quantitative data abstracted from case records in an attempt to evaluate one pretrial diversion program. Statistics utilized in this report suffer all the limitations of court and police statistics. Furthermore, this type of analysis exaggerates the importance of variables which are readily quantifiable, at the expense of more qualitative information. Throughout, the purposes of an experimental and demonstration project must be kept in mind--and these differ markedly from the pure research undertaking.

II. THE METHODOLOGY OF ASSESSMENT

The Research Component

In order to quantitatively assess the impact of Project Crossroads, a research consultant was added to the staff four months into Phase II of project operations.[1] Her task was to familiarize herself with the project in order to propose the necessary steps to be taken prior to program evaluation. To accomplish this, time was spent observing the daily activities of the staff and interviews were conducted with all staff members. Existing data recording and retrieval techniques were surveyed. An assessment of the project was proposed after the researcher felt she understood the project's philosophy, grasped the program on an operational level, and caught the "feeling" of the office.

Unfortunately, the introduction of the researcher at this late point in project operations resulted in some staff suspicion and resentment. The suspicion appeared related to the staff's concern that the researcher had been hired to "check up" on their work habits. Resentment was incurred with staff realization that the use of revised--and in some cases additional--data-recording forms "imposed" by an outsider would increase their workload. Although most of the staff were in agreement with the research purpose and the need for an evaluation and assessment of the project, they agreed only reluctantly to alter some of their procedures. All changes instituted were worked out only after close consultation and compromise between the staff and the researcher. The late date prohibited anything but minor alterations in data recording and gathering.

The racial difference between the researcher and the overwhelming majority of the staff did not appear to pose problems for the research task, nor was any posed by the limited verbal and literary skills of some of the paraprofessional staff. The major problem encountered was the manner and timing of the introduction of the research component into the project. Recommendations for building the research component into future projects will be discussed in the last section of this report.

Record Keeping

The initial review of data-recording forms utilized by the staff revealed some deficiencies in relevant information and a lack of coordination in information across staff divisions. Of necessity, keeping in mind the limitations of time, the purpose of an experimental and demonstration project, and the problems inherent in the late introduction of the research component, all changes in forms were kept to a minimum and represented compromises between the staff and the researcher.

The Intake Record, a detailed background information questionnaire administered during a participant's initial counseling interview, was left in its original form. The participants' Employment and Job Placement record was revised to more readily reflect changes in a participant's employment status as well as fluctuations in the job market. A Participation Termination Form was initiated to summarize project services rendered the participant during his tenure with the project. A Participant's Evaluation Form was developed for the purpose of viewing the project through the eyes of the recipient of its services. In addition, weekly and monthly supervisors' reports were more finely detailed. The most significant change, for evaluative purposes, was the revision of the project's Follow-Up Interview Form.

In retrospect, after use over a seven month period, some forms have proven more workable than others. Their major improvement over preceding ones was that they were more directed towards the goals and questions of a final evaluation. The major problems uncovered in attempting to institute change at such a late date were the staff's perception

[1] Phase I of the project ran from January 1968--May 1969; Phase II from May 1969--September 1970.

of their role as being people-oriented and not paper-oriented (although this dichotomy is not an absolute one), and their belief that qualitative experiences cannot be transformed into quantitative data. To overcome these problems in future projects, researchers must work closely with program staff from the start of the project.

Ironically, most of the data utilized in this report have been taken from "old" forms. Since the final evaluation had to be completed by project termination in September 1970, the requisite follow-up data could be collected only on those participants who were enrolled in Project Crossroads during Phase I and the early months of Phase II. The submission of a final report two or three months after project termination would have altered this situation considerably.

Selection of the Crossroads Sample

The data on which the assessment of Project Crossroads is based was taken from a systematic sampling of closed case files. An important determinant of the sampling timeframe was whether follow-up information was available for at least a six month period after Crossroads termination. For both the adult and juvenile sample, case sampling began with participants who entered the program shortly after its inception, and sampling concluded at the mid-point of Phase II. In all, a sample of 157 adult participants and 123 juvenile participants was drawn; these numbers represent 34% of the adult population and 42% of the juvenile population. These sample sizes were considered large enough to permit anticipated stratification by relevant variables (e.g., sex, age, status on termination from the project). Since a stratified sampling technique was not employed at the outset, the adult sample drawn was compared ex-post facto with the adult population on proportions of favorably and unfavorably terminated participants--a variable of importance in later calculations. The adult sample contains a slightly lower proportion of favorably terminated participants (as compared to the total project adult group), which has the effect of lending a conservative estimate to positive findings within the body of the report. A similar comparison for the juvenile sample was not undertaken, since a policy decision had been made not to quantitatively evaluate the juvenile component of the project.

After sample selection, a code was devised for abstracting data from the case record forms. The coded information was then transferred to IBM punch cards and appropriate questions were put to the computer.

Adult Sample

An original adult sample of 157 was selected by taking every second case involved with the project between September 1968 and November 1969. The statistics which follow, however, are based solely on a follow-up group of 134, taken from the original 157, each of whom had been terminated from the project for at least six months. Computer runs comparing the original sample with the follow-up sample showed them to be similar on major variable distributions. Although this final sample has the bias of including only those participants who were reached for a follow-up interview (which might appear as a favorable bias for the project), the fact that the sample includes a higher proportion of unfavorably terminated participants than is present in the population tends to negate this bias.

Juvenile Sample

The decision was made by the project director that case information on a juvenile sample--other than recidivism information--would not be coded and assessed. Problems encountered in working with the Juvenile Court, as well as in the labor market, accounted for this decision and are discussed elsewhere in the final report.

Follow-Up Information

Adults

Follow-up interviews on the adult sample were conducted at approximately three-month intervals for one year after project termination--in theory. In fact, some participants were contacted for their first follow-up anywhere between three and twelve months after termination. Although this does not necessarily bias the results, the follow-up methodology employed forced the researcher to abandon plans for chronological trends.

While it was felt by the project counselors that most of the information requested on the follow-up interview was of a non-threatening nature, and as such the validity of the responses would not be questionable, the decision was made to omit a question on rearrest and to check recidivism through the files of the Washington Metropolitan Police Department. Unfortunately, information on dispositions was not readily available from police records, nor was there the means of checking nearby districts of Maryland and Virginia for offenses committed outside of Washington city boundaries.

Many of the follow-up interviews were conducted by anyone who had knowledge of the participant. While the use of VISTA volunteers for this task was expedient, this approach always runs the risk of lowering the validity and reliability of responses.

Juveniles

Follow-up recidivism information for a systematically selected sample of juvenile participants was obtained from the Research Division of the Juvenile Court in Washington, D.C. Arrest histories were traced for a year after project termination; those individuals who turned 18 years of age were checked in the adult police files.

Control Sample Selection

A control sample of adult and juvenile offenders was selected as a yardstick against which project participants could be compared. The control samples were taken from court records using the same criteria utilized to select Crossroads participants: age, charge, and first offender status. Since this sample was not chosen along with the participant population, selection was from records of individuals who were eligible between one and six months before the project began. Geographical mobility coupled with false and incomplete information on court records made it impossible to locate these individuals. The only information possible to gather on this sample turned out to be information on recidivism--through official police records. It is the researcher's opinion that if a control sample is considered relevant to future projects of this nature, forethought is necessary in its selection and follow-up.

Adult Control

The records maintained by the D.C. Bail Agency were considered most relevant for the purpose of selecting an adult control group. They included information necessary for control sample selection and were stored to facilitate selection. A control sample of 107 accused offenders was selected systematically from all offenders seen by the court one to six months prior to Crossroads who met project acceptance criteria. A drawback in selection by this method was that only group similarities exist in comparing the control and project samples. On the other hand, there is no reason to believe that this group, coming into the courts earlier than project commencement, differed on any significant variable from the participants.

Adjudication and disposition information on the original charge was taken from the register of the clerk's office in the Court of General Sessions. Recidivism was checked through the police department in the same manner as for project participants.

An ex-post facto stratification of the control sample revealed too few 18- and 19-year olds in comparison with the participant sample. Since age appears to play an important role in participant recidivism--not realized until after assessment of the data--our control group might well have been stratified on this variable beforehand.

Juvenile Control

The decision to exclude a complete quantitative analysis of the juvenile participants limited data collection for juvenile controls. In order to compare recidivism rates, the Research Division of the Juvenile Court, using a systematic sampling technique, selected a group of 123 accused delinquents who appeared before the court between one and six months prior to project commencement and who fit project criteria for enrollment. As was the case for project participants, case records were checked for a period of 15 months, going into adult records when necessary.

Statistical Significance

The data reported in the body of this paper have been subjected to tests of statistical significance (chi-square). It was found that the decrease in participant recidivism over a 15-month period and the increase in steady employment and wages over the same period were of statistical significance (to the .05 level). Thus, Project Crossroads appears to have been successful not only in proving its concept operationally feasible but also in producing socially significant changes.

Exactly why these changes resulted is difficult to determine. Many of the variables which are related to success in the project are overlapping and appear in clusters. For example, increased age is related to success; but steady employment is related to age. Thus, a constellation of overlapping social variables--and the exclusion of others which might prove relevant--result in findings difficult to interpret via statistical tests. Whenever warranted, though, simple cross-tabulations were made in an attempt to understand the clustering effect. It was felt that a multivariate analysis necessitated a larger sample than was drawn.

It is the researcher's opinion that social policy planning for future projects similar to Crossroads should not necessarily be based upon the results of statistical tests. For example, whether or not test results prove significant, the fact that an increase in wage occurred, from $1.75 to $2.25 per hour for successful participants, has meaning from a planning point of view. While the tests were applied to the data as a routine evaluative measure, their value for program planning is, at best, unclear.

SUMMARY

The experimental and demonstration aspects of Project Crossroads have been reviewed in previous reports. The addition to the staff of a research consultant during Phase II of project operations was to provide for the assessment of quantitative data in the areas of court adjudication, recidivism and employment. This entailed an ex-post facto construction of a design for evaluation which would attempt to answer questions initially posed by the project. The analysis which follows assesses selected areas of program operation and highlights implications of this program for future efforts.

III. PROJECT IMPACT ON EMPLOYMENT

The Project Participant--A Profile

The researcher has decided to avoid a lengthy discussion of the characteristics of the project's participants, per se, except where they are relevant to the project's evaluation. There is little doubt that in many ways Washington is similar in its social, economic, health, education, and crime problems to most other large American cities--compounded by issues of race and politics. In reference to crime and delinquency, in particular, the etiology of such behavior has been speculated upon and researched by everyone from social scientists to geneticists. Yet, it is interesting that very little space in the concluding volume of the President's Report on Law Enforcement and the Administration of Justice is devoted to the accused offender; little more than reference to the poverty of the courts' "clients."[2]

The little information on the accused given us by The Challenge of Crime in a Free Society[3] cites the city offender of street crimes as overwhelmingly male, black and living in an urban slum. The findings of Project Crossroads are essentially in agreement with this statement. Other characteristics of Washington, D.C., offenders accepted into the project are found in Table 1.

A reading of Table 1 reveals that most project participants, in addition to being male, black, and below 20 years of age, were born in Washington, D.C. Thus, an explanation of present date crime that attempts to place the burden of responsibility on recent migrants appears to be no more than myth for Washington, D.C. The relatively small number of high school graduates is also a revealing statistic. Although approximately 25% of our sample were still enrolled in school, not all could be expected to complete high school. Thus, the typical participant criminal offender is the high school dropout. The large number of accused individuals who are neither employed nor students (approximately 39%) at time of project enrollment tells us about the high proportion of "detached" individuals in the city. We shall note in a later section that many of these comprise the 18- and 19-year old age group.

TABLE 1. CHARACTERISTICS OF SAMPLE OF PROJECT CROSSROADS ADULT PARTICIPANTS ENROLLED BETWEEN SEPTEMBER, 1968 AND NOVEMBER, 1969

CHARACTERISTIC	PERCENT OF SAMPLE*
SEX	
Male	83.59
Female	16.42
RACE	
Black	85.82
White	12.69
Other	1.50

[2]WALD, Patricia, "Poverty and Criminal Justice," in Task Force Report: The Courts, U.S. Government Printing Office, 1967.

[3]The Challenge of Crime in a Free Society, U.S. Government Printing Office, 1967, p 44.

TABLE 1. CHARACTERISTICS OF SAMPLE OF PROJECT CROSSROADS ADULT PARTICIPANTS ENROLLED BETWEEN SEPTEMBER, 1968 AND NOVEMBER, 1969

MARITAL STATUS	
Single	82.09
Married	16.42
Other	1.50
BIRTHPLACE	
D.C.	62.41
Other U.S.	30.08
Other	7.53
AGE	
18-19	60.45
20-21	23.13
22-23	9.70
24+	5.97
Other	.75
LIVING ARRANGEMENTS	
1 parent only	55.97
Alone	14.18
Relatives	11.20
2 parents	8.21
Other	10.44
SOURCE OF SUPPORT	
Parent	47.76
Self	38.06
Other	14.18
HIGHEST GRADE COMPLETED	
9th or lower	15.59
10th	20.90
11th	26.12
12th (high school)	22.39
13th	6.72
Other	8.28
POSITION AT INTAKE	
No employment, non-student	38.81
No employment, student	17.17
Employed, non-student	38.82
Employed, student	8.21
PREVIOUS MILITARY--MALE	
No	87.50
Yes	12.50

*Total Sample is 134 Adult Participants.

To sum, the background of project participants is similar to that already characterized by sociologists, crime prevention commercials on television, and government commissions delving into problems of crime in the cities. The Crossroads participant is young, male, and black. He is living in a broken home. His main source of support is someone other than himself. He is a high school dropout. It is an assumption of the project that lack of skills, high school diploma, and unstable employment history makes him a likely recidivist--unless an intervening variable (such as a pre-trial diversion project) can alter or divert an already patterned course.

The Employment Variable

Project Crossroads was designed to serve "a person young enough to be amenable to intensive, short-term manpower services" and whose future would be enhanced by a diversion from routine court processes. The major supportive service offered a participant was employment and/or job training. Previous studies have pointed to the lack of job skills and the irregularity of employment as being related to criminal careers.

To employ individuals, and hopefully reduce recidivism, the employment division of the project worked with potential employers to develop jobs and uncover available openings, as well as with Crossroads participants for job/training referrals and placements. Approximately 50% of the Crossroads participants were placed in one or more jobs during their three-month enrollment. Participants received anywhere up to nine job referrals, although most were placed within the first, second, or third referral. Although 28 of the sample were placed in job training centers, only nine individuals completed a training program. The researcher's task was to assess the effectiveness of the project in terms of a participant's employment on a short- and long-term basis.

Project participants were relatively underemployed, unskilled and working for low wages, if working at all, when enrolled. Efforts of the employment division were aimed at "enhancing the productivity and employability of disadvantaged workers and directly aiding their job placement."[4] Thus, indicants of project success can be seen as decreases in unemployment over time, coupled with increases in wage and skill level. Short-term and long-range employment success will be reviewed in light of the goals of the project.

Employment at Project Termination

The employment service at Crossroads functioned to place an individual in a job with potential for mobility. Unfortunately, the reality of job openings and the skill level of the participants kept this goal in the realm of theory for many. Still, a short-term employment "impact" is noticeable when we compare relevant variables at intake and at termination from the project. Tables 2, 3, and 4 can be viewed as a summary statement of the short-range impace of employment services provided during Crossroads, and offer a comparison with a participant's pre-project status.

Table 2 reveals that at time of intake, approximately 56% of the participants were unemployed. Of these, almost two-fifths were both unemployed and out of school. In contrast, upon project termination, unemployment decreased to approximately 30%--which includes an unknown proportion who were enrolled in school. Perhaps the most significant comparison is that between favorably terminated participants and their project intake statistics. Here we find the employment percentage at termination (87%) to be twice as large as employment at intake (44%). Participants who receive a favorable termination from Project Crossroads are those who have been successful in obtaining and holding employment while enrolled. Although there may be a history of one, two or three job referrals before a successful placement, almost 90% of the Favorables are employed as they leave Crossroads. In contrast, only 10% of the Unfavorables were employed on termination.

[4]Set as a goal for the entire Manpower Division of the Department of Labor. Manpower Report of the President, U.S. Government Printing Office, March 1970.

TABLE 2. COMPARISON BETWEEN EMPLOYMENT AT INTAKE AND UPON TERMINATION FROM PROJECT CROSSROADS FOR ADULT PARTICIPANT SAMPLE

EMPLOYMENT STATUS	TIME OF INTAKE		TIME OF TERMINATION					
			TOTAL**		Favorable**		Unfavorable	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
YES*	59	44.03	88	70.40	85	87.64	3	10.72
Student	11	8.21						
Non-student	48	35.82						
NO	75	55.98	37	29.60	12	12.38	25	89.29
Student	23	17.17						
Non-student	52	38.81	125		97		28	

*Includes Both Full-time and Part-time Employment.

**Significant at the .01 Level (chi-square)

Wages also increased between intake and termination. Table 3 reveals increases, particularly in the $2.75 per hour and over category. Since the greatest increase is in the upper wage categories, wage increases cannot be attributable solely to increases in the minimum wage. For some participants, increases reflect increasing skill on the job and length of employment. This is particularly true for those individuals who were employed at intake and who did not find jobs through Crossroads. There is the strong probability that the project's assistance in having the charges against a participant nol-prossed, as well as providing less tangible supportive services, was a major factor in their employment success. For a number of Crossroads participants, steady employment was maintained for the first time, and, at a higher wage than in previous positions. It is interesting that for those participants who were employed during Crossroads, wages were not dramatically different for favorable and unfavorable terminations; wages after termination, in contrast, differ markedly between the two groups.

TABLE 3. COMPARISON BETWEEN WAGE AT INTAKE AND AT TERMINATION FROM PROJECT CROSSROADS FOR ADULT PARTICIPANT SAMPLE

AVERAGE PER HOUR WAGE*	TIME OF INTAKE		TIME OF TERMINATION					
			TOTAL**		Favorable**		Unfavorable	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
$1.26-1.75	67	55.37	47	45.63	40	44.44	7	53.85
$1.76-2.25	44	36.36	36	34.95	32	35.55	4	30.77
$2.26-2.75	9	8.26	11	10.68	10	11.11	1	7.69
$2.76+	1	.83	9	8.74	8	8.89	1	7.69

*Average Per Hour Wage is Estimated by the Use of Relative Weights Given for the Proportion of Time Worked in Particular Jobs During the Year Preceding Crossroads Intake and During Participation Period.

This goes along with our findings in Table 4: the skill level of employment for favorably and unfavorably terminated participants was relatively similar in all skill categories. While there was some improvement in skill level from intake, the project appears to have affected wages more than it did skills. No doubt, in certain cases, increased wages were concurrent with increased skills. Yet, it is more likely that the employment service avoided placing participants in the lower paying positions and made referrals to the higher paying jobs, without effective true skill change.

TABLE 4. COMPARISON BETWEEN SKILL LEVEL AT INTAKE AND AT TERMINATION FROM PROJECT CROSSROADS FOR ADULT PARTICIPANT SAMPLE

SKILL LEVEL	TIME OF INTAKE		TIME OF TERMINATION					
			TOTAL**		Favorable**		Unfavorable	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Unskilled	37	61.66	57	50.00	47	48.96	10	55.55
Semi-skilled	19	31.66	40	35.09	34	35.42	6	33.33
Skilled	4	6.66	9	7.89	8	8.44	1	5.55
Clerical-office	*	--	8	7.02	7	7.29	1	5.55

*Not Recorded.

We have not included any figures on percent of time employed during Crossroads, since this figure doesn't account for time spent in repeated referral interviews until "proper" placement was found. What the short-range employment statistics have shown is that participants terminating the project are more likely to be employed, in a higher skilled position and for higher wages, than they were upon entering the project. Because employment is by definition related to the final participant evaluation of favorable or unfavorable, perhaps a more meaningful indicant of project employment success is over the "long-range" period of one year following project termination.

Employment After Termination

Follow-up employment information was gathered on 134 participants.[5] Each participant had been away from the project for at least six months. Calculations based upon a full year's earnings and employment were estimated by weighted averages extended over a 12-month period.[6] It was the unanimous agreement of the Crossroads staff that employment information given by former participants in follow-up interviews would be valid. But a possible bias introduced through the follow-up interviews was that individuals who were reached for follow-up may represent the more stable population. Still, this does not undercut the fact that Project Crossroads might have been in some way responsible and supportive.

Participants were asked many questions regarding employment during follow-up interviews. Table 5 is quite revealing, comparing steady employment prior to and after termination from Crossroads. One year after project termination, over half of all the

[5]All results are based on the follow-up sample. It was found via cross-tabulations, that this group did not differ markedly from the larger sample on any relevant group characteristics.

[6]A more detailed explanation is found in the cost-benefit study of Project Crossroads.

participant sample had been employed for at least 80% of the year. This should be compared to the only one-third having been employed 80% of the year prior to project entrance. This gain in steady employment after project termination is really a gain for those favorably terminated; Unfavorables remain relatively unemployed.[7]

TABLE 5. COMPARISON OF ESTIMATED PERCENTAGE OF YEAR EMPLOYED PREVIOUS TO PROJECT CROSSROADS ENTRANCE AND PERCENTAGE OF YEAR EMPLOYED ONE YEAR FOLLOWING TERMINATION

PERCENT OF YEAR EMPLOYED*	ONE YEAR PRIOR TO PROJECT CROSSROADS		ONE YEAR AFTER TERMINATION					
	Time of Intake		Total**		Favorable**		Unfavorable	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
0- 19	31	23.14	41	30.61	24	23.09	17	56.68
20- 39	29	21.65	9	6.73	6	5.78	3	10.00
40- 59	19	14.19	5	3.74	3	2.90	2	6.68
60- 79	14	10.46	10	7.47	9	8.66	1	3.34
80- 89	6	4.48	12	8.96	10	9.62	2	6.68
90-100	35	26.12	57	42.54	52	50.00	5	16.67
TOTAL	134		134		104		30	

*Full- and Part-time.

**Significant at .01 level (chi-square).

To some extent, increased age is related to increases in percent of time employed: the older the participant, the more likely he is to be working for a greater percent of time both prior to and after termination from Crossroads. When we hold age constant, we find that 17% of the 18-year olds are employed over 80% of the year prior to Crossroads, while 39% of this group is employed over 80% of the year after Crossroads. And, when we account for increased age by comparing 20 year old "priors" with 19-year old "afters," we still find an increase in employment in the "after" group (17 percentage point difference). This appears to rule out increased age as a determining variable. Finally, while increases in educational attainment would be ordinarily expected to have an effect on employment status over a 12-month period, this is not a factor in the present analysis since only youths engaged in full-time employment are compared in the pre- and post-project periods. In short, increase in time employed over a period of one year following project termination appears related to services provided by Crossroads.

When we compare favorable and unfavorable terminations, the effects of the project are even more apparent: approximately 60% of those favorably terminated were employed for more than four-fifths of the year following termination, while only 23% of those unfavorably terminated were employed for the same period. Since recidivism and sentencing would not automatically lower an individual's percentage of time employed (the formula is based on time available for employment), we cannot attribute the difference to an individual's unavailability for employment.

[7]Since our early figures are estimates, having been arrested and/or sentenced does not spuriously deflate statistics. Estimates are based upon time available for work.

In short, we feel comfortable in our finding that enrollment in Project Crossroads and termination with a favorable recommendation is related to a substantial increase in steady employment over the year following Crossroads termination.

A check on the chronology of post-project employment reveals that for those favorably terminated participants who held jobs upon Crossroads termination, almost all were working in a non-Crossroads job within four months after Crossroads termination. Thus, we are led to believe that the routine of work, as well as such intangibles as self-confidence and increased aspiration derived from the Crossroads experience, tend to keep an individual employed after the official relationship with Crossroads is ended.

Wage increases parallel our employment findings. Although the estimated average wage per hour one year following termination is much higher than for one year prior to entrance, the increase falls to our favorably terminated group (Table 6). While only 6% of those employed prior to intake received over $2.26 per hour, approximately 33% of the favorable terminations were receiving this wage. No doubt, time spent on the job and inflation all have their part to play in increased earnings. The cost-benefit study will have more to say on this matter and will not be discussed here. Still, our comparison between favorably and unfavorably terminated participants leads us to believe that if natural changes (such as inflation and increased age) were important variables in this matter, they would have affected the unfavorably terminated group to a larger degree. If increased time employed contributes to higher wages, then Crossroads is to some measure responsible. In short, individuals who are considered "successes" in Project Crossroads, and terminate with a favorable recommendation, are more likely to be receiving higher wages for their work than are project "non-successes."

TABLE 6. COMPARISON OF ESTIMATED AVERAGE WAGE PER HOUR RECEIVED AT INTAKE AND ONE YEAR FOLLOWING PROJECT CROSSROADS PARTICIPATION

AVERAGE WAGE	WAGE AT INTAKE		WAGE ONE YEAR FOLLOWING PROJECT					
			Total**		Favorable**		Unfavorable	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
0-$1.00*	13	9.70	39	29.11	23	22.12	16	53.34
$1.01- 1.25	--	--	--	--	--	--	--	--
$1.26- 1.50	20	14.93	2	1.50	2	1.93	--	--
$1.51- 1.75	47	35.08	15	11.20	11	10.58	4	13.34
$1.76- 2.00	27	20.15	19	14.18	15	14.43	4	13.34
$2.01- 2.25	17	12.69	22	16.42	18	17.31	4	13.34
$2.25- 2.50	8	5.97	15	11.20	13	12.50	2	6.67
$2.51- 2.75	1	.75	6	4.48	6	5.77	--	--
$2.76- 3.00	1	.75	9	6.72	9	8.66	--	--
$3.01+	--	--	7	5.32	7	6.75	--	--
TOTAL	134		134		104		30	

*Comprised Mainly of the Unemployed.
**Significant at the .01 level (chi-square).

SUMMARY

The quantitative data on the employment of adult participants followed for a year after project termination reveals:

1. The percent of individuals employed at project termination is nearly twice as great as those employed at project intake.

2. Upon termination from Project Crossroads, wages and skill level of job performed had increased over measures taken at project entrance.

3. Project participants are more likely to be steadily employed during the year following project termination than prior to enrollment.

4. Wage comparisons reveal that increases occur after Crossroads termination--and these increases appear related more to job factors than non-job-related ones.

5. All positive findings are attributable to the group of favorably terminated participants.

These findings tell what one can expect from project participants in the employment sphere after termination. What it also highlights is the small group of unfavorably terminated individuals--those project "failures"--who will most likely continue to "fail" after project termination. The concluding chapter of this paper hopes to speak to the problems of this group.

IV. PROJECT IMPACT ON RECIDIVISM

A defendant before the criminal court is a "loser" in many ways. Perhaps his mere presence in the courtroom, a testimony to the fact that, guilty or not, he has not succeeded in avoiding the differential selectivity of police arrests, labels him a loser at the outset. If he is found innocent of the charges pending, or no action is pressed by the prosecutor, he retains a permanent arrest record. If he is adjudicated guilty or pleads guilty, he then acquires a conviction record and the imposition of a "rehabilitative" measure. His new label of "criminal" will then function to negatively influence his economic and social future.

We have already documented that Project Crossroads increases employment stability, wages, and skill levels for participants--specifically, for those who terminate with a favorable recommendation. In the present chapter we attempt to explore the impact the project has on variables related to the justice system (case backlog and factors of time, expense, and personnel) and the participant's "legal" future (police record and recidivism). Comparisons with a control sample have been made wherever relevant and possible.

Note on First Offender Adult Status

From a sociological perspective, as well as a rehabilitative one, the notion that the participants enrolled in Project Crossroads are first offenders is misleading. Technically, they have no previous adult conviction record in Washington, D.C. (any previous juvenile record not involving institutionalization for delinquency was disregarded). Realistically, the probability of an extensive juvenile record is high. In short, the "first offender" label is an artifical one, more meaningful for administrative purposes than for rehabilitative ones. Although this researcher is not impractical enough to negate the need for distinctions which keep a system operating, as one criterion for project acceptance it is more related to working with the court than it is to working with the participant. A true first offender at 19, 24, or 30 years of age, is a different person than the "first offender" under 18 years of age with an extensive juvenile delinquency history. In short, project entrance criteria should be rethought in terms of the rehabilitative, as opposed to the court administrative, function.

Disposition of Original Charge for Adult Sample

A number of adjudicatory alternatives are open to the individual charged in adult court: nol-pros (prosecution declined), dismissal for want of prosecution, acquittal, or guilty. The "nol-pros" category is desirable for the participant because it can (1) preclude a possible adjudication of guilty or involvement and consequent sentencing, (2) shorten court time, and (3) avoid the social and economic liability of a criminal record. The court's advantage in working with the project lies with the reductions in hearings and trials when a simple "nol-pros" decision can be made upon a favorable Crossroads recommendation.

When we look at Table 7, it is obvious that participants who terminated Crossroads with a favorable recommendation were nol-prossed three times as often as the control sample (99% versus 33%). Since this form of adjudication was consistent for approximately all of the Favorables, a closer look must be had at the Unfavorables. Here we find a similarity with our control sample. Less than one-third of the Unfavorables' cases are nol-prossed, although a relatively higher number of them than of the controls are subsequently dismissed or acquitted (15%). Although dismissal is a favorable finding for the defendant, court time has still been tied up in case processing. The probation, prison, and fine categories represent dispositions for guilt, which become responsible for approximately 34% (or more, since we have a large "unknown" gap) of those unfavorably terminated and 32% of the control group. Thus, the financial and managerial burden of rehabilitation via these techniques are necessitated for one-third of those controls and unfavorably terminated participants who appear before the court. Table 7 also reveals that imprisonment is infrequently used, while probation is heavily relied upon.

TABLE 7. COMPARISON OF PARTICIPANT UNIVERSE AND CONTROL SAMPLE ON LEGAL ADJUDICATION OF CHARGE

SAMPLES	TOTAL	NOL-PROS		DISMISSAL OR ACQUITTAL		PROBATION		PRISON		FINE		UNKNOWN		NOT APPLICABLE	
	No.	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Participants															
Total	200	162	81.00	9	4.50	10	5.00	4	2.00	4	2.00	10	5.00	1	.50
Favorable	149	148	99.33	1	.67	--	--	--	--	--	--	--	--	--	--
Unfavorable	51	14	27.45	8	15.69	10	19.69	4	7.84	4	7.84	10	19.69	1	1.99
Controls	107	36	33.65	22	20.56	26	24.30	7	6.54	2	1.84	14	13.08	--	--

Statistics on dismissals and acquittals obviate the fact that hearings, jury trials and court trials have had to take place before reaching these decisions. More apparent is the burden on the adjudicative mechanism for cases found guilty by plea or trial coupled with the rehabilitative efforts of probation and prison. In other words, a favorable termination from Crossroads appears to significantly alter charge adjudication and subsequent disposition--having its effect on both the participant and the court.

Although the accompanying cost-benefit study measures financial savings for the court and society, the program's impact on participant attitudes was not measured. It is hypothesized that the willingness of the court to explore alternatives and act in good faith with project recommendations does a great deal not only to the court's "image" but the client's attitude toward the legal system.

Adult Recidivism

Perhaps the most dramatic positive finding related to the project's legal "success" criteria is the reduction in recidivism for its favorably terminated participants. According to Table 8, overall recidivism (defined in this study as "rearrest") for the Favorables was 20.13%, while for the Unfavorables and Controls it was over twice as high. When we combine all project participants, we still find a difference of 14% between participants and Controls who recidivate within 15 months after initial arrest.

TABLE 8. COMPARISON OF PARTICIPANT UNIVERSE AND CONTROL SAMPLE RECIDIVISM WITHIN 15 MONTHS OF INITIAL ARREST*

	TOTAL SAMPLE**		RECIDIVISM*	
SAMPLES	No.	Percent	No.	Percent
Participants				
Total	200	100.00	59	29.50
Favorable	149	74.50	30	20.13
Unfavorable	51	25.50	29	56.65
Controls	107	100.00	46	43.36

*Data Obtained from Metropolitan Police Records.

**Significant at the .05 level (chi-square).

To this figure must be added a qualification. Although the control sample matched the participant sample on group characteristics, an ex-post facto stratification of the samples for the age variable revealed an important dissimilarity: approximately 60% of the participant sample was between 18 and 19 years old, while only 52% of the control sample fell between these ages. Since our data reveals that 18 and 19 year olds are more likely to recidivate than the older age group, an age adjustment for recidivism resulted in a difference between the participant and control group which is approximately 17%. (The new control recidivism rate being 46.73%.) While other factors in addition to age are related to recidivism, it was felt that as a criteria for enrollment in Crossroads, age was an important variable upon which to stratify the groups.

In short, there is little doubt that recidivism in Washington, D.C., within a 15-month period following initial arrest was markedly lower for participants who were

favorably terminated from the project. While 57% of the unfavorable terminations recidivated, only 20% of the favorable terminations did. Although little can be said for rearrests outside Washington, D.C., there is no reason to assume that such rates would be different for the participant and control samples.

It was interesting to discover that for the control sample, recidivism was almost as high for those on probation (46%) as for those who were imprisoned (57%). When we looked at recidivism-by-disposition for our Unfavorables, we found: 40% of those receiving a nol-pros recidivated, as did 40% of the dismissals, and 50% of those on probation. Although figures are too small to offer definitive conclusions, the effectiveness of probation as it now exists in deterring recidivism must be questioned.

Similarities between Unfavorables and Controls also exist in the distribution of recidivism over time. Forty-one percent of the recidivism among Unfavorables occurs within three months after initial arrest; the proportion for Controls over the same period is 50% (Table 9). Since in many ways the behavior of the unfavorable participant sample is similar to that of the control sample--project enrollment having little apparent effect on behavior--the ability either to "screen-in" candidates with whom the Crossroads approach will be successful or to provide additional and/or intensive project services for those who cannot "make it" in the existing program is critical to future demonstration projects with the recidivism concern. Also, since the tendency to recidivate, at least for Favorables, was held in check during Crossroads supervision, the desirability of sudden, as opposed to gradual, termination from future projects should be evaluated. Implications for program alteration and participant screening will be made in the concluding section of this paper.

TABLE 9. COMPARISON OF PARTICIPANT UNIVERSE AND CONTROL SAMPLE RECIDIVISM DURING AND AFTER THE PROJECT

	TOTAL RECIDIVISM		RECIDIVISM WITHIN PROJECT (0-3 months)		RECIDIVISM AFTER PROJECT (4-15 months)	
	No.	Percent	No.	Percent	No.	Percent
Participants						
Total	59	29.50	17	28.81	42	71.19
Favorable	30	20.13	5	16.67	25	83.33
Unfavorable	29	56.65	12	41.38	17	58.62
Controls	46	43.36	23	50.00	23	50.00

Although there are interesting questions to be asked about the repetition of certain offenses, it was decided that most of these were tangential to our main concern. The charges for which participants are brought before the court and into the project should be noted in Table 10. In comparison with rearrest charges, we observe a slight rise in rearrest for the more serious offense categories: robbery, burglary, assault, and narcotics. It is interesting to note the relatively large number of disorderly conduct charges upon rearrest. Whether this is a question of minor individual misconduct or police harrassment is difficult to assess.

TABLE 10. ORIGINAL CHARGE AND REARREST CHARGE FOR PARTICIPANT UNIVERSE

CHARGE	ORIGINAL ARREST		REARREST	
	No.	Percent	No.	Percent
Narcotics	2	1.00	3	5.08
Larceny	122	61.00	13	22.03
Assault	4	2.00	4	6.79
Disorderly Conduct	--	--	5	8.47
Auto Offenses	35	17.50	8	13.56
Robbery	--	--	8	13.56
Fraud	5	2.50	2	3.39
Burglary	3	1.50	7	11.86
Weapons Offenses	6	3.00	3	5.08
Prostitution-Procuring	4	2.00	3	5.08
Destroying Property	7	3.50	1	1.69
Homicide	--	--	1	1.69
Stolen Property	10	5.00	--	--
Other Misdemeanors	2	1.00	1	1.69
TOTAL	200	100%	59	100%

Juvenile Recidivism

Although juvenile participants were not followed-up with interviews, recidivism data was obtained from the Research Division of the Juvenile Court. A control sample was taken (explained in Section II) and followed in the court records for recidivism. In the course of checking Juvenile Court records for participants, it was discovered that 57.78% were first offenders at enrollment but 42.22% had had previous delinquency records. Some of the latter youths had been knowingly admitted to the project in the absence of eligible first offenders referred by the court; in many other cases, however, previous histories were unknown at project intake.

In order to obtain a valid comparison, the control sample (all of whom were first offenders) was compared with the true first offender juvenile participants. The result was an absence of any noticeable difference in recidivism: over a 15-month period there was a 26.5% recidivism for first offender participants and 28.8% for Controls. A chronological evaluation, dividing recidivism into three-month intervals, also exhibits no substantial difference between the groups. Thus, it appears that Project Crossroads had no special effect on the recidivism rate of its juvenile participants.

Although there was no decrease in recidivism, it is still possible to learn from the behavior of the total juvenile sample at a particular point in time. Here we find that while 28% of the true first offenders recidivated, 61% of those with a previous record did. In other words, there appears to be a strong tendency to recidivism for individuals with a previous record. For both first offenders and those with an arrest record, about 50% of all recidivism occurs within the three months after arrest. It might be worthwhile for future programs to consider efforts directed at a younger juvenile population, in a less work-oriented context, in order to deter the onset of a delinquency career pattern.

SUMMARY

A pre-trial diversion program not only attempts to channel the accused offender away from court processing and into a program of employment, training, counseling, and remedial education, it also attempts to deter the first offender from recidivating. In assessing the impact of Project Crossroads on legal variables, and comparing the participant group with a control sample, it was found that for adults:

a. Recidivism was substantially decreased for the participant group (when compared with a control sample), the decrease being attributable to the favorably terminated participants.

b. Participants terminated with a favorable recommendation to the courts are in almost every case "nol-prossed." Of those terminated with an unfavorable recommendation, only one-half of the group was "nol-prossed," dismissed, or acquitted.

c. Unfavorably terminated participants mirror the Controls in terms of adjudication of charge, time of rearrest, and percent of recidivism.

d. Recidivism appears to entail a progression to more serious crimes.

When we explored the juvenile statistics, we discovered this:

a. Project participation did not decrease recidivism (as compared with a control group).

b. A previous arrest record is positively related to recidivism within 15 months.

Some implications of these findings will be found in the concluding section.

V. "PREDICTING" SUCCESS IN CROSSROADS

Whenever we attempt to predict behavior--in school, at home, on the job--we are drawing upon one or a set of indicants which has been observed to be related to the behaviors in which we are interested, or which have already proved valid referents. When it is criminal behavior we are trying to predict, the indices can take various forms, depending upon one's perspective and purposes. For example, if we start from the premise that characteristics of individual offenders can be used to predict future criminal behavior, we would look at personal characteristics, life histories, attitudes, and self-conceptions. If we start from the premise that this behavior is part of a life-style of individuals, we would focus on modes of criminal operation, stiuations in which offenses occur, subcultural norms, etc. Thirdly, if we adhere to the assumption that criminality relates to conditions and processes by which behaviors become defined as criminal, we would explore the differential handling of different types of individuals by the police, prosecutors, and the courts.

Although Project Crossroads was designed to focus on offender characteristics, the relevancy of the other approaches cannot be overlooked in the present section. Still, what we are focusing upon are personal variables which appear to bear some relationship to favorable termination from the program, and non-recidivism. The present section treats these variables individually, exploring cumulative effects whenever relevant and feasible.

It has already been shown that Crossroads has reduced recidivism* and increased employment,* wages, and job skill levels over a 15-month period. Yet, a small percentage of participants do not work out favorably in the program and recidivate within the year after initial charge. In order to make the present project more effective in terms of its choice of future participants, the present section explores "success"-related variables.

Indicants of Favorable Project Termination

Of the adult participant sample of 134, 22% were unfavorably terminated. In other words, utilizing the criteria for "successful" termination established by the project, the program did not "reach" one-fifth of the total group. Recidivism during the project, unwillingness to obtain and hold a job, lack of effort to maintain stable family and social relationships, chronic uncooperativeness with counselors, and abscondance were, singly or in combination, grounds for their unfavorable termination from the project and return to the normal adjudication process. On the other hand, 78% of the sample performed satisfactorily in the project, were terminated favorably, and were recommended for favorable court action on their pending charges.

There can be no doubt that individual motivation plays a key role in program success. Although motivation wasn't measured, the project attempted to provide incentives: a nol-prossed charge, a job suited for the individual, and a close relationship with a counselor genuinely concerned with the participant's future. Family situation and other intervening variables were also not quantified. The following discussion will focus on the information derived from quantitative records completed by staff personnel.

Employment Variables

There is little doubt that a participant's work history is related to a favorable termination from the project (Table 11). Those participants employed at intake were far more likely to receive a favorable termination from Crossroads than were the unemployed. As shown in Table 11, approximately 90% of all participants who were employed at intake received a favorable termination from the project. In addition, those participants who

*To a statistically significant degree (.01 level on chi-square).

were relatively steadily employed during the year prior to Crossroads enrollment (i.e., more than 60% of the year), as well as those who had been employed in skilled or semi-skilled positions and those receiving higher wages ($2.25 plus per hour), were more likely to perform successfully in the project. Although self-support appears related to favorable termination, the indeterminate group of student participants who performed successfully cloud this finding.

TABLE 11. EMPLOYMENT AND TYPE OF TERMINATION FROM CROSSROADS FOR ADULT PARTICIPANT SAMPLE

EMPLOYMENT	FAVORABLE TERMINATION*		UNFAVORABLE TERMINATION**	
	No.	Percent	No.	Percent
Source of Support at Intake				
Self	43	84.32	8	15.69
Parents	47	73.44	17	26.57
Spouse	3	100.00	--	--
Other Relatives	3	100.00	--	--
Other ( )	(8)		(5)	
Skill Level at Intake				
Unskilled	31	83.79	6	16.22
Semi-skilled	17	89.48	2	10.53
Skilled	4	100.00	--	--
Not Applicable ( )	(52)		(22)	
Average Wage Per Hour at Intake				
$1.26-$1.50	12	60.00	8	40.00
$1.51- 1.75	39	82.98	8	17.03
$1.76- 2.00	21	77.78	6	22.23
$2.01- 2.25	13	76.47	4	23.53
$2.26- 2.50	8	100.00	--	--
$2.51+	2	100.00	--	--
Other ( )	(9)		(4)	
Percentage of Prior Year Employed at Intake				
0-19	21	67.74	10	35.26
20-39	21	72.41	8	27.59
40-59	14	73.68	5	26.32
60-79	12	85.71	2	14.29
80-99	36	87.80	5	12.20
Employed at Intake				
Yes - Non-student	43	89.59	5	10.42
Yes - Student	10	90.91	1	9.09
No - Non-student	32	61.54	20	38.47
No - Student	19	82.61	4	17.40

*N = 104.
**N = 30.

When we consider those participants most likely to be unfavorably terminated, we find that unemployment at intake (as well as being out of school) is an important determinant. We also find reliance on parental support and earning a relatively low wage ($1.25-$1.50 per hour) when working (most likely in an unskilled job) to be related to doing poorly in the project.

Personal Variables

To some extent, work stability may be a function of age. When we observe the relationship between age and favorable termination (Table 12), we find a trend towards a higher project success rate with older participants. It is likely that age and employment history are related to some degree and that the most favorable combination for success in Crossroads is older age and a background of steady employment.

Although Table 12 shows that 82.36% (14) of the white participants received favorable recommendations on termination, while only 76.53% (88) of the black participants did, the small number of whites in the sample and the small difference between the groups in percentage points make definitive statements difficult. When we look at the personal characteristics which differentiate between the racial groups it becomes evident that the more favorable termination ratio for whites is attributable to a cluster of background characteristics which distinguish these groups (e.g., age, education, employment), and which are independently highly correlated with project success. For example, we find that whites comprise the older group of participants (41% are over 21 years of age, compared with 24% of the blacks); they are more likely to have received a high school diploma and/or further education (59% versus 29%); have had a history of relatively steady employment (41% of the whites were employed for 70% of the year or more, in contrast to 36% of the blacks).

It is uncertain whether sex differences are related to success in Project Crossroads: 79% of the male sample and 68% of the female participant sample were favorably terminated. When we look closely at what it means to be female, we find: females comprise the younger participant group (64% were between 18 and 19 years old, compared with 59% of the males); they are more likely to be supported, either by welfare and unemployment compensation (14% versus 00% for males) or by a spouse (13% versus 00% for males); are neither employed nor enrolled in school at intake (68% versus 33% of males); have a poor employment history (9% of the females were employed for at least four-fifths of the year prior to intake, contrasting with 35% of the males); and have a poor school history (23% completed high school versus 34% of the males). In short, "femaleness," similar to race, has meaning when understood in relation to its many sex-linked variables which are pertinent to project performance.

Marital status is slightly related to project success: 86% of those married were favorably terminated, versus 75% of the single group. Yet, we find that those who are married are more often female and that age bears no relationship to marital status. These findings are particularly interesting in view of our previous findings that (1) females are more likely than males to become unfavorable terminations; and (2) age plays an important role in project success. The discovery that the marital state reverses the sex relationship and neutralizes the age factor suggests that there is something peculiar to the marital state, be it personal maturity, sense of responsibility, social attachment, or whatever, which exerts a strong positive influence on project performance.

Although mentioned in conjunction with the racial and sexual variables, the importance of the school variable should be re-emphasized. Graduation from high school is related to project success; all participants enrolled in higher education (9) were favorably terminated.

TABLE 12. PERSONAL CHARACTERISTICS AND TYPE OF TERMINATION FROM CROSSROADS FOR ADULT PARTICIPANT SAMPLE

PERSONAL CHARACTERISTICS	FAVORABLE TERMINATION*		UNFAVORABLE TERMINATION**	
	No.	Percent	No.	Percent
Age				
18	34	72.34	13	28.27
19	27	77.15	8	22.86
20	12	75.00	4	25.00
21	13	86.67	2	13.34
22	6	75.00	2	25.00
23	5	100.00	--	--
24+	7	87.50	1	12.50
Sex				
Male	89	79.47	23	20.54
Female	15	68.19	7	31.82
Race				
Black	88	76.53	27	23.48
White	14	82.36	3	17.65
Other ( )	(2)			
Marital Status				
Single	83	75.46	27	24.55
Married	19	86.37	3	13.64
Other ( )	(2)			

*N = 104.

**N = 30.

To conclude, it is suggested that racial and sexual variables are related to success in Project Crossroads only to the extent to which they are related to employment and school variables. The marital variable appears relevant, although an explanation as to why it is so is speculative. While program implications will be discussed in a later section, we should note that the participant characteristics just presented tell us almost as much about the success of the local school system, as well as other social agencies professing to be children- and youth-oriented.

Indicants of Recidivism

We have seen that recidivism occurs both during and after project termination, with those unfavorably terminated likely to have recidivated during the project. Although it is important to know those types of individuals who work well within the project, it is equally important to discover those characteristics related to recidivism. Here we are

interested in looking at recidivism for the total participant sample and recidivism, after project termination, for the favorably terminated group.

Table 13 reveals some general characteristics of recidivists. One of the most striking differentials shown in the table is that 38.40% of all males in the sample recidivated within a 15-month period after project entrance, while only 18.19% of the females recidivated. This finding that male participants were far more rearrest-prone than female participants is consistent with FBI statistics on the sex ratio of arrested offenders.[8] Here it is important to keep in mind that an unknown but undoubtedly substantial proportion of differences in the sex distribution of offenders is the result of certain peculiarities of the criminal justice cycle. For example, female crimes are generally less visible than male crimes (e.g., prostitution, shoplifting). In addition, the "victim" in a crime by a female is very often an individual not considering himself one and consequently not filing a complaint with the police. There is also the possibility that statistics on the sex ratio of offenders reflect differences in police handling of illegal situations. The point being made is that just as "maleness" is related to offense type, it is also related to police enforcement procedures. These factors become all the more important when we note that females are more likely to have dropped out of high school than are males, twice as likely to be both unemployed and out of school at time of intake, and more likely to have been employed for less of the year prior to intake.

The age factor, as related to recidivism, coincides with the findings of other studies: chronological age is a predictor of future criminality; the earlier an individual is arrested, the more likely he is to recidivate.[9] According to our findings, 18- and 19-year old participants have a higher rate of rearrest than older youths. Unfortunately, it is difficult to know whether this younger group has had more contact with the courts as delinquent offenders or if the group is "true" first offenders, which would bear upon early criminal career patterns.

The racial factor tells us that 37.40% of the black participants as opposed to 23.53% of the white participants recidivated within 15 months. Already mentioned was the fact that blacks in the sample are likely to be the youngest members in addition to having the least amount of education and regular employment, characteristics which are correlated with recidivism as well as unfavorable project performance. Although no definite proof can be offered, the possibility of differential arrests made on the basis of race may also account for some portion of the difference.[10]

[8] FBI Uniform Crime Statistics, Washington, D.C.

[9] CLINARD, Marshall and QUINNEY, Richard: Criminal Behavior Systems, New York; Holt, Rinehart and Winston, 1967.

[10] GOLDMAN, Nathan: The Differential Selection of Juvenile Offenders for Court Appearance, National Research and Information Center, National Council on Crime and Delinquency.

TABLE 13. GENERAL CHARACTERISTICS OF RECIDIVISTS IN ADULT PARTICIPATION

CHARACTERISTICS	NUMBER	PERCENT
Sex		
Male (112)	43	38.40%
Female (22)	4	18.19
Age		
18 years (46)	18	39.13
19 years (35)	14	40.00
20 years (16)	5	31.25
21 years (15)	5	33.34
22 years (8)	2	25.00
23 years (5)	--	--
24+ (8)	3	37.50
Race		
Black (115)	43	37.40
White (17)	4	23.53
Marital Status		
Single (110)	42	38.19
Married (22)	4	18.19
Other (2)	1	--
Living Arrangements		
Mother (35)	12	34.29
Father (40)	19	47.50
Wife (5)	1	20.00
Relatives (15)	1	6.67
Alone (19)	7	36.85
Two Parents (11)	5	45.55
Other (9)	2	--
Place of Birth		
D.C. (83)	36	43.38*
South (36)	9	25.00
West (4)	1	25.00
Other (10)	1	--
Military Training		
Yes (14)	4	28.58
No (120)	43	35.85

*Significant at the .05 level (chi-square).

Finally, married participants are only half as likely to recidivate as unmarried youths. This is consistent with the finding that individuals living with a spouse are unlikely to recidivate.

It is curious that individuals living alone with a mother in the house are less likely to recidivate than those living with a father. Although statistics are not offered, there is the likelihood that this is a spurious relationship, accountable, in reality, to variables of employment, school enrollment, etc.

Place of birth provides material upon which to re-evaluate the notion that migrants to urban areas--due to disrupted family ties and living arrangements--account for crime in the city. While this might have been true 20 years ago, changing societal conditions have most probably altered this situation. According to our sample of first offenders, almost twice as many individuals recidivate who have been born in Washington, D.C., as compared with those born elsewhere. From the table we note that individuals born in D.C. are responsible for 78% of the recidivism.

While military training appears slightly related to recidivism (36% of those not having received military training recidivating, compared to 29% who had received military training), it is likely the relationship is explained by the age relationship to military service: the older the participant, the more likely he is to have been in the military.

School and Work Variables

Both attending school and/or being employed are related to non-recidivism. Of the participants who, at time of intake, were neither working nor enrolled in school, 40.39% recidivated within 15 months (Table 14). This compares with the recidivism rate of 26.09% for full-time students and with the non-student worker rate of 33.34%. Whether this finding is due to stability, maturity, or to merely being occupied for some part of the day would be interesting to explore, but not relevant for our purposes.

In addition to not being enrolled in school at intake, the lower an individual's educational attainment, the more probable his recidivism. According to Table 14, high school graudates and those enrolled in college have a substantially lower recidivism rate (11.11% and 23.34%, respectively) than non-high school graduates (42%). Thus, if being a high school dropout is construed as non-success in the school system, this early lack of success appears related to future non-success (in employment, legal spheres, etc). Type of curriculum in school makes no difference in future recidivism.

The more steadily a participant has worked prior to intake, the less likely he is to recidivate. This finding holds consistently. When we dismiss the 0-19% column in Table 14 (the student population), the finding consistently holds for non-steady employment (40-60% of the year) and continues through to steady employment (80-99%). To this we add a relationship between recidivism and unskilled employment, finding that 43% of the unskilled group recidivated as compared with 32% of the semi-skilled.

TABLE 14. SCHOOL AND WORK CHARACTERISTICS OF RECIDIVISTS IN ADULT PARTICIPANT SAMPLE

CHARACTERISTICS	NUMBER	PERCENT
Employed at Intake		
Yes		
Non-student (48)	16	33.34
Student (11)	4	36.37
No		
Non-student (52)	21	40.39
Student (23)	6	26.09
Source of Support		
Parents (64)	25	39.07
Self (51)	16	31.38
Spouse (3)	--	--
Welfare or compensation (3)	--	--
Relatives (3)	1	33.34
No information (10)	5	--
Skill Level at Intake		
Unskilled (37)	16	43.25
Semi-skilled (19)	6	31.58
Skilled (4)	--	--
Not applicable (74)	25	--
Enrolled in School at Intake		
No (99)	37	37.38
Yes		
Full-time (28)	8	28.58
Part-time (6)	2	33.34
Other (1)	--	--
Highest Grade Completed		
9th (18)	8	44.45
10th (28)	12	42.86
11th (35)	16	45.72
High school graduate (34)	8	23.53
13th+ (9)	1	11.11
Other (10)	2	--
Percent of Year Employed Prior to Intake		
0-19 (31)	9	29.00
20-39 (29)	9	31.03
40-59 (19)	11	57.90
60-79 (14)	6	42.86
80-99 (41)	12	29.49

Note on Charge

In attempting to answer the question of whether charge is related to recidivism, caution must be exercised. When individuals are considered "burglars" or "robbers" because they have been arrested for a particular charge, a false impression of specialization is created. It implies that criminals confine themselves to the kinds of crimes for which they happen to be caught. This may or may not be true. While the "personal crime" and

"property crime" categories may more than likely not be committed by the same individuals, patterns across criminal behaviors arise when we look intra-categorically (e.g., a "larceny-burglary" type[11]). We also find the situation where more serious crimes have been "broken down" into lesser components, which can totally alter a charge (e.g., burglary to larceny). Thus, we do not feel it necessary to explore charge statistics for present purposes.

Recidivism of the Favorably Terminated

The above findings indicate that Project Crossroads has had greater relative success with participants with specific personal and background characteristics. Knowing this, it becomes possible to utilize these indicants of project performance at an early stage in project participation in order to give special attention to individual needs, or to shape a program to be oriented towards a particular population.

While some of these findings differentiate between recidivism and non-recidivism in general, the researcher thought it necessary to isolate and observe that group of individuals which could be termed "favorable-recidivists." Although numbers are small (22 in total), it was considered worthwhile to focus on those favorably terminated participants who recidivated within 12 months after project termination, in order to see if an individual's functioning within the project could offer advance indicants of later failure. Characteristics for this group and for the group receiving a favorable termination but who did not recidivate are presented in Tables 15 and 16.

The general characteristics associated with post-project recidivism mirror recidivists in general. While age (youth), race (black), and marital status (single) are variables which appear important, we have already shown that they have meaning only as they cluster with other related variables. Although the quantitative data collected in this report emphasizes employment and school-related variables, differences in socio-economic status, family environment, and area of residence between age and racial groups may account for some part of the findings. Employment information gathered during Crossroads participation is unclear regarding post-project recidivism. While there is a slight tendency to be working at a lower skill and wage level, the strongest indicant of success after Crossroads seems to be the completion of a job training program. In order to assess the effectiveness of job training, per se, we looked more closely at the group of 7 receiving training who did not recidivate. It was startling to discover that 6 were neither employed nor enrolled in school upon intake, none had received a high school diploma or equivalency degree, and that the group was predominantly male, black, single, and 20 years of age or younger. Since the combination of these characteristics usually indicate a potential for project and post-project failure, it appears that a successful completion of a job training program is one way of securing post-project success. The problem then becomes one of making such training available to large numbers and motivating the participant to start and complete such training.

[11] ROEBUCK, Julien: Criminal Typology, Springfield, Illinois; Charles C. Thomas, 1967.

TABLE 15. RECIDIVISTS AFTER FAVORABLE CROSSROADS TERMINATION COMPARED WITH NON-RECIDIVATING FAVORABLY TERMINATED ADULT PARTICIPANTS ON EMPLOYMENT CHARACTERISTICS*

CHARACTERISTICS	PERCENT OF "FAVORABLE" RECIDIVISTS*		PERCENT OF NON-RECIDIVATING FAVORABLE GROUP**	
	No.	Percent	No.	Percent
Number of Job Referrals During Crossroads				
1	8	40.00	19	38.77
2	3	15.00	11	22.45
3	2	10.00	8	16.33
4	3	15.00	2	4.08
5+	4	20.00	9	18.37
Not Applicable ( )	(2)		(28)	
Percent of Time Employed During Crossroads				
0-19	3	13.64	8	10.39
20-39	3	13.64	5	6.49
40-59	1	4.54	6	7.79
60-79	3	13.64	13	16.88
80-99	12	54.54	45	58.44
Average Wage Per Hour During Crossroads				
$1.50- 2.00	15	75.00	44	65.67
$2.01- 2.50	4	20.00	11	16.41
$2.51- 3.00	0	--	6	8.96
$3.00+	1	5.00	6	8.96
Not Applicable ( )	(2)		(10)	
Skill Level of Crossroads Positions				
Unskilled	14	63.64	31	56.51
Semi-skilled	7	31.82	24	36.23
Skilled	1	4.54	7	10.14
Clerical	0	--	7	10.14
Other or Non-Applicable	0	--	(8)	--
Training Program During Crossroads				
Placements - No Completions	7	87.50	5	41.67
Placements - One Completion	1	12.50	7	58.33
Not Applicable ( )	(14)	--	(65)	--

*Twenty-two in the group.

**Seventy-seven in the group.

TABLE 16. RECIDIVISM AFTER FAVORABLE CROSSROADS TERMINATION COMPARED WITH NON-RECIDIVATING FAVORABLY TERMINATED ADULT PARTICIPANTS ON GENERAL CHARACTERISTICS

CHARACTERISTICS	PERCENT OF "FAVORABLE" RECIDIVISTS*		PERCENT OF NON-RECIDIVATING FAVORABLES*	
	No.	Percent	No.	Percent
Sex				
Male	22	100.00***	62	80.52
Female	0	000	15	19.48
Age				
18-19	16	63.63	42	54.57
20-21	4	18.18	20	25.96
22-23	1	4.54	10	12.98
24+	1	4.54	5	6.49
Race				
White	00	--	12	15.58
Black	22	100.00	65	84.42
Marital Status				
Single	21	95.46	61	79.22
Married	1	4.54	16	20.78
Place of Birth				
D.C.	17	68.17	43	61.42
South	4	18.18	24	34.29
West	1	4.54	3	4.29
Not Applicable ( )			(7)	
Living Arrangements				
Mother only	11	50.00	18	23.37
Father only	1	4.54	1	1.29
Wife/Husband	0	--	13	16.88
Alone	0	--	5	6.49
Two parents	8	36.36	27	35.06
Relatives	2	9.09	10	12.98
Friends	0	--	3	3.93

*Twenty-two in group.

**Seventy-seven in group.

***Significant at the .05 level (chi-square).

SUMMARY

The present section has explored those characteristics which appear to bear some relationship to "success" through Project Crossroads, either in terms of a favorable termination or non-recidivism. We conclude that a number of personal and background characteristics can be used to indicate project and future behavior. These must be taken into consideration in the planning of all future projects of the Crossroads type.

Those individuals who are most likely to be favorably terminated from the project include participants who are male, married, and in their twenties. Those individuals who are most likely to be unfavorably terminated have a work history of unsteady employment, poor work skills and low wages prior to project intake, and an educational history of failure (non-high school graduate).

Indicants of recidivism in most ways parallel the above. The group most likely to recidivate, whether favorably or unfavorably terminated, includes males, youths, the unemployed and non-school enrolled, blacks, singles, the unsteadily and unskilled employed. Those individuals who successfully terminate Project Crossroads but then recidivate are not readily distinguished from those non-recidivating Favorables, although skill level and wage per hour during Crossroads employment somewhat distinguishes these groups. On-the-job training appears strongly related to non-recidivism when the training program is completed.

VI. IMPLICATIONS OF PROJECT FINDINGS

The previous sections of this paper have described the research component and presented an assessment of the quantitative material gathered. The present section will go beyond this, attempting to order and organize project findings according to patterns which emerge from the data, and offering recommendations based upon these findings--including a certain amount of inference and speculation.

The Research Component

Demonstration and/or Experimentation

All projects cannot be expected to do all things with equivalent ease. An experimental and demonstration project which is also required to undertake a research evaluation has many, sometimes conflicting, goals. In an E & D program, the feasibility of new approaches and techniques are tested in practice and insights are achieved through experimentation and change. A research undertaking, on the other hand, oriented towards the gathering, classifying and evaluating of data in order to determine the statistical significance of quantitative differences among program elements, requires a design and methodology not always readily adaptable to experimental projects. While the two approaches are not necessarily incompatible, they place schizophrenic demands on projects attempting to do both. Thought should be given to this problem in advance of program implementation to minimize the inevitable compromises entailed in combining both approaches.

If a systematic, controlled, empirical assessment of a project's impact and effectiveness is desired, the research component should be an integral part of the project, from planning to conclusion. The early inclusion of a researcher would enable him to work "with" rather than "around" the staff, building into the project adequate provision for recording, gathering and evaluating materials. For example, once a concept has been demonstrated feasible to implement, program variations might be included to help identify critical program components. On a larger scale, an initial E & D project could provide the basis for additional projects aimed at inter- and/or intra-program variation in an attempt to delineate the effectiveness of specific techniques.

This, of course, leads us to the question of how to undertake the guidance of many projects working with similar concepts in similar contexts, so as to maximize the systematic gain in knowledge. Although we will not attempt to answer this question in this paper, it is suggested that more thought be given, on the large scale and over the long-run, to ways of identifying reliable techniques and providing valid generalizations. A systematic approach to building upon insights, recommendations and generalizations must be attempted which would in turn influence projects of similar orientation.

The inclusion of the researcher who is viewed as an ex-officio staff member is encouraged. Contracting for the services of this person (as opposed to placing him on salary) would enable him to maintain some "distance" from identification with the project. This was done, successfully, in the case of Project Crossroads.

The researcher might work with the project three times weekly for the first six to eight months of program planning and operations, reducing contact to once weekly after the program has stabilized. The development of the overall research design, as well as data gathering techniques and devices, would be one job of the researcher, in joint venture with the staff. Project supervisors would be held ultimately responsible for case and file review and for the collection of monthly summary statistics.

Staff Orientation

Once goals have been decided upon by the funding agency and the project director, the needs of the program in the area of staff selection become clear. If the research

component is considered an important part of the project, an early staff orientation to the rationale behind data gathering and the relevancy of a research evaluation will gain staff cooperation throughout the project. In the present project, the late inclusion of the research component and its underemphasis during project establishment, made detailed record-keeping a chore for the people-oriented "new careers" staff.

There is little doubt that "new careers" staffs working in programs for the disadvantaged have been of outstanding value.[12] However, this type of staff is unfamiliar with research methods and rationale, initially uninterested in data gathering, and reluctant to combine a people-to-people approach with a certain amount of "paper shuffling."

It is the researcher's opinion that the value of the "new careers" individual far outweighs any misgivings about their acceptance of research as a valid undertaking. For the most part, the initial role orientation of the staff toward the research task--as part of their understanding of the program's goals--will determine later cooperation with the researcher. Lack of skills on the part of this staff is not deemed important or necessarily valid. Thus, we again stress the early inclusion of the researcher into project planning.

Sample Selection

The sampling technique employed in projects of this type should ensure that a sample representative of the larger population be drawn and that each member of the population be given an equal chance of being selected. Although the systematic selection of project participants for the experimental sample in Project Crossroads was acceptable, the simple random is preferable. The ex-post facto selection of the experimental sample served to avoid any inequality of services given to the "chosen" few, since the sample was unknown in advance.

It is suggested that the control sample, on the other hand, be randomly selected from among all individuals meeting project criteria at the same time that the participant population is selected. In other words, a specified number of individuals would be excluded from project entrance based on a randomization process of selection. This would assure participant-control group comparability, and increase the likelihood of reaching the control sample for follow-up purposes. Also, this technique would provide for a base-rate of job finding, job holding, recidivism, and other variables which would be independent of changing external conditions (e.g., alterations in labor conditions). The major difficulty to overcome in control sample selection by this method is the frustration of the staff in turning away "acceptable" individuals.

Follow-Up Information

The follow-up task is important in determining long-range program impact. It is suggested that this information be systematically collected at pre-determined intervals, each counselor being responsible for his own participants as well as for a given group of controls. Data could conceivably be collected for some participants for a two year post-project period (in a three year project).

In addition, the follow-up task might be reconceptualized as being an integral part of the program in addition to being a technique for data gathering. Viewed as a data gathering technique alone, it becomes a burden of contacting "old" cases for statistical purposes. But as part of the program--as an opportunity to be supportive and offer project aid--it could be viewed as an essential element of the staff's efforts and ultimately important in the project's long-term effectiveness. In short, the purposes of follow-up can be tied more closely to, and foster, project goals. In this perspective, the researcher

[12]GORDON, Jesse E., Dr.: Testing, Counseling and Supportive Services for Disadvantaged Youth, University of Michigan.

might envision monthly follow-ups of project participants. Increased frequency of attempted control group follow-ups, should increase the likelihood of this group's response.

The Employment Service

The data reported in the body of this paper has shown the proclivity of many variables to be related, and these variables to bear some relation to project success (favorable termination and non-recidivism). The Crossroads endeavor, for purposes of social policy planning, has had a relatively higher success rate (in terms of recidivism) with individuals who are older (20-24), have a background of relatively steady employment, and are high school graduates. The project also "reaches" a statistically significant greater proportion of females, as opposed to males, even when these females do not exhibit stable employment or educational credentials. Whether or not, in the case of females, this relates to arrest policy of law enforcement officials or type of criminal behavior engaged in, has been previously alluded to. Since males appear before the court in overwhelmingly larger numbers than do females, the bulk of this report, as well as emphasis in future projects, is directed to the male population.

The Crossroads approach--crisis intervention at first court appearance and provision of manpower services--has been shown to be least successful with those participants with extreme disadvantaged backgrounds, employment-wise and educationally, prior to Crossroads entrance, particularly the younger adults. This leads us to question the assumption that a basically employment-oriented approach, such as Crossroads provides, can be effective with all disadvantaged youths.

Although no data could be obtained for the juvenile population, other than the finding that the project had no effect on their recidivism, it is the researcher's impression that little success was possible with this group. It is quite possible that overall maturity is an important factor in success through an employment oriented program, and this may come with age, increased responsibilities (e.g., marriage) and experience (e.g., military training), and previous employment opportunities. This leads the researcher to speculate that individuals devoid of these characteristics and history might be assigned to a specific component within a project, which is designed to serve this group with a more intensive counseling effort, coupled with incentives for educational advancement and/or short-term job experience as part of a planned entrance into a stable career.

Apparently, the incentive to work, provided by the possibility of a nol-pros adjudication, is not strong enough to overcome those variables which work against success through employment for a small "hardcore" group. It is this researcher's recommendation that the entire question of "incentives" be reconsidered in planning for programs which aim at the least stable (or least "mature") group. Juveniles, especially, might need more of a perspective on how and where they fit into society before they can be expected to settle down with employment--and a program which is employment-oriented may not be the appropriate vehicle. Although the completion of a job training program by a small number of participants has been shown to be related to success in Crossroads, the problem to be tackled revolves around the many who start training programs but never finish. It might be important to undertake a special effort to analyze program failures, in an attempt to work with those individuals in most need of assistance. In short, the question of how to motivate and change the behavior of a hard-to-reach population which does not succeed in a program heavily oriented towards steady employment must lead us to reconceptualization of our traditional notions of "incentives" which becomes part of future program planning.

The Counseling Service

Little has been said in this paper about the work of the Crossroads counseling division. This is no way reflects upon the importance of the counseling operation, as it does upon: (1) a dearth of quantitative material; (2) limited researcher involvement with

day-to-day staff activities; and (3) an inability to isolate counseling from other project activities. No variation in counseling technique, nor major counseling philosophy, was structured into the project. The result was an inability to precisely evaluate the importance of the counseling operation as it relates to project success. While this researcher is of the opinion that this kind of variation was not called for in demonstrating the feasibility of the Crossroads concept, future projects should be structured to offer insights regarding counseling services (techniques, orientations) as well as counselor type ("new careers" versus professionals).

Many insights have already come from previous E & D projects: (1) counseling should not replace performance in life but should be a part of a larger set of services; (2) peer pressure seems more effective than pressure from staff in inducing attitude change; and (3) group counseling is practical and functional for getting across interview behavior, grooming, etc.[13] Although we have no way of quantitatively evaluating the impact of the counseling service as separate and distinct from that of the employment division, answers to the anonymous Participant Evaluation Form give every reason to believe that counseling plays a critically important role in the project.

This form was devised to obtain feedback on the project from the point of view of the recipient of its services. Distributed and returned anonymously at termination from the project, the completed forms do not distinguish between the 18- and 24-year old, the black or the white, the project success or the recidivist. There is reason to believe, though, that there is an overabundance of answers from favorably terminated individuals. A consensus on responses to questions emerges from 100 evaluation forms, giving a clear picture of the counselor and his services.

Question One asked: "What do you think is the most important thing your counselor does for you?" There is little doubt that the personal bond formed between counselor and participant--which is reflected in responses which cite "caring" about the participant as an individual, trying to understand his problems and just being there when needed--was strong and appreciated. Many of the answers indicate that apparently genuine concern shown by counselors on a continuing basis was important to the participant. Often mentioned was the notion of being helped to "get myself together," as were such specifics as being taken to a job interview and being helped in communicating with his family. Rarely mentioned were specifics regarding problem solving, per se (such as helping a participant with the court), which leads the researcher to believe that the quality of the relationship was more important than the problem solving aspects--although in reality, both are necessary.

The second question, which asked how the participant might do things differently if he were a counselor, revealed nearly complete satisfaction with the counselor. The majority of comments were related to spending more time with the participant, going deeper into problems, and enlarging the program so that more individuals could take advantage of it. A few comments indicated that the participant would like to be like his counselor.

Some of the comments would have it appear that this was the first time the participant was made to feel worthwhile as an individual. The following are offered to transmit the "feeling" quality of the remarks:

> "The counselor works with more as a human being, plus with the helping hand and voice (of) experience. They listen to the accused more fairly."
>
> "He has put a little more incouragement (sic) into me. Also for just one day a week and a little of your time your really think about what he is all about."
>
> "When she talks to me about my troubles, and I can let myself go, it seems like she understands."

[13]GORDON, op. cit.

"To me the most important thing ---------- does for me is to be a friend."

"I would get the participants more time to spend with me to show love and understanding and willingness to listen."

Questions related to the employment service reveal that although the staff might consider speed in finding a job, willingness of the employer to hire, and dependability of the employment service itself important, the participant was particularly impressed by the counselor's effort in his behalf. On the other hand, criticisms of the employment services were more often directed at the job market, as opposed to the service provided. Salary was rarely mentioned.

The Participant Evaluation Form is important in that it directs our gaze at the "secondary" benefits of the program--an improved feeling of self-worth for the participant and an image given by the program that there are people who care. Although it may sound overly sentimental to middle class readers who have been taught to put faith in the Protestant Ethic, the people-to-people approach of the counselors is an essential ingredient to the participants. This finding leads us to questions concerning abrupt program termination and the dichotomized counseling--employment division in services as they both relate to participant stability.

Counseling as Support

Individual comments of participants on the evaluation form lead the researcher to believe that the counselor is appreciated by many as a supportive figure. To further increase the impact of this service, increasing the frequency of counselor-participant contact is recommended, particularly for those participants with a background of failure: high school dropout, poor work history. These characteristics were found most frequently among the younger age group (18- and 19-year olds) of project participants, suggesting that a specific effort oriented toward that group is desirable.

This, of course, is related to the issue of counselor caseloads: more frequent counselor-participant contact might result in fewer cases handled. To some extent, group counseling might minimize this problem while at the same time providing a vehicle for peer contact as well as for information imparting by the counselor. Whether individuals are grouped according to stage of progress through the program or age or counselor, it might be adviseable for the more difficult to help group of participants as a supplement to individual counseling.

Although quantative documentation is not available, observations of the administrative and content aspects of the program leads the researcher to suggest that the counseling staff take more responsibility for employment counseling than engaged in at present. This would give the counselor more of a "task" purpose, in addition to his present supportive role. Greater counselor contact would be generated, resulting in a more comprehensive counselor-participant relationship.

Counselor as Role Model

The positive role model offered the participant by the staff, as interpreted from participant evaluation forms, leads this researcher to believe that the "new careers" person's value to the program cannot be overestimated. Also, the overrepresentation of black youth in the participant population, coupled with the pride-in-race movement and racial tension in urban areas, encourages the continuation of a predominantly black staff for this and similar programs. This would not necessarily sacrifice staff effectiveness with white participants; according to data from this study, there was no noticeable lack of success for white Crossroads participants. As it turned out, race-linked variables such as education, age, and employment were related to most trends. Other studies have already shown that a good "mix" was a multi-racial staff with a heavy proportion of counselors who are

of the same racial group as the participants.[14] Also, since an overwhelming number of males are handled by the courts, it is suggested that project services and staff apportionment continue being oriented to the male population.

Differential Services

The quantitative data included in the body of this paper leads us to believe that the differential needs of participants must be met through differential services. Whether this means a series of projects, each providing a different service to a specific population, or one project with component parts structured for special needs is a policy decision which is not within the purview of this paper.

The relative lack of success with the teenage population leads the researcher to believe that this group must be a priority target for future offender rehabilitation programs. Although we are not in a position to know all the reasons for continued failure, perhaps an experimental and demonstration program has the imperative of not allowing a person to fail--at least until it was very clear that the program cannot be of any help but after new insights were gained which will avoid the problem in the future. It must be remembered that failure in a program such as Crossroads is indicative of failures to follow.

Although the question of extending the term of project participation takes us into the problem of denying an accused offender a speedy trial, abrupt termination of a participant may not be beneficial for all participants. We have seen in Section IV that a proportion of favorably terminated participants recidivate after leaving Project Crossroads. Frequent follow-ups for a "marginal" group of participants might serve to provide consistency in support and reduce post-project recidivism.

To sum, the project is a "last chance" for many participants. "Giving up" on those who are more difficult to work with is taking the easy way out. It is suggested that even more resources be devoted to working with the most severely disadvantaged problem cases. While "success" statistics may not look as good in final evaluations, when this approach is taken, a program should be flexible and determined to put forth the greatest effort on behalf of the most difficult cases.

There is little doubt that the Crossroads effort was quite successful in reducing court case processing time and recidivism, and in increasing employment and related variables of wage and skill, for most of its participants. But the success was relative, and as the project presently functions it is more successful with those participants who were most stable upon project entrance. The project achieved least success with the youngest non-working, non-studying offenders. Efforts with juveniles were inconclusive. The following program modifications--extrapolated from findings and discussions contained within the paper--are offered to stimulate thinking, and not as a thoroughly reconceptualized approach to new programs.

The Employment Approach

Our data indicates that an employment oriented project is most suited for a relatively stable, older population. On the basis of evaluating a cluster of background characteristics (previously mentioned), a program of Crossroads' nature might be opened to first offenders ranging beyond the 26 years old group. Age is a variable which should help a person into the project as opposed to screening him out. The first offender status is expedient to retain in this manpower program by screening out "career" offenders.

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[14]GORDON, op. cit.

The emphasis of the project must continue to center on employment and job training programs as economic alternatives to crime. Better training programs and opportunities, however, seem essential if economic stability is sought.

The Counseling Approach

Data indicate that Project Crossroads had a lesser impact on participants who have a poor work and school history. This is usually correlated with a younger age. The researcher interprets this data as indicating that the group was not "ready" for a program oriented towards regular, long-term employment. It has been previously noted that juveniles with prior arrest records comprised the larger segment of the recidivating juvenile population. It is speculated that the same would be true for adults with previous arrests, although the data were not available.

It is felt that this group is in need of an extensive and intensive counseling program (individual and group), job training and/or remedial education. Since incentive and motivation are important to success, it is quite conceivable that participants be paid when enrolled in a schooling or job training program and that nontraditional methods and variations be considered. For some participants, time will be needed for "growing up" to the demands of legitimate society. Whatever the need, this counseling approach would give the participant the time and supportive services necessary to work through personal and family problems, as well as those related to employment, without the pressure of a "real" job.

Although the technical first offender status is desirable for expediency, the charge criteria might be expanded for this group to involve those individuals (predominently youths) most in need of assistance. New approaches to project termination, follow-up, and counselor contact must be considered and have been alluded to in the early pages of this section.

A promising approach to working with this group might involve the availability of a residential facility. For many participants there is a need to be removed from home and neighborhood for a limited amount of time--particularly in conjunction with supportive services. The best concepts of the "therapeutic community," "behavior modification," and the "half-way house" might be incorporated into a trial facility.

The Educational Approach

A program designed with juvenile offenders in mind (14 through 17) could be similar to the above, with the emphasis placed on education. This program might best serve a juvenile population, a practical distinction in age categories which is necessitated by court administration. It is conceivable that work toward the GED would be encouraged through payments, and might take place as a program organized outside of the usual school context. Although this paper is not the proper vehicle for a program to work with juveniles, the approach which is recommended would emphasize extracting the best of existing knowledge and approaches of existing institutions which presently fail with juveniles, and establishing a program better suited to the needs of this special group.

CONCLUSION

Project Crossroads has succeeded in deterring recidivism and stabilizing employment for the large majority of its participants. Its success would be misunderstood and misplaced if it became a pre-packaged approach to delinquency and crime prevention. The data examined in the body of this report indicate the importance of using insights available from this experience, in conjunction with those gained from past experimental and demonstration projects, in order to modify program approaches to meet the differing needs of participants and locales.

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VT 013 090
HOLAHAN, JOHN F.
A BENEFIT-COST ANALYSIS OF PROJECT CROSSROADS.

NATIONAL COMMITTEE FOR CHILDREN AND YOUTH, WASHINGTON, D.C.
MANPOWER ADMINISTRATION (DOL), WASHINGTON, D.C.
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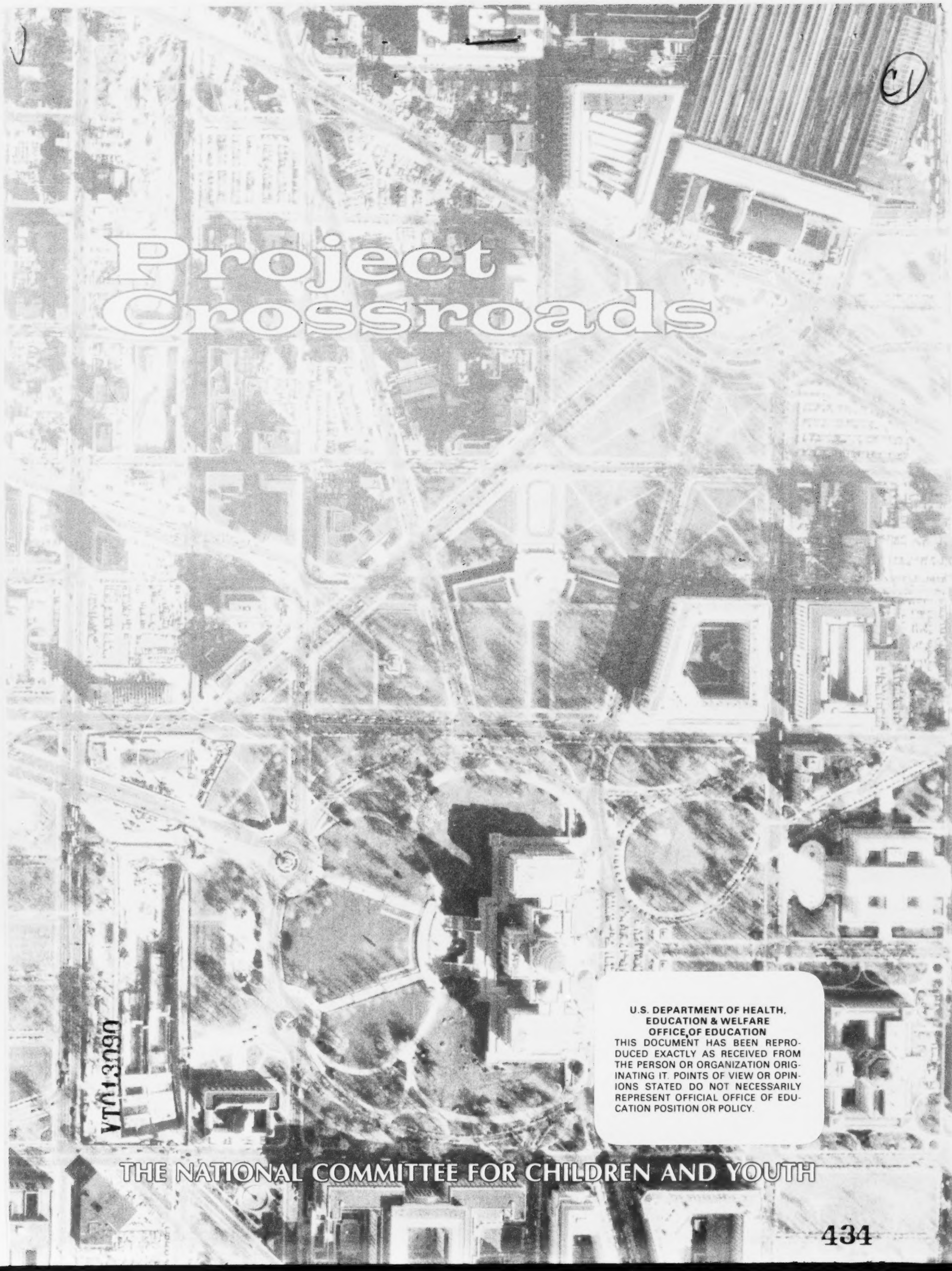
IDENTIFIERS - PROJECT CROSSROADS

ABSTRACT - THIS STUDY PRESENTS A COST-BENEFIT ANALYSIS OF A DEMONSTRATION PROJECT IN WHICH A 90-DAY PROGRAM OF COUNSELING, JOB PLACEMENT, JOB TRAINING, AND REMEDIAL EDUCATION WAS PROVIDED FOR YOUNG FIRST OFFENDERS. THE ANALYSIS INCLUDES BENEFITS IN TERMS OF EARNINGS, RECIDIVISM, AND DIVERSION OF CASES FROM THE JUDICIAL SYSTEM. EDUCATIONAL BENEFITS ARE ACKNOWLEDGED AS WELL, ALTHOUGH THEY ARE NOT QUANTIFIED. THE COSTS INCLUDED IN THE ANALYSIS ARE THE ACTUAL EXPENDITURES REQUIRED TO OPERATE AND MAINTAIN THE PROGRAM. WITH DISCOUNT RATES OF 5-15 PERCENT, BENEFIT-COST RATIOS RANGED FROM 1.8 TO 2.2. RELATED DOCUMENTS ARE AVAILABLE AS VT 012 115 (ARM FALL 1971) AND VT 013 088-VT 013 089 (ALSO IN THIS ISSUE). (BH)

VT 013 090



Project Crossroads

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A BENEFIT-COST ANALYSIS

Of

PROJECT CROSSROADS

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TABLE OF CONTENTS

	Page
Foreword	iv
I. INTRODUCTION	1
A. Measurement of Benefits	3
B. Data	5
1. Project Crossroads participants	5
2. Control group	7
C. Cost of Project Crossroads	8
II. ECONOMIC COSTS OF CRIME	11
A. Welfare Costs of Thefts	12
B. Police Costs	13
C. Court Costs	17
D. Corrections Costs	20
E. Probation and Parole Costs	24
F. Physical Injury; Property Damage	25
G. Private Crime Prevention Costs	26
III. BENEFITS FROM PROJECT CROSSROADS: DIVERSION, EARNINGS AND EDUCATION	27
A. The Diversion Benefit	27
B. The Earnings Benefit	30
C. The Education Benefit	38
IV. BENEFITS FROM PROJECT CROSSROADS: RECIDIVISM REDUCTION	41
A. The Model	41
B. Cost of Crimes of Recidivists	47
C. Cost of Police from Offenses of Recidivists	48
D. Data for Trial Choice and Dispositions	50
E. Length of Prison and Probation Sentences	53
F. Recidivism Probability	55
G. Crime-Switch Matrix	58
H. Estimated Costs of Recidivist, by Round, by Crime	58
I. Use of Model for Measurement of Benefit from Reduced Recidivism in Project Crossroads	60
V. RESULTS AND IMPLICATIONS	63
A. Benefit-Cost Ratios	63
B. Implications of Findings	65

Foreword

The public misconceptions of the actual cost of correctional programs result partially from a long standing failure to encourage specific correctional research and from the dearth of hard data dealing with the cost of law enforcement and criminal prosecution. This deficiency in so critical an area of public concern is intolerable. Sound business practices alone demand a more accurate and efficient accounting of the results sought and obtained in the same manner industrialists must take into account costs, depreciation, replacement and results if they wish to stay in business and satisfy their investors.

Crime is also big business, not only in the actual cost of crime itself, but in the cost of attempting to control it. Millions of people are affected by it, as victims or defendants, or employed as a result of it, and billions in funds are expended annually in an attempt to protect the public and create a safer society.

We must begin to look at the economic cost entailed in setting up programs and at the rate of return on the investment. We must also begin to evaluate in actual economic terms the effect of these programs and compare the results using compatible terms. Any objective and rational planning effort needs to establish commonality in order to reach a factual basis for policy guidance. The less critical and less accurate traditional methods are unsatisfactory in providing the information needed.

We were fortunate to have John F. Holahan associated with Crossroads; the thoroughness with which he has conducted his research and the potential of his contribution should assist others into a more careful examination of the factors that must be studied to achieve a balanced program focus.

Leon G. Leiberg
Project Director

I. INTRODUCTION

This study will present a cost-benefit analysis of Project Crossroads, a manpower program for first offenders in the District of Columbia. The Crossroads program is designed as an alternative to the traditional judicial and correctional systems for individuals with no previous adult (18 or over) convictions. Through intensive counseling, job placement, remedial education, and other supportive services--over a three-month period, following arrest but prior to trial--the program attempts to reorient the individual before he is committed to crime as a way of life. If, at the end of the 90-day period, the defendant has shown satisfactory progress, the court will, upon Crossroads' recommendation, dismiss the charges.

The program attempts to reach individuals at an early age, when delinquency and recidivism rates are at their highest, and help them establish an economic stake in the community. While the crimes involved are non-violent, lesser offenses, it is believed that most serious offenders begin in this manner, get involved in the court and prison system, obtain a criminal record and have a very difficult time "going straight."[1] This analysis will focus on the marginal costs to society of a manpower-oriented pre-trial diversion program and the return in terms of: (1) an immediate reduction in costs to the criminal justice system through successful diversion of cases to the program, (2) increased productivity as reflected in higher wages and more regular employment, and (3)a reduction in future social costs from crime by lowering recidivism (rearrest) rates.

The rationale for the project was stated as follows:

> It is a well-documented fact that offenders committed to a correctional institution most often do not receive the kind of services that are effective in helping them avoid repetition of criminal behavior. Life in prison or a correctional institution tends to embitter and harden individuals, particularly if their experience in confinement is non-productive. Incarceration does not bring about meaningful personality changes nor does it result in long-range benefits to society or the offender.
>
> Even if a convicted offender is not incarcerated but placed on probation, he is rarely provided the types of services and the individual attention that will preclude his subsequent resort to criminal activity. In addition, he has a criminal record which severely circumscribes his future employment prospects.
>
> Two principles presently recognized in the treatment of mental illness-decentralization and non-institutionalization--can avoid most of the liabilities of the present criminal justice system and are believed to be valid in dealing with an offender population. Project Crossroads is an attempt to investigate in an experimental and demonstration setting the reaction of a sizeable number of first offenders offered an alternative to adjudication and incarceration. The underlying tenents of this program are the beliefs that, given an acceptable alternative to criminal activity, the majority of young people will hold to the principle of individual responsibility and self-sustaining pride in accomplishment, and that the rise in crime and delinquency among the young can be reduced by attention to the first offender and the application of manpower services to his problems.[2]

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[1] President's Commission on Law Enforcement and Administration of Justice, Task Force on Assessment of Crime, Crime and Its Impact, an Assessment, (Washington, D. C.: U. S. Government Printing Office, 1967), pp. 79-80.

[2] Project Crossroads, Final Report Phase I, Project Crossroads, (Washington, D.C.; National Committee for Children and Youth, 1970), p. 5.

The project's services are available to both males and females between the ages of 16 and 25. Although it operates in both the Juvenile and General Sessions (adult) Court systems in the District of Columbia, this study will evaluate only that part of the program involved with the latter; that is, with individuals 18 years of age and over. Four hundred and sixty individuals participated in the adult program between September 1968 and August 1970.

The Crossroads program works with individuals involved in what is known as street crime, meaning such offenses as burglary, larceny, auto theft, and to some extent, prostitution and forgery. Many are felonies at arrest but are reduced or "broken down" by the United States Attorney's Office to misdemeanors for prosecution. The project does not work with individuals charged with such crimes as homicide, rape, gambling, fraud, racketeering, etc., which are usually regarded as being either spontaneous crimes lacking economic motivation or as the province of professional criminals.

Individuals qualify for the project by being "first offenders" arrested for one of the crimes mentioned above or others of a similar nature. A candidate for the project would not be rendered ineligible by one or more juvenile convictions. A previous adult conviction would do so. Prior arrest records do not automatically preclude project participation; many participants have histories of both juvenile and adult arrests. Individuals must be presently unemployed, underemployed or in jeopardy of losing a current job as a result of arrest, and/or a school dropout or only tenuously enrolled in school. Finally, candidates must voluntarily agree to project participation and be approved for enrollment by the court and U.S. Attorney's Office.

This analysis, then, is focused on the youthful criminal offender arrested for a property crime and facing the possibility of his first criminal conviction, and for whom there is a high probability of both recidivism and of remaining in the field of property crime. Throughout this study "property crime" is defined as robbery, burglary, larceny, and auto theft. The normal procedure is to include robbery with violent crimes because an assault is involved. However, here we are interested in crimes with an enrichment motivation, and thus include robbery as a property crime. Recidivism rates of individuals convicted for such property crimes are significantly higher than for those convicted of serious crimes of violence such as murder, rape and aggravated assault.[3] Studies done on criminal careers indicate that there is, at a minimum, a 90% probability that a person convicted of either robbery, burglary, larceny or auto theft, if again arrested, will be rearrested for one of these four crimes.[4]

This type of property crime can be viewed as an economic alternative to work, or as an addition to income from work. For the individual with few skills and minimal education, who is living in a crowded urban area with few social taboos against stealing, crime can become an acceptable way of life. There are many psychological, social, and environmental determinants of an individual's willingness to commit crimes. The declining average age of the population is often cited as a cause of increasing crime rates. Urban density, broken homes, inadequate education, unemployment, and increased affluence in the community are other factors which are associated with high or rising crime rates in the core areas of U.S. cities.[5]

It is clear that programs like Crossroads will not solve the urban crime problem. The issue is the value of this type of program in dealing with one aspect of the problem. For convenience, it can be assumed that the inner city youthful population (or any other)

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[3]Daniel Glaser, The Effectiveness of a Prison and Parole System, (Indianapolis: The Bobbs Merrill Co., Inc., 1964), pp. 41-44.

[4]A. Blumstein and R. Larsen, "Models of a Total Criminal Justice System," Operations Research, XVII (March-April, 1969), 224-225.

[5]President's Commission on Law Enforcement and Administration of Justice, Task Force on Assessment, pp. 25-27, 77-78.

can be divided into three hypothetical groups. First, there is a significant segment of the population which will not commit crimes under even quite pressing social and economic conditions. Second, there is a body of individuals who will "prefer" crime, due to the inherent pleasure, excitement, rewards and leisure, and who are not likely to be "reformed" by manpower or other types of programs, or by the general amelioration of social and economic conditions.

Thirdly, it can also be assumed that in the modern urban community there is a sizeable marginal population which is swayed by economic incentives, whether they issue from job opportunities or criminal opportunities. These individuals, consciously or unconsciously, make a rough benefit-cost evaluation and attempt to maximize their welfare. Accordingly, a given individual will commit crimes if his subjective perception of income accessible to him through crime, discounted by the risk of arrest, prosecution, and conviction, and their respective costs, is greater than his perception of the legitimate income-producing alternatives available. Included in this benefit-cost calculus are the value of leisure obtained from the quick rewards of a theft, the disutility of the exertion, frustration and boredom involved in work, and the psychic value of "going straight," which may or may not be positive.

This analysis assumes that the objective of a program such as Crossroads is to alter the third type of individual's perception of the benefits and costs of his alternative choices. It is not assumed that higher wages and increased employment will totally eliminate crime. The hypothesis is that the program will yield returns in terms of (a) a reduction in the social costs attendant to crime, as well as (b) increased earnings or productivity, which will sufficiently exceed the costs of the program to society.

A. Measurement of Benefits

The four principal social benefits derived from Project Crossroads are: the earnings benefit, the education benefit, the diversion benefit, and the recidivism reduction benefit. These will be analyzed in Chapters III and IV.

The first benefit is an immediate return to society from enrollment of defendants in the program to the extent that their cases are dismissed by the court after project participation. The value to society of thus diverting cases from the criminal justice system depends upon the number of cases dismissed that otherwise would not have been, the costs of judicial proceedings, and the cost of sentences.

The second benefit--earnings--is a measure of the increase in participants' contributions to social welfare. It is assumed that earnings are a valid measure of an individual's productivity and that this, in turn, is a reflection of his contribution to social welfare. The program provides job placement assistance and counseling services which reduce the number and length of unsuccessful job searches, as well as the number of job changes. Reduction in recidivism or delinquency will also result in a higher rate of labor force participation and employment. Changes in annual earnings of project participants will be used to measure this benefit.

The third benefit is derived from the remedial education program. It is impossible to quantitatively measure most of the effect of this aspect of the program because of the poor quality of data available. However, the benefits to those who have been assisted in attaining the high school equivalency certificate can be measured with the traditional rate of return methods found in the economics of education literature. These benefits are briefly presented though they are not included in the benefit-cost calculation.

Crossroads has provided a fourth benefit if it has in fact reduced recidivism, defined here as rearrests. Most studies of recidivism show remarkably high rates, indicating that the traditional judicial and correctional processes are not particularly successful in rehabilitating offenders. A recent FBI survey of offenders released in 1968 found that

60% to 75% were rearrested within five years.[6] Though these rates vary with age, the crime, the disposition, individual court sentencing policies, and the community to which released, the fact remains that recidivism is a major factor in rising crime rates. If the recidivism rate of Crossroads participants, during enrollment and over one year after leaving the project, is lower than it would have been had they not participated in the project, it can be said that society has benefited.

In order to quantitatively measure this benefit, it is necessary to know something of the value to society from reducing recidivism rates by a given percentage. This requires data on the costs of different crimes, police services, various types of judicial proceedings and the costs of various sentences. Furthermore, it is necessary to construct a flow model to predict the probability of each judicial event and each type of disposition for each crime. With this information we can calculate the expected costs of recidivism and thus the benefit from the program to the extent that it reduces recidivism.

Clearly, measurement of the recidivism benefit by this method only examines its effect on the criminal justice system. As will be discussed in Chapter II, there are many other social costs of crime. Individuals alter their behavior patterns, foregoing certain activities, changing residences, using more expensive means of transportation, and so forth. Expenditures are made on locks, alarms, dogs, lighting, armed guards and other deterrent devices. Individuals also purchase insurance against theft. These are losses to society because the human and material resources used in production and distribution of these items could be employed in another manner. To the extent that resources employed in these industries could be reduced through a reduction in recidivism rates, there is a further benefit from the program.

The total benefit from Project Crossroads is the sum of the present values of each benefit measured. The diversion benefit accrues at termination and over the first year or two after the project. The other benefits (earnings and reduced recidivism) can be expected to accrue over several years. Future benefits can be discounted at various interest rates. This is done because, at any point in time, society places a lower money value on goods and services if expected to be received in the future than the same goods and services received in the present. This difference in money values between present and future as seen at any one point in time is called time discount, and this discount when translated to an annual percentage rate is called the social time preference rate. Clearly, if society is to sacrifice present income for the promise of future income, the future income must be sufficiently greater than present income to counterbalance society's time preference. Thus, the time preference rate is the price, stated as an annual rate, which individuals must be offered in order to part with current income on the promise of future income.

It can be shown that in a perfectly competitive capital market, the social time preference will also be equal to the opportunity cost of capital. The opportunity cost of capital is defined as the next best alternative use to which resources used in a given investment could have been put. When the capital market is not perfectly competitive, as in the normal case, the opportunity cost of capital will differ from the social time preference rate.

There is a great debate in the economics literature as to the determinants of the proper discount rate, and on the implications of using the opportunity cost of capital as opposed to the social time preference rate or vice versa. The matter is further complicated because (1) these two rates are not readily observable, as there are numerous interest rates in the market at a given point in time, and (2) observable interest rates are heavily influenced by monetary policy which has different goals than determining the proper allocation of investible resources. Since these issues are far from resolved, this study will present benefits discounted at 5%, 10%, and 15%.

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[6] Federal Bureau of Investigation, Uniform Crime Reports, 1968 (Washington, D.C.: U.S. Government Printing Office, 1969), p. 37.

Project costs include funds expended for counseling, job development and placement, and remedial education, as well as for overhead items such as administration, rent, supplies, etc. Since many of these costs were incurred jointly for both the juvenile and adult components of the project, those attributable to the adult program evaluated here must be isolated. This will be done in Part C of this chapter.

In Chapter V the measured social benefits attributable to the project will be compared to the cost of operating the Crossroads program. If the benefits exceed the costs, the project has resulted in a net gain to society. More precisely, if the benefit-cost ratio exceeds unity, assuming that the discount rate used accurately reflects the social time preference rate and/or the opportunity cost of capital, the project has been a worthwhile investment. Benefits are defined as increases in the welfare of society as a whole. Clearly, some benefits are distributed primarily to project participants. Others will accrue to the rest of society. The benefits and costs to these "groups" will also be discussed.

B. Data

1. Project Crossroads Participants

The participant samples used for this analysis were drawn from the first 200 individuals enrolled in the project. No participant after number 200 was used because there would have been an insufficient follow-up period.

Recidivism and diversion data were available from police and court records for the entire 200 participants. Benefits estimated on the basis of these data were projected for the final project population of 460. Post-project employment and earnings information, obtained from follow-up interviews covering 9- or 12-month periods after project termination, was available on only 130 participants. Data on the number of follow-up interviews and the total follow-up period are presented below.

Table I

FOLLOW-UP DATA					
Number of Follow-up Interviews per Individual			Maximum Length of Follow-up Period per Individual		
One Interview	26	20%	Seven Months	3	2.3%
Two Interviews	65	50%	Nine Months	58	44.6%
Three Interviews	39	30%	Twelve Months	69	53.1%

The interviews were designed to obtain information on employment and earnings since the last contact with the individual, rather than to obtain data at a particular point in time. The earnings benefit for the final project population of 460 was estimated on the basis of the data obtained from the sample of 130.

Since the measurement of the earnings benefit is based on data obtained only from those participants who were contacted during the post-project period, there is some danger of an upward bias resulting from this group's being more stable and more successful than the population as a whole. However, a comparison of the participants followed up with a random sample chosen from the total sample of 200 participants indicated fairly close matching of demographic characteristics, in-project performance, and recidivism both during and after the program. These results support the assumption that the project's earnings benefit, estimated on the basis of the follow-up sample, is unbiased.

Table II provides a comparison of the distributions of the random and follow-up samples for selected socio-demographic characteristics, in-project performance and recidivism. Besides providing a comparison of the two samples, the data provide general information on the population served.

Table II

DEMOGRAPHIC CHARACTERISTICS, IN-PROJECT PERFORMANCE and RECIDIVISM DATA			
CHARACTERISTIC		% of Individuals in Random Sample (N = 72)*	% of Individuals in Follow-up Sample (N = 130)
AGE	18	31.9%	35.1%
	19	25.0%	26.1%
	20	18.1%	11.9%
	21	8.3%	11.2%
	22	5.6%	6.0%
	23	1.4%	3.7%
	24-25	9.7%	6.0%
SEX	Male	81.9%	83.6%
	Female	18.1%	16.4%
RACE	White	11.1%	12.7%
	Black	87.5%	85.8%
MARITAL STATUS	Single	83.3%	82.1%
	Married	13.9%	16.4%
	Separated	2.8%	1.5%
BIRTHPLACE	D. C.	75.0%	62.4%
	South	18.1%	27.1%
	West	2.8%	3.0%
	Non-U.S.	2.8%	2.3%
	Unknown	1.4%	5.3%
SOURCE OF SUPPORT	Parents	40.3%	47.8%
	Other Relatives	1.4%	2.2%
	Spouse	2.8%	2.2%
	Self	45.8%	38.1%
	Welfare	1.4%	2.2%
	No Income	8.3%	7.5%
ENROLLED IN SCHOOL AT INTAKE	No	76.4%	73.9%
	Yes--Full	15.3%	20.9%
	Yes--Part-Time	8.3%	5.2%
HIGHEST GRADE COMPLETED	6	2.8%	1.5%
	7	0.0%	.8%
	8	8.3%	5.2%
	9	12.5%	13.4%
	10	16.7%	20.9%
	11	31.9%	26.1%
	12	23.6%	25.4%
	13 & Up	4.2%	6.7%

		Random Sample	Follow-up Sample
% YEAR EMPLOYED PRIOR TO ENROLLMENT	0- 9%	9.7%	9.0%
	10-19%	11.1%	14.2%
	20-29%	11.1%	14.9%
	30-39%	6.9%	6.7%
	40-49%	4.2%	7.5%
	50-59%	6.9%	6.7%
	60-69%	4.2%	3.7%
	70-79%	11.1%	6.7%
	80-89%	4.2%	4.5%
	90-99%	30.6%	26.1%
RECOMMENDATION TO COURT AT TERMINATION	Favorable	70.8%	79.2%
	Unfavorable	29.2%	20.8%
% TIME EMPLOYED WHILE IN PROGRAM	0- 9%	23.6%	20.2%
	10-19%	4.2%	2.2%
	20-29%	1.4%	3.7%
	30-39%	1.4%	6.0%
	40-49%	0.0%	.8%
	50-59%	5.6%	6.7%
	60-69%	9.7%	7.5%
	70-79%	2.8%	3.7%
	80-89%	7.0%	7.5%
	90-99%	44.4%	41.8%
RECIDIVISM DURING PROJECT	No	91.7%	92.5%
	Yes	8.3%	7.5%
RECIDIVISM AFTER ENTERING CROSSROADS**	No	72.3%	73.8%
	Yes	27.7%	26.2%
RECIDIVISM AFTER LEAVING CROSSROADS	No	72.2%	71.6%
	Yes	27.8%	28.4%

*In the beginning, the sample was drawn from every second individual in chronological order. After 14 were drawn, the procedure was changed to include every third individual in chronological order.

**Excludes disorderly conduct arrests.

2. Control Group

The benefits from the project will be estimated by comparison of a sample of Crossroads participants with a control group. Ideally, controls are selected simultaneously with or from the same time period as the subject or experimental group. However, since all General Sessions Court defendants who were eligible for the project during its existence had been enrolled, it was decided to choose the control group from the 12-month period prior to the beginning of project operations in General Sessions Court in September, 1968.

Individuals in the control group were selected randomly from the court records on the basis of their similarity to the participant group on the four major enrollment criteria: age, no prior adult convictions, offense category, and eligibility for personal bond.[7] There are three factors which are impossible to control and, thus, may be sources of bias. These are: (1) individuals must agree to enter the program, (2) permission to enroll must be given by the U.S. Attorney's Office, and (3) participants are interviewed by a project counselor before enrollment.

Selection of the control group from an earlier point in time than the participant group presents no serious problem for measuring the diversion and recidivism benefits of the project. Data on the case dispositions and incidence of rearrests for both groups are available from police and court records.

However, the time difference does present serious problems for the measurement of the employment and earnings benefit. The individuals chosen as a control group are, at a minimum, one year older, one year further from court disposition, and one year longer in the employment market than project participants when interviewed. More seriously, they were extremely difficult to contact and those who could be reached were likely to be those with better community ties. For this reason, the control data would be biased because of a heavy concentration of individuals with better employment records. Therefore, it became necessary to use the employment records of Crossroads participants prior to project enrollment as an indicator of their performance after the program. It is assumed that the employment and earnings data of the participant group during the year prior to enrollment were equal to those of a theoretical "control group" during the same period. These data were then adjusted to make them comparable to the expected performance of the "control group" a year later, without the intervention of Project Crossroads. Adjustments were made for inflation, increased productivity, knowledge of opportunities, increased age, etc. Furthermore, an adjustment was made for recidivism, and thus lower earnings due to lower force participation, by use of the actual control group recidivism data. To the extent that the "constructed control group" is a good proxy for the performance of the program participants, this technique is valid.

These adjustments fail to account for difficulties imposed by a conviction record. Crossroads intervention eliminates the burden of a conviction record. For participants who would have had conviction records had the program not existed, earnings would have been lower the year after the program than assumed by the method used here. To the extent that this factor exists, the results will underestimate the benefit from the program.

C. Costs of Project Crossroads

Measurement of the costs of Project Crossroads presents some difficulty because there were actually two programs in operation at the same time. In addition to the adult component discussed in this paper, the project operated a similar program for juveniles. The appropriate method when confronted with joint costs is to evaluate the benefits from

[7] Eligibility for personal bond is determined through an interview with the accused by a judicial officer. There is not a fixed set of criteria covering all cases. "Under the Bail Reform Act of 1966, any person charged with an offense other than one punishable by death must be released by a judicial officer on personal recognizance or unsecured appearance bond unless release on these terms will not reasonably assure the accused's presence at trial . . . In setting conditions to ensure the accused's appearance, the judicial officer is authorized to consider the nature and circumstances of the offense charged, the weight of the evidence against the accused, the accused's family ties, employment, financial resources, character and mental condition, the length of his residence in the community, his record of convictions, and his record of appearance at court proceedings including any prior flight to avoid prosecution or failure to appear at court proceedings."

President's Commission on Crime in the District of Columbia, Report of the Commission (Washington, D.C.: U.S. Government Printing Office, 1966), pp. 508-510.

both components and measure these against the costs entailed in operating both. However, since the Crossroads juvenile program did not become a true pre-trial diversion program until the fall of 1969,[8] the decision was made by project administrators not to examine the benefits of that component. For the purpose of this analysis, it is necessary to allocate those costs attributable solely to the adult program. That is, it is necessary to estimate the costs that would have been incurred had only the adult component been in operation.

Another difficulty is the fact that 25% of the project administrators' time was required by contract to be devoted to technical assistance in the planning and development of other MDTA programs on behalf of the Manpower Administration. This obligation also required expenditures for out-of-town travel which were in no way connected with the project operations discussed here.

The cost of operating any new program includes expenditures involved in early planning and organization, which will not be incurred at the same rate as times goes on. The Crossroads program had a four-month period of planning by project administrators before beginning enrollment. Expenditures incurred prior to enrollment of individuals are not included in the extimated cost of maintaining the program. Here monthly costs for the last 12 months of the program are used to estimate the average cost per participant. Cost per participant is then multiplied by the total population (460) to obtain the total cost of operating the program.

Counselors, job developers, secretaries, office rental and office supplies are all considered specific costs. These are allocated to the adult program on the basis of the proportion of adult participants to total participants. Twenty-five percent of administrators' salaries is subtracted because of technical assistance provided to other MDTA programs. No allocation is made of administrative costs between the juvenile and adult program, because administration is not specific to either program. It is assumed that these administrative costs would have been incurred even if there had been no juvenile program.

The equation used here for estimating costs of operating and maintaining the program is as follows:

$$C_x = \left\{ \sum_{i=1}^{12} [C_O - (C_A + C_M)]_i \right\} + \left[\sum_{i=1}^{12} \frac{Ai}{Ti} \right] + .75\ C_A$$

where: i = month; June 1969, to May 1970

C_O = total monthly costs of operating program

C_A = monthly cost of administration of program

C_M = monthly cost of out-of-town travel for technical assistance to MDTA programs

A_i = number of adult participants in month i

T_i = total number of participants in month i

The average cost per person, when these calculations are carried out, is $194.38 per month. Allowing for the differences in length of project participation, the cost of the

[8] The basic difficulties were twofold: (1) unwillingness of the Juvenile Court to allow a 90-day continuance for a significant number of candidates and (2) unwillingness of Juvenile Court to comply with project recommendation for dismissal of charges following favorable participation.

program for 460 participants can be easily derived. The 74% of project participants who are favorably terminated average three months of program participation, while the 26% who were terminated unfavorably average six weeks. On this basis, the average cost per participant is $506.52.[9] The total cost for 460 participants calculated as above is $233,999.20.

[9] The administrators of the program believe that optimum caseloads for this type of program would be 25 participants per counselor. During the 12-month period considered here, the average caseload was 18 per counselor. If, in fact, the counselors had maintained caseloads of 25, then 639 individuals would have been enrolled for the same cost, assuming the same rate of favorable termination (74%) with the larger caseloads. In this event, the average cost per participant would fall to $370.83.

II. ECONOMIC COSTS OF CRIME

This chapter discusses the economic costs of property crime. Estimates of the welfare costs of thefts and the marginal costs of police, court, corrections, probation, and parole services are provided. These estimates will be used in a model in Chapter IV to measure the value of reduction in recidivism rates.

First the welfare costs of thefts are discussed (Part A). A theft of goods or cash is not an economic loss to society insofar as it results in a redistribution of ownership of wealth or monetary claims on wealth. Although there is a loss to the victim, there is no net reduction in social welfare, ignoring physical injury, property damage, etc., if that loss is equal to the gain of the perpetrator or ultimate consumer. It can be argued, however, that there is a cost to society in the transfer if in fact the good loses value because it is a stolen good.

While the value of property stolen should not be considered a loss to society as a whole, this does not mean that forced transfers of wealth have no social costs. Rather, they include the foregone productivity of the thief, assuming this would be in socially acceptable employment. The social costs also include the private and public resources which are expended to prevent crime and to apprehend, adjudicate, punish, and rehabilitate criminals. This would include private expenditures on locks, alarms, lights, security guards, insurance, etc., and public expenditures on police, courts and correctional systems. These expenditures employ human and material resources which could be employed elsewhere in the absence of crime. To the extent that these resources could be used productively elsewhere, they are a cost to society in their present use. Finally, one must also include the fear, avoidance of normal activity, and community disruption, which, though impossible to quantify, are nonetheless very real costs of crime.

Parts B, C, D, and E discuss the economic cost of resources used in the criminal justice system. Many of the costs of crime in the criminal justice system are fixed in the short run in the sense that they do not vary with changes in the numbers of crimes, arrests, court cases, incarcerations, etc. For example, expenditures on corrections include many fixed costs (e.g., existing prison facilities), with the result that a specific reduction in crime cannot be expected to proportionately reduce corrections expenditures. Activities of the police force both prevent and solve crimes, so that a reduction in crimes committed cannot be expected to proportionately reduce the cost of maintaining a police force.

The average costs of arrests, trials, imprisonment, probation, etc., do not reflect the changes in demand for resource inputs to the criminal justice system generated by changes in the number of crimes, trials, inmates, etc. Thus it is necessary to estimate the <u>marginal</u> costs to society for police, court and corrections services. Specifically, we are interested in the following derivatives:

$$\frac{d\,R_p}{d\,O}, \quad \frac{d\,R_j}{d\,D}, \quad \frac{d\,R_c}{d\,I}, \quad \frac{d\,R_b}{d\,B}$$

where: R_p = resources employed in the police department

R_j = resources employed in the judicial system

R_c = resources employed in the corrections system

R_b = resources employed in the probation or parole departments

O = number of property offenses

D = number of defendants in court cases

I = number of inmates in the corrections system

B = number of cases in probation or parole department

A. Welfare Costs of Thefts

As stated above, the actual theft of goods or cash involved in a property crime is not, itself, an economic loss to society as a whole, but a transfer of wealth from one member of society (the victim) to another (the thief or the ultimate consumer). It can be argued, however, that there is a cost to society in the transfer to the extent that the good loses "value" because it is a stolen good. For example, a $100 television is stolen from a store, transferred through a "fence," and purchased by another party for $50. Objectively, the good has not lost value in the sense of its ability to yield a stream of tangible benefits to the owner (e.g., x number of years of television viewing), but it is perceived by the purchaser to be worth less than $100. The difference between the two prices is due to both the risk involved in holding a stolen good (from the viewpoint of the purchaser) and the windfall gain to the purchaser, i.e., the difference between what he would be willing to pay for the stolen good and the price which he actually pays for it because the thief or seller is inclined to offer it at a lower than competitive price. This can be shown in equation form as follows:

$$V_s = V_p + r\,(V_s) + G$$

where: V_s = value of good stolen

V_p = cost of good to ultimate purchaser

r = risk discount for holding stolen good

G = windfall gain to purchaser

Because of the risk factor, the stream of benefits to the purchaser is discounted. If $r > O$, it cannot be argued that the gain to the thief and ultimate purchaser is equal to the loss of the victim. There has been a reduction in value of wealth in society to the extent that $V_s - V_p - G = r\,(V_s) > O$. If $r\,(V_s) = O$, the entire difference in the two prices is a gain to the thief or ultimate purchaser; it is thus pure transfer and no loss to society occurs.

The Metropolitan Police Department Annual Report, 1969 gives the estimated value of goods stolen (unrecovered) in robbery, burglary, and larceny and auto theft offenses.[1] Criminals derive 25% to 33% of the value of goods and individuals can normally purchase stolen goods for 50% of their market value.[2] For the purpose of estimating the social benefit of reduced recidivism in Chapter IV, this study will assume r = .2, or that a good loses 20% of its value by acquiring the characteristic of being stolen. The average value of goods stolen per unit of property crime and the estimated welfare costs of thefts based on the assumed r value are provided below in Table I.

TABLE I

ESTIMATED VALUE COST OF THEFTS

	AVERAGE VALUE OF GOOD STOLEN (V_s)	ESTIMATED WELFARE COST OF THEFTS $r(V_s)$
Robbery	$148.21	$29.64
Burglary	$230.98	$46.20
Larceny	$143.53	$28.71
Auto Theft	$261.94	$52.39

[1]Metropolitan Police Department, Washington, D.C., Annual Report, 1969, (Washington, D.C.: Metropolitan Police Department, 1969), p. 60.

[2]Narcotics Division, Metropolitan Police Department, private interview, Washington, D.C., April, 1970.

As property crime increases, the fencing market becomes more competitive. There are a large number of producers (criminals), several wholesalers (fences), and many final consumers. In the inner city, the relative ease with which one can purchase a given make electrical appliance, certain types of clothing, etc., is well known. The greater the efficiency of the fencing market, the more the current difference between V_s and V_p is due to r rather than G. Thus, in the above estimates, r may be closer to .5.

B. Police Costs

One index of the cost of crime as perceived by society is the amount it is willing to pay to prevent and solve crimes, to adjudicate guilt, and to imprison and/or rehabilitate convicted offenders. In the specific case of the demand for police services we are interested in how much society is willing to pay to prevent and solve certain types of crime. The hypothesis is that society responds to increases in reported crime by increasing police. We are interested not only in the existence of this relationship but also in the increment to police costs attributable to a unit change in the number of specific crimes or set of crimes. Clearly, many criminal acts go undetected (weapons offenses, shoplifting) and/or unreported (larceny, assaults). Here we assume that public decisions to increase expenditures on police are based on the most ostensible crimes--those reported.

The existence of unknown numbers of unreported and undetected crimes complicates any empirical analysis of resource allocation within the criminal justice system. The President's Commission on Law Enforcement and Administration of Justice estimates that unreported crimes are three to ten times as many as those reported.[3] The ratio of reported to unreported crime decreases with the degree of violence in the crime. That is, murder is much more likely to be reported than larceny. Other crimes, such as narcotics sales or gambling, which have no unwilling victims, are not readily detected by the community at large. Data on the amount of such crimes is available only through arrest statistics which undoubtedly greatly underestimate their incidence. Because the community as a whole is most aware of reported crimes, it is assumed here that decisions are made on the basis of these data.

In this analysis we are primarily interested in the marginal cost of property crime. Expenditures on police department services have increased greatly over the past decade in response to property crime in the District of Columbia. These expenditures have also increased in response to changes in violent crime, narcotics usage, gambling and other such "no victim" offenses, automobile traffic, and general social unrest. The police costs incurred in response to an increase in specific crimes can be estimated by the use of multiple regression analysis. This permits estimation of the increase in police costs attributable to an increase in property crime, while holding constant the independent effects of changes in other types of crime.

Dependent Variable

The dependent variable, annual police costs (X_1), was constructed by estimating labor and mobile equipment costs in constant dollars for each year, 1957-1970. Labor costs were estimated by multiplying units of police manpower by rank for each year, 1957-1970, by 1969 salaries. Current year salaries are used to eliminate inflation as a cause of increased police costs. However, increases in police salaries over time may reflect a demand for more productive manpower as well as inflation. If this has occurred, this method understates the increase in demand for police services by weighting equally previous and current years' units of manpower.

[3]President's Commission on Law Enforcement and Administration of Justice, The Challenge of Crime in a Free Society, (Washington, D.C.: U.S. Government Printing Office, 1967), p. 21.

The annual costs of mobile equipment is added to manpower costs. These costs have been estimated for each year with the following equation:

$$C_v = [(S_o - \underline{S}_1) + \underline{S}_3] \; C_n - \underline{S}_3 \cdot C_d + \sum_{i=0}^{2} S_i \; (C_m)$$

where: S = stock of motor vehicles in a given year; S_o = stock of new vehicles, $\underline{S}_1$ = stock of 1 year old vehicles, etc. Vehicles are assumed to last for three years, and are then scrapped.

C_n = cost of a new vehicle, 1969.

C_d = scrap value of discarded vehicles, 1969.

C_m = average cost of operation and maintenance of a vehicle in the year 1969.

The Metropolitan Police Department estimates the average cost of new vehicles, including special equipment, at $3400 each, and the average scrap value of discarded vehicles at $500.[4] The average expenditure on maintaining and operating police vehicles is estimated by the 1969 cost per vehicle multiplied by the stock of vehicles in each year. By using current year prices, increases in costs are due solely to increases in the number of vehicles. However, the quality of motor vehicles and police equipment has improved over time. By not adjusting for quality change, each year's motor vehicles are weighted equally, and the increase in demand for police services is understated.

Independent Variables

The independent variables include all the various crimes which have caused resources to be employed in the police department. Also included are traffic and parking violations and special details such as riot duty, Capitol Hill patrol, etc. The principal difficulty in using multiple regression analysis is the existence of multicolinearity. There is a high simple correlation between each of the four property crimes (robbery, burglary, larceny and auto theft). When two or more independent variables are highly correlated with each other, it is impossible to discern the separate effects of these on the dependent variable. These independent variables can be combined to form a new variable, such as "property crime," "no victim offenses," etc., with the results then yielding the effect of each of the newly constructed aggregate variables on the dependent variable. The independent variables used here have been developed from 14 years of data provided by the District of Columbia Police Department and are defined as follows:

X_2 = murder and non-negligent manslaughter, rape and aggravated assault offenses reported, 1956-1969.

X_3 = robbery, burglary, larceny and auto theft offenses--classified in this study as "property crime"--reported, 1956-1969.

X_4 = other assault, fraud, embezzlement, forgery, vandalism offenses reported plus stolen property and weapons arrests reported, 1956-1969. Stolen property and weapons arrest rates were used because these crimes are usually not reported except by the arresting officers. Often an arrest will be reported and the offense not reported. Thus, arrests are a better indicator of detected offenses.

[4] Fiscal Affairs Division, Metropolitan Police Department, private interview with members of division, Washington, D.C., 1969.

X_5 = sex, prostitution, gambling, liquor law and drug law arrests--the "no victim" offenses. These are aggregated because they are rarely reported by the public, but rather are uncovered by police investigation. If the police department makes fewer searches for narcotics violations, numbers of arrests will fall even though offenses may have risen.

X_6 = moving traffic violations.

X_7 = parking violations.

X_8 = special details--hours spent by police away from normal daily activity. This includes riot or demonstration duty, embassy parties, etc. The increases in this variable over time primarily reflects the increased police manpower due to intensified political activity. Police must prepare for "peak-load" requirements, by adding to full-time staff over an entire year.

Table II gives the results of the regression of each variable on time.

TABLE II

REGRESSION OF INDEPENDENT VARIABLES ON TIME				
Variable	Coefficient on Linear Term (Yearly Increment)	Growth Rate	T-Value of Linear Term	$\bar{R}^2$
X_2	50.8	1.5%	2.95	.37
X_3	3516.3	12.0%	6.52	.76
X_4	69.2	.8%	1.06	.01
X_5	-202.1	-5.5%	-6.53	.76
X_6	250.2	.3%	.52	.06
X_7	22711.2	6.9%	9.43	.87
X_8	17346.0	5.9%	6.12	.74

The results of the multiple regression analysis (Table III) indicate that property crimes, as defined above, are significantly related to increases in expenditures on police. The coefficient for the property crime variable is consistently around 282, which should be interpreted to mean that in the recent past society has responded to increased property crime by increasing police manpower and equipment at the rate of $282 per unit (one crime) change in the level of reported property crime. In Table IV the upper term in each row is the coefficient for each variable. The lower term, in parenthesis, is the T-value, indicating the statistical significance of the corresponding coefficient.

TABLE III

REGRESSION ANALYSIS--POLICE COSTS						
Constant	Property Crime X_3	Violent Crime X_2	Hours of Details X_8	Part II Offenses X_4	No Victim Offenses X_5	$\bar{R}^2$
16,703,958 (13.36)	281.09 (10.46)		11.90 (2.21)			.962
17,141,715 (3.84)	283.12 (8.23)	-170.25 (-.10)	12.07 (2.06)			.958
17,105.921 (3.21)	282.60 (5.54)	-180.07 (-.09)	12.16 (1.43)	9.02 (.01)		.953
17,132.964 (3.60)	283.53 (5.58)	-184.49 (-.09)	12.12 (1.69)		8.03 (.01)	.954
16,790,125 (4.23)	281.99 (5.87)		12.12 (1.69)	12.73 (-.02)		.958

The property crime variable (X_3) is highly significant and its coefficient remains stable as new variables are introduced. This indicates that we can be reasonably confident that the marginal cost of this type of crime, defined as the additional expenditures society is willing to make to purchase police services as crime increases, is about $282 per reported property crime. The hours of details variable is also quite stable and is significant in two equations. The high value of the coefficient (in comparison to the hourly wage of a police officer) indicates a "peak-load effect." Police must prepare for peak-load requirements (civil disturbances, political demonstrations, rallies, etc.) by adding to full-time staff over an entire year.

None of the other coefficients are statistically significant. Clearly, society reacts quite strongly to crimes included in "violent crime," and to a lesser extent to "no victim" offenses, particularly narcotics. A low T-value is not proof of no correlation; it means only that correlation could not be firmly established with this technique. The results do not indicate correlation presumably because there was irregular movement in the data series over the 14 years. The costs arising from "violent crimes," "no victim" crimes, etc., are included in the constant term in the results, which reflects all costs which are relatively constant over time.

The R^2 statistic, adjusted for degrees of freedom, is consistently around .96. The addition of new variables to X_3 and X_8 results in a decrease in the adjusted $\bar{R}^2$.

The property crime coefficient may be overstated due to the omission of some independent variable with which it is highly correlated. Omission of a particular variable is one approach used in multiple regression analysis to cope with the problem of multicolinearity. This approach is used only where there is some a priori information which indicates that the variable omitted is of minor importance relative to the variable specified. In this analysis, parking violations (X_7), which have increased by 6.9% per year between 1956 and 1969 and which have a very high simple correlation (.96) with property crime, were omitted from the equations presented in Table III. If, in fact, society has increased its expenditures on police services for the purpose of issuing more parking violations, the property crime coefficient is overstated. If, on the other hand, increased parking violations are a result, not a cause, of a larger police force, or if they have occurred because of the reduction in the relative price of violations vis-a-vis prices of parking lot spaces, then it is correct to ignore them. Finally, expenditures on police services could increase

over time regardless of changes in the level of various crime rates. Unless police services are an inferior good, expenditures on police manpower and equipment can be expected to increase as personal income increases. Additional equations were estimated using real personal income per capita in Washington, D.C., as an independent variable. The income variable was not significant, presumably due to a high degree of multicolinearity. Real personal per capita income is highly correlated with both property crime (.91) and hours of details (.87). Multicolinearity does not result in biased coefficients, but rather in reducing the value of the standard errors. The results are presented in Table IV.

TABLE IV

POLICE COST REGRESSIONS--
INCOME, PROPERTY CRIME, etc., ON POLICE EXPENDITURES

CONSTANT	PROPERTY CRIME X_3	HOURS OF DETAILS X_8	REAL PERSONAL INCOME PER CAPITA X_9	$\bar{R}^2$
-24,137,391 (-3.94)			16,547.34 (8.56)	.847
8,565,129 (1.24)	258.28 (5.43)		3,941.28 (1.54)	.955
14,988,264 (1.86)	272.99 (5.82)	10.76 (1.40)	725.43 (.22)	.944

C. Court Costs

Development of cost estimates for the judicial process is considerably more difficult, primarily because less data are available. Secondly, it is difficult to measure the opportunity cost of court facilities. The opportunity cost of court facilities would be their lease value in their next best alternative use, adjusted for the cost of preparation or remodelling. Also, some arbitrary allocation of the opportunity cost over separate judicial events, such as jury trials or pleas of guilty, must be made. Because the opportunity cost of court facilities per judicial event will be rather insignificant, they will be ignored in these estimates.

The cost of manpower, which is a far more important resource input in the judicial process, is more readily measurable. Furthermore, manpower inputs are more readily varied. If there is a decrease in the demand for judicial proceedings, there are at least two possible changes which can be made. Either fewer court personnel are needed, or the quality of court services can be altered (i.e., less plea bargaining, shorter lags between arrest and trial). In either case, there is a clear savings in the sense that society can reallocate these human resources to satisfy other existing needs. Thus, for the purpose of estimating the marginal cost of judicial proceedings, only costs of labor will be included. The method for estimating the court costs will be a simple summation of the personnel involved in a specific court event (e.g., a jury trial) and their respective annual salaries, the time involved in each type event as a proportion of time worked in a year, plus similar estimates for prosecution, defense attorney, and docket clerk costs for each type event.

There are, of course, clear limitations on this method of estimation of costs of judicial events. For example, the time consumed by jury trials, court trials and pleas is subject to a great amount of variation. The length of each of these can vary with the facts

of the case, the number of motions presented,[5] the number of witnesses, the judge, and the prosecution and defense attorneys. Also, a case may have many continuances,[6] involving repeated court appearances for several people. A small percentage of cases are sent to the Court of Appeals for review.[7] Finally, the costs of legal counsel for the defense were estimated on the assumption that the attorney was provided by the government through the Criminal Justice Act. The cost of a private attorney is usually substantially greater.

The data required for these estimates of the costs of the judicial process were obtained from various sources. Information on court personnel and salaries, clerical time per case, and numbers of witnesses and jurors per event in the District Court was provided by the Clerk's Office, U.S. District Court for the District of Columbia. Defense attorney costs, district attorney costs, and time per jury trial, grand jury hearing, court trial and plea in the District Court are based on information provided by the Administrative Office, U.S. Courts. Finally, data on court personnel and salaries and clerical time per misdemeanant case were provided by the Clerk's Office, D.C. Court of General Sessions. Data on the average time per trial, plea and pre-trial processing, as well as information needed to estimate district attorney costs per type of disposition, were provided by the U.S. Attorney's Office, D.C. Court of General Sessions. Defense attorney costs in General Sessions Court were based on information provided by the Administrative Office of the Criminal Justice Act in that court.

The objective here is to estimate the incremental demand for resources due to a unit change in demand for a judicial proceeding. It is necessary to make certain assumptions in order to calculate the impact of time spent in a specific court event for different individuals. Thus, it is assumed individuals work 240 days in a year. That is, individuals are compensated for the entire year, including vacation, sick leave, weekends, etc., for productivity during 240 days. Likewise, a seven hour day is assumed. Thus, a trial lasting 3-1/2 hours consumes one-half of the daily supply and 1/480th of the annual supply of these resources.

Finally, the opportunity cost of witnesses or jurors has been estimated on the assumption that each earns $6,000 annually. Since earnings are a measure, although imperfect, of productivity, this is an estimate of the loss to society from the need to employ individuals as witnesses or jurors. In order that the social cost of jurors or witnesses be spread more evenly among society, a fee is paid. To the extent that the fee is less than his compensation for goods and services he could have provided had he not been a juror or witness, the individual bears the difference as a tax. The $6,000 multiplied by the time per event as a proportion of total time worked during a year yields the opportunity cost per juror or per witness. To the extent that jurors or witnesses average more or less than $6,000 annual earnings, these estimates are biased.

The estimates of costs per judicial event are shown in Table V. The units of manpower, the annual cost per unit, and the estimated time per judicial event are also presented.

[5] President's Commission on Crime in the District of Columbia, Report of the President's Commission on Crime in the District of Columbia (Washington, D.C.: U.S. Government Printing Office, 1966), p. 258.

[6] Ibid, p. 258.

[7] Ibid, p. 258.

TABLE V

ESTIMATED COSTS OF SPECIFIC JUDICIAL EVENTS, 1969

I. Grand Jury Hearing - U.S. District Court:

PERSONNEL	ANNUAL COST
1. Grand jurors (23)	$ 6,000
2. Witnesses (3)	6,000
3. District Attorney	12,000
4. Court Reporter	10,000
	$178,000

Time = .25 hours
Cost per Grand Jury Hearing $26.50

II. U.S. District Court - Jury Trial:

PERSONNEL	ANNUAL COST
1. Court (judge, reporter, bailiff, etc.)	$ 76,115
2. Jurors (14)	84,000
3. Witnesses (6)	36,000
	$196,115

Time = 2.25 days

Cost per jury trial	$1,837.60
Docket Clerk	42.30
District Attorney	182.00
Criminal Justice Act	150.00
	$2,211.90

U.S. District Court - Non-Jury Trial:

PERSONNEL	ANNUAL COST
Court	$ 76,115
Witnesses (6)	36,000
	$112,115

Time = .75 days

Cost per trial	$ 622.80
Docket clerk	42.30
District Attorney	57.30
Criminal Justice Act	100.00
	$ 822.40

U.S. District Court - Plea:

PERSONNEL	ANNUAL COST
Court	$ 76,115

Time = 1/3 hour

Cost per plea	$ 15.10
Docket Clerk	21.15
District Attorney	14.00
Criminal Justice Act	50.00
	$ 100.25

III. Court of General Sessions - Jury Trial:

PERSONNEL	ANNUAL COST
Court	$ 51,262
Jurors (13)	78,000
Witnesses (5)	30,000
	$169,262

Time = 4/7 day	
Cost per trial	$ 403.00
Docket Clerk	5.00
District Attorney	42.00
Defense Attorney	90.00
	$ 540.00

Court of General Sessions - Non-Jury Trial:

PERSONNEL	ANNUAL COST
Court	$ 61,262
Witnesses (3)	30,000
	$ 91,262

Time = 1/7 day	
Cost per trial	$ 54.30
Docket Clerk	5.00
District Attorney	24.50
Criminal Justice Act	57.50
	$ 141.30

Court of General Sessions - Plea:

PERSONNEL	ANNUAL COST
Court	$ 61,262

Time = 1/3 hour	
Cost per plea	$ 12.15
Docket Clerk	5.00
District Attorney	14.00
Defense Attorney	50.00
	$ 81.15

D. Corrections Costs

The marginal costs to society from the incarceration of offenders can also be determined by multiple regression techniques. In this analysis we are interested in the value of the resources which could be freed to be used in another way by society, if the prison population could be reduced. Since many of the costs of incarceration are fixed in the short run, these are independent of changes in the inmate population. In the long run, no costs are fixed and a large scale reduction in crime or institutionalization of criminals could conceivably lead to a decision to lease some existing facilities for another purpose. In that event, the value of resources freed by reduction in crime would be larger than the estimates made in this paper. Here we are interested in costs which are dependent upon changes in the inmate population over a relatively short time period. The marginal cost of an inmate has been estimated for the District of Columbia Department of Corrections and for its two largest correctional institutions, the Lorton Youth Center and the Lorton Correctional Complex.

The hypothesis tested in this section is that there is a significant relationship between the costs of running a prison and the number of inmates. By using monthly data, we can observe the changes in prison expenditures (average monthly costs) in reaction to changes in the prison population (average monthly inmate population). We are interested not only in the statistical significance of the coefficient but also in its value, which is the equivalent of the marginal cost of an inmate per day. Since costs will increase over time because of general wage and price inflation, and because of increased institutional services per inmate (e.g., an increase in the staff-to-inmate ratio), other independent variables are used to eliminate the effect of these influences on the coefficient of the inmate variable. Fixed costs will appear in the constant term in the results.

The variables used in the analysis can be defined as follows:

DEPENDENT VARIABLES

X_1 = Average daily direct costs by month in the Lorton Youth Center, July, 1967 to February, 1970. Direct costs as defined by the D.C. Department of Corrections include personnel compensation and benefits, office machine rental, officers' uniforms, inmate clothing and footwear, provisions, laundry services, maintenance and office supplies, etc.

X_2 = Average daily total costs by month in the Lorton Youth Center over the time period July, 1967 to February, 1970. Total costs as defined by the D.C. Department of Corrections include direct costs plus executive and administrative services, transportation, medical services, planning and research, evaluation and training of personnel, etc.

X_3 = Average daily direct costs by month in the Lorton Correctional Complex over the time period July, 1967 to February, 1970.

X_4 = Average daily total costs by month in the Lorton Correctional Complex over the time period July, 1967 to February, 1970.

X_5 = Average daily direct costs by month in the D.C. Department of Corrections over the time period July, 1967 to February, 1970.

X_6 = Average daily total costs by month in the D.C. Department of Corrections over the time period July, 1967 to February, 1970.

INDEPENDENT VARIABLES

X_7 = Average daily population by month in the Lorton Youth Center over the time period July, 1967 to February, 1970.

X_8 = Average daily population by month in the Lorton Correctional Complex over the time period July, 1967 to February, 1970.

X_9 = Average daily population by month in the D.C. Department of Corrections over the time period July, 1967 to February, 1970.

X_{10} = Dummy variable representing the influence of government pay increases on personnel compensation. July, 1967--June, 1968 = 0; July, 1968--June, 1969 = 1; July, 1969--February, 1970 = 2.

X_{11} = Staff-inmate ratio: This is included because of the effect of increasing the level of custody per inmate, the services provided per inmate, etc.

X_{12} = Time; this is a proxy variable, representing the influence of both inflation and increased services per inmate.

Regression equations were established for the Department and the two institutions using both direct and total costs as dependent variables. The most important independent variable is, clearly, the number of inmates. The pay increase dummy and the staff-inmate ratio were used to account for inflation and the increasing level of services per man. In alternative equations, time was used for the same purpose. It is not clear which yields better estimates.

The dummy variable representing the government pay increase is used rather than a price index because such pay increases come at given points in time, not throughout the year. Personnel compensation is by far the largest item in the Corrections Department budget. Efforts were made throughout this 32-month period to increase the level of services-per-inmate. This includes both the number of correctional officers, treatment personnel, educational and job training equipment, etc. The staff-inmate ratio does not do well in these equations, primarily because of high vacancy rates during late 1968 and early 1969. While the Department was attempting to increase its level of services, disturbances at several institutions resulted in high vacancy rates. Thus staff-inmate ratios show sporadic movement until the middle of 1969 when they began increasing.

Time is introduced as an alternative independent variable. Many expenditures of the Corrections Department other than payroll are affected by inflation. Also, some of the effort to increase the level of services per inmate is through upgrading the quality of equipment and personnel. Thus, perhaps time will better account for the overall influence of inflation and the level of services per inmate.

The results are presented in Table VI. The upper term in each row is the coefficient for each variable. The lower term, in parenthesis, is the T-value of the corresponding coefficient.

TABLE VI

REGRESSION ANALYSIS - CORRECTIONS COSTS

	DEPENDENT VARIABLES	Constant	X_7	INDEPENDENT VARIABLES X_{10}	X_{11}	X_{12}	$\bar{R}^2$	D.W.
LORTON YOUTH CENTER	(1) Direct Costs (X_1)	1,392.59	7.95			34.56	.719	
		(1.31)	(2.08)			(2.08)		
	(2) Direct Costs (X_1)	1,874.84	11.04	214.52	- 5,603.52		.714	1.56
		(1.47)	(3.55)	(1.27)	(-1.16)			
	(3) Total Costs (X_2)	522.88	15.39			48.98	.799	
		(.34)	(2.80			(2.05)		
	(4) Total Costs (X_2)	-90.65	18.45	436.86			.776	1.90
		(.07)	(4.20)	(1.94)				
	(5) Total Costs (X_2)	51.76	18.53	426.75	-786.82		.768	1.90
		(.03)	(4.09)	(1.73)	(- .11)			
		Constant	X_8	X_{10}	X_{11}	X_{12}	$\bar{R}^2$	D.W.
LORTON CORRECTIONAL COMPLEX	(1) Direct Costs (X_3)	3,162.05	4.71			131.67	.796	
		(1.75)	(2.53)			(3.14)		
	(2) Direct Costs (X_3)	3,150.23	5.93	1,331.61	- 2,641.30		.811	1.70
		(1.03)	(4.36)	(3.51)	(- .21)			
	(3) Total Costs (X_4)	3,715.37	8.15			238.80	.800	
		(1.17)	(2.50)			(3.26)		
	(4) Total Costs (X_4)	1,700.10	11.38	2,099.03			.800	1.83
		(.61)	(4.56)	(3.15)				
	(5) Total Costs (X_4)	-1,491.52	11.36	2,231.46	15,150.42		.790	1.88
		(.26)	(4.50)	(3.18)	(.75)			
		Constant	X_9	X_{10}	X_{11}	X_{12}	$\bar{R}^2$	D.W.
D. C. DEPARTMENT OF CORRECTIONS	(1) Direct Costs (X_5)	11,177.95	3.43			356.08	.811	
		(2.05)	(1.53)			(4.22)		
	(2) Direct Costs (X_5)	5,440.71	6.13	3,288.50	3,847.37		.812	1.68
		(.81)	(3.66)	(4.15)	(.15)			
	(3) Total Costs (X_6)	5,816.18	9.06			497.21	.801	
		(.60)	(2.28)			(3.32)		
	(4) Total Costs (X_6)	-2,003.02	13.21	4,330.23			.799	1.81
		(.25)	(4.43)	(3.26)				
	(5) Total Costs (X_6)	-8,423.27	12.99	4,685.64	33,041.84		.795	1.89
		(-.70)	(4.29)	(3.28)	(.71)			

The regression equations were estimated first with inmates as the sole independent variable, secondly with inmates and time as independent variables and thirdly with inmates and the pay increase dummy as independent variables. The inmate variable is significant at the .05 level in all equations. The coefficient, however, depends on which independent variables are specified. For the aggregate of all D.C. Department of Corrections institutions, the coefficient is 9.06 when time is included and 13.21 when the pay increase dummy is used.

The coefficient on the inmate variable can be interpreted as the marginal cost per inmate. Thus the estimated marginal daily cost per inmate in the Lorton Youth Center is $15.39 or $18.45 depending on the other variable specified. Likewise, the estimate of the marginal cost per day per inmate in the Lorton Correctional Complex is equal to either $8.15 or $11.36. The time variable is significant at the .05 level in each equation. The pay raise variable is significant in all but the Youth Center equations.

The $\bar{R}^2$ multiple correlation coefficient ranges from .75 to .80 in all the total cost equations. The equations with time included as an independent variable have slightly higher $\bar{R}^2$'s than do the equations with the pay raise variable. The addition of the staff-inmate ratio reduces the value of the adjusted $\bar{R}^2$. The value of the Durbin-Watson statistic can be interpreted as rejection of the hypothesis of auto-correlation.

An important social cost of imprisonment is the foregone productivity of inmates. This can be measured as the difference between his productivity in the institution and his productivity had he been in the labor force. There are little data on the marginal productivity of inmates but it is doubtful that it is very significant. Some inmates work in laundries, farms, license plate factories, etc. However, the production process is extremely labor intensive, suggesting very low marginal productivity.

In a sample of individuals (average age = 21.8 years) who participated in the Crossroads program, several (26%) recidivated in the following year. Of these, it was found that the average percentage of time employed prior to incarceration was 43.6%, and the average wage per hour was $1.73. Using these, we can make a rough estimate of earnings of individuals who are committing crimes but are not yet apprehended, and thus estimate the foregone productivity of inmates.[8] Assuming marginal productivity of inmates in prison to be equal to zero, earnings foregone per year would be $1509. This is equal to $4.13 per day of incarceration.

On the other hand, some of the expenditures of the Corrections Department are more properly considered transfers (food, shelter) rather than social costs. Expenditures for housing facilities are relatively fixed costs, and thus would not appear in the inmate coefficient. However, expenditures for food and beverages vary closely with the number of inmates, but amount to only 10% - 12% of direct costs.

E. Probation and Parole Costs

The marginal cost of an additional person on probation or parole depends upon the decision-making period. Here it is assumed that adjustments of caseloads are made annually. The cost per probation or parole officer can be estimated as his salary plus the manpower needed to support him. The latter can be determined by dividing the total clerical and secretarial manpower in a probation or parole office by the number of caseworkers.

Next we assume that there is some maximum caseload which society deems desirable. When caseloads grow to exceed this, expenditures will be made to expand the number of caseworkers. This is a reasonable supposition but it is difficult to determine if such ceilings exist, what they are, and if they are followed. For the purpose of making

[8]The assumptions necessary to use earnings as a legitimate proxy for productivity are discussed in Chapter III, page 30.

these estimates it is assumed that they are equal to levels which have been set most recently by the respective probation and parole administrations. These levels are as follows:

Parole[9]	50
District Court Probation[10]	85
General Sessions Probation[11]	112

Thus, for the purpose of this simple model, it is assumed that if 100 additional cases were given to parole officers, action would be taken (expenditures made) to increase the number of caseworkers by two. The cost per day by one of these additional parolees would be the annual cost per caseworker (as defined above) divided by 50, divided by 365. The table below presents the annual and daily marginal costs of individuals placed on parole or on probation in the District of Columbia:

TABLE VII

PROBATION AND PAROLE COSTS

PAROLE	
Annual Cost per Caseworker	$17,361.00
Marginal Cost per Parolee (Annual)	354.60
Marginal Cost per Parolee (Daily)	.97
DISTRICT COURT PROBATION	
Annual Cost per Caseworker	$20,027.00
Marginal Cost per Probation Case (Annual)	235.61
Marginal Cost per Probation Case (Daily)	.65
GENERAL SESSIONS COURT PROBATION	
Annual Cost per Caseworker	$15,683.00
Marginal Cost per Probation Case (Annual)	140.00
Marginal Cost per Probation Case (Daily)	.38

F. Physical Injury; Property Damage

Another economic cost of property crime is the medical expense which is often incurred by victims of robbery offenses. The Task Force on Assessment of Crime of the President's Commission on Law Enforcement and Administration of Justice estimates that injuries result during 25% of all robberies, one-third of which require hospitalization.[12] Average losses incurred through injuries received in the course of a robbery were estimated at $350 ($100 in foregone earnings and $250 in medical expenses) for each person

[9]Budget Office, D.C. Department of Corrections, private communication, Washington, D.C.

[10]Probation Office, District Court, private communication, Washington, D.C.

[11]Probation Office, General Sessions Court, private communication, Washington, D. C.

[12]President's Commission on Law Enforcement and Administration of Justice, Task Force on Assessment of Crime, Assessment of Crime (Washington, D.C.: Government Printing Office, 1967), p. 14.

hospitalized.[13] The expected value of injuries from a robbery (costs from physical injury weighted by probability of its occurring) can be calculated as follows:

$$C_I = .75\ (\$0) + .25\ [\ (.33)\ (\$350) + .67\ (\$50)\ ] = \$37.50.$$

There is also considerable property damage in burglary, auto theft, and robbery offenses but no reliable information is available on the amount or value of the damage. Of the 18,256 burglaries reported in 1969, 12,681 or 69.4% involved breaking glass, breaking or forcing locks, or breaking or sawing iron bars.[14]

G. Private Crime Prevention Costs

The limited data available do not permit a detailed study of costs incurred privately through expenditures on crime prevention due to increases in crime. Moreover, some idea of the magnitude of these costs can be found in the discussion below.

Society spends large sums of money each year to prevent crime by purchasing locks, alarms, dogs, window bars, lights, etc. Many individuals are employed as guards and watchmen, which is a social cost to the extent that these resources could be employed elsewhere. Resources are also employed in the insurance industry, which spreads the cost of crime over the general public while reducing the cost to individual victims. Society as a whole loses to the extent to which premiums paid in exceed the benefits paid out by the insurance companies.

In the President's Commission on Law Enforcement and Administration of Justice: Task Force on Assessment of Crime, there are estimates of these private costs of crime. Yearly expenditures on burglar alarms, watchmen's equipment, and other similar equipment is estimated at $120,000,000. Another $80,000,000 is spent on such equipment as office safes, vaults, personal wall safes, bullet-proof glass, iron grills, special photographic equipment, etc.[15] This does not include such items as guns and other personal weapons, lighting, locks, or travelers' checks, which serve as crime deterrents.

The Task Force also studied the extent to which manpower was employed as guards, watchmen, doorkeepers, private detectives and related supervisory personnel. The total wage bill for these individuals, on the basis of the 1965 employment levels and median wage figures, was estimated at $1.35 billion per year.[16] The overhead cost of the insurance industry (the true cost of insurance to society, after excluding the transfer of funds from those insured to those victimized) was estimated at $300,000,000 for 1964.[17] All of these costs have undoubtedly increased from 1964 to 1969.

The 1968 Uniform Crime Report indicates that 4,139,430 property crimes (robbery, burglary, larceny, auto theft) were reported in 1968.[18] In Washington, D.C., there were 54,467 reported property crimes in 1968, or 1.3% of all property crime in the United States.[19] Assuming that purchases of security devices, employment of protective manpower and expenditures on insurance are directly related to the amount property crime in the vicinity, the following estimates can be made of private costs of crime in Washington, D.C.:

Security Equipment	$ 2,600,000
Protective Personnel	17,550,000
Insurance	3,900,000
	$23,050,000

[13] Ibid., p. 49.
[14] Metropolitan Police Department, Washington, D.C., Annual Report, 1969, p. 62.
[15] President's Commission on Law Enforcement and Administration of Justice, Crime and Its Impact--An Assessment (Washington, D.C.: U.S. Government Printing Office, 1967), p. 57.
[16] Ibid., p. 58.
[17] Ibid., p. 58.
[18] The Federal Bureau of Investigation, Uniform Crime Reports - 1968 (Washington, D.C.: U.S. Government Printing Office, 1968)
[19] Metropolitan Police Department, Washington, D.C., Annual Report -- 1968 (Washington, D.C.: Metropolitan Police Department, 1968)

III. BENEFITS FROM PROJECT CROSSROADS: DIVERSION, EARNINGS, AND EDUCATION

This chapter presents estimates of the value of successful diversion of cases from the judicial process to the Project Crossroads program and of the increase in earnings attributable to project participation. In addition, the benefits deriving from the project's remedial education program are discussed, though not quantified for this analysis.

A. The Diversion Benefit

The first benefit to be measured is that accruing from diversion of participants' cases from the judicial and correctional systems. To the extent that the program increases the number of cases which are dismissed without judicial proceedings, there is a savings to society. Fewer cases go to trial and fewer individuals receive probation or prison sentences. Obviously, this benefit from the reduction in the demand for court and corrections resources could be rapidly reversed if this type of program led to increased recidivism. The recidivism effect will be treated in Chapter IV.

Participants who are favorably terminated from the project have their cases dismissed from court. The value to society from diverting cases from the criminal justice system depends on the number of cases that otherwise would not have been diverted, the expected cost of adjudication, and the expected cost of sentence. The expected costs of adjudication depend on the costs of each type of judicial proceeding weighted by the probability that that type of trial would have been chosen. The expected costs of sentence depend on the costs of different types of dispositions, including acquittal, prison sentence, etc., weighted by the probability that each disposition would have occurred.

Those participants who are terminated unfavorably return to the court for trial on the original charges. Those terminated unfavorably for new offenses have these added to the original charges. Since the individual is only eligible for Crossroads if he meets the conditions of the Bail Reform Act, he would not have been detained in jail awaiting trial in the absence of the program. Thus, an individual who commits a crime while in Crossroads may be assumed to have been equally likely to do so if awaiting processing through the judicial system. The time one must await a trial in General Sessions under normal conditions is four to six weeks; thus, the (90-day) continuance for Crossroads participants may add to social costs if additional crimes are committed during the continuance period. However, almost all who recidivated while in Crossroads did so very early in the program; thus, it is likely that they would have done so while waiting for trial, had they not been enrolled in Crossroads. Therefore, we assume that this effect, while positive, is very small.

1. Reduced Court Costs

The estimate of the diversion benefit with respect to reduced judicial services can be estimated with the following equation:

$$C_J = N (Z_j - X_j) C_j$$

where:

N = total number of project participants

Z_j = percentage of individuals in control group receiving trial type j

X_j = percentage of individuals in Crossroads group receiving trial type j

j = type of judicial proceeding such as jury trial, non-jury trial, plea

C_j = marginal cost per jury trial, plea, etc.

The totals and percentages of each sample having jury trials, court trials and pleas is presented in Table I. Column 6 gives the estimated number of Crossroads participants who proceeded through the judicial system differently than they otherwise would have.

TABLE I

ESTIMATED DIFFERENCES IN TYPES OF JUDICIAL PROCEEDINGS
CROSSROADS AND CONTROL SAMPLES

	CONTROL SAMPLE		CROSSROADS SAMPLE		PERCENTAGE DIFFERENCE	ESTIMATED ABSOLUTE DIFFERENCE
	Number (1)	Percent(Z_j) (2)	Number (3)	Percent(X_j) (4)	(Z_j - X_j) (5)	N(Z_j - X_j) (6)
DPW	11	12.4%	8	4.2%	-8.2%	-38
Nolle	36	40.3%	162	85.7%	45.4%	209
Plea	23	25.8%	13	6.9%	-18.9%	-87
Court Trial	13	14.6%	6	3.2%	-11.4%	-52
Jury Trial	7	7.9%	0	0.0%	-7.9%	-36
Sub-total	89		189			
No Papers	5		1			
Missing	13		10			
TOTAL	107		200			

The estimated value of the judicial resource savings attributable to Project Crossroads, calculated with the above data and the estimates of costs of judicial proceedings, discussed in Chapter II, Part C, is presented in Table II.

TABLE II

REDUCED JUDICIAL SYSTEM COSTS
FROM DIVERSION OF CASES TO PROJECT CROSSROADS

Pleas	$ 7,060.05
Non-Jury Trials	7,348.12
Jury Trials	19,440.00
	$33,888.17

The value of resources "freed" because of fewer prison and probation sentences has been estimated by taking the difference in days of prison or probation sentences received per person in each sample, multiplied by the marginal cost per day of each sentence. This can be written:

$$C_S = N (Z_S - X_S) C_S$$

where:

N = number of project participants

Z_s = percentage of individuals in control group receiving sentence s

X_s = percentage of individuals in Crossroads group receiving sentences

s = type of sentence; 6 months prison, 1 year probation, etc.

C_s = marginal cost per day of each type of sentence

The totals and percentages of each sample receiving probation or prison sentences is presented in Table III. The total days of prison or probation received by members of each sample is also shown.

TABLE III

COMPARISON OF DISPOSITIONS OF ORIGINAL CASES CROSSROADS AND CONTROL SAMPLES

Disposition	Control		Crossroads	
Acquittal	2			
Fine	2	2.2%	3	1.6%
Probation	23	25.8%	9	4.8%
6 months	(2)			
9 months	(1)		(5)	
1 year	(19)		(1)	
18 months			(3)	
2 years				
TOTAL DAYS	7470		4500	
Prison	10	11.2%	5	2.6%
10 days			(1)	
30 days	(1)		(1)	
60 days	(1)		(1)	
90 days	(2)		(1)	
180 days	(4)		(1)	
360 days	(1)		(1)	
540 days	(1)			
TOTAL DAYS	1890		370	
TOTAL SENTENCES	35	39.2%	17	9.0%

The estimated value of the prison and probation resource savings attributable to Project Crossroads, calculated by using the data presented above and the marginal cost of prison and probation sentences estimated in Chapter II, Parts D and E, is presented in Table IV.

TABLE IV

REDUCED CORRECTIONAL COSTS FROM DIVERSION OF CASES	
Probation	$10,369.44
Prison	71,276.64
TOTAL	$81,646.08

The diversion benefit, discounted at 5%, 10% and 15%, is presented below. It is assumed that this benefit accrues in year one, although it is likely that some prison terms will extend into year two.

TABLE V

PRESENT VALUE OF DIVERSION BENEFIT
$109,994.52 @ 5% Discount Rate
$104,994.77 @ 10% Discount Rate
$100,429.78 @ 15% Discount Rate

B. The Earnings Benefit

The second benefit derived from the project is that from increased earnings of participants. The true social benefit is the increase in each individual's material contribution to social welfare. It is assumed that earnings are a valid measure of an individual's productivity and that this, in turn, is a reflection of his contribution to social welfare. Under conditions of perfectly competitive equilibrium, wages will equal the marginal productivity of the worker. Wages will not equal a worker's contribution to output if there exist market imperfections such as: (1) monopsonistic labor markets, (2) monopolistic product markets, or (3) discrimination due to race or criminal record. A worker's contribution to output will not equal his material contribution to social welfare if there exist externalities or spillover effects, e.g. pollution, which result in market prices that do not reflect social value, and thus wage rates which do not reflect the social value of marginal products. All of these conditions exist to some degree and lessen the usefulness of wage rates as a measure of one's contribution to social welfare. However, wages are the best and most useful measure available.

The project employment staff develops and maintains contacts with area employers, both public and private, training programs, and with the public employment service. The benefits derive from providing job information and placement assistance to participants, thereby reducing the number and length of unsuccessful job searches and thus increasing earnings over a given period of time. The counseling of participants serves to increase motivation, resulting in fewer job changes and shorter periods between jobs. If individuals are placed in training programs or in employment providing on-the-job training, skills and productivity may increase, providing still further benefit. Furthermore, if the overall effect of the program is to reduce recidivism, it is likely that employment rates will be higher, both in the present and the future. Reductions in time spent in prison increase the non-institutional population from which the labor force is drawn. Reduction in time spent pursuing a criminal career while out of prison will most likely be associated with higher labor force participation rates and lower unemployment rates.

It is possible that others among the unemployed would have filled the jobs provided participants had the program not existed. The existence of job vacancies

simultaneously with unemployment is a well recognized phenomenon. There is no way of discerning if the effect is one of reduction in unemployment or of displacement of other workers. If, in fact, the gains to participants reduce the opportunities for others, use of earnings data overstates the net social benefit from the program. On the other hand, many participants would have the burden of a conviction record had the program not existed. Earnings for this group would have been lower the year after the program than assumed by the method used here. To the extent that this factor exists, these results underestimate the benefit from the program.

It is difficult to determine if there is any long-term effect of the job placement and counseling services. If there is no change in the skills or productivity of the participants, they will, after a given period of time, be in the same position in the labor market as they otherwise would have been. On the other hand, if increased motivation and productivity have occurred, participants will be in a superior position in the labor market than otherwise long after termination from the project. In this study we make the assumption that there is no effect beyond one year. Earnings beyond one year are assumed to be the same as they would have been in the absence of the program, except for the employment rate adjustment. This adjustment is made because the program, by reducing the probability of recidivism, will most likely increase the level of employment over time of individuals who are enrolled. This is the same, conceptually, as reducing the cost of crime; the cost, in this case, is the foregone earnings of criminal offenders.

Determination of the existence of these effects over time would require followup data over a much longer period than presently available. In lieu of the necessary data, a number of assumptions will be required in order to make estimates of the earnings benefit. These will be discussed in the following pages.

In the discussion of the control group it was explained that it was impossible to obtain the necessary employment history data on the control group for the measurement of the earnings benefit. Thus earnings and employment records of Crossroads participants for the year prior to their project enrollment were used as a proxy for their performance the year after termination, had they not entered the program. The data were adjusted for the fact that the individuals would be one year older and thus likely to have higher earnings without the program. Earnings can be expected to increase with age because of better knowledge of opportunities, increased productivity, maturity and the increased need to support oneself. A separate adjustment is made for inflation.

The social benefit from increased earnings (productivity) can be written:

$$B = \sum_{j=1}^{460} \left[\frac{(Y_{xj} - Y_{cj})}{(1+r)} + \sum_{i=2}^{5} \frac{(Y_{cj} + a_i)\, E_i}{(1+r)^i} \right] \tag{3}$$

where:

j = individuals; $j = 1, 2, 3, \ldots\ldots 460$

i = time in years; $i = 1, 2, 3, \ldots\ldots 15$

Y_x = earnings of Crossroads participants in year after the program. Earnings depend on:

- w_{xj} = average of individual j's wages in one or more jobs over the one year follow-up period, weighted by the length of time at each job.
- h_{xj} = average hours worked per week by individual j at his job(s) over the one year follow-up period, weighted by the length at his job.
- e_{xj} = percentage of the year spent in employment over the one year follow-up period.

Y_c = earnings of the control group. This depends upon:

- w_{cj} = average of individual j's wages in one or more jobs in the year prior to Crossroads, weighted by the length of time at each job.
- h_{cj} = average hours worked per week by individual j in his job(s) over the year prior to Crossroads, weighted by the length at each job.
- e_{cj} = percentage of the year prior to Crossroads spent in employment.
- E = difference in employment levels of participants over time attributable to project; this is derived on the basis of the reduction in recidivism.
- a = constant by which annual earnings are assumed to increase through fifth year after the program.
- r = the social rate of discount

The earnings stream for the Crossroads and control samples which are based on the above discussion can best be seen in the graph below.

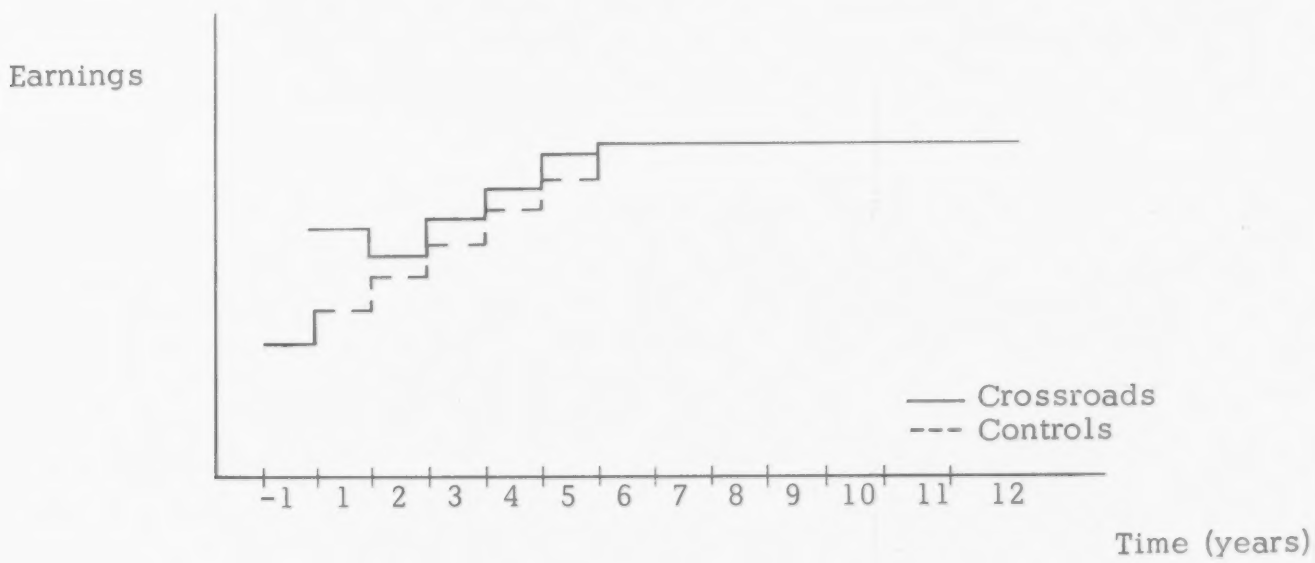

Fig. 1. Projected Earnings Streams for Crossroads and Control Groups Over Time

The upper line represents the earnings performance of project participants. The lower line represents the same for the control group. In year t + 1, the earnings of participants exceed those of controls because of (1) the job placement and counseling services and (2) the higher employment rates due to lower recidivism. The earnings level of the control group is higher in year t + 1 (t = the three-month period of project participation) than in the year t - 1 because of the age and inflation adjustments.

In year t + 2, participants' earnings are reduced to the level they would have been in the absence of the program. Earnings of Crossroads participants exceed those of the control group in years t + 2 through t + 5 because of the higher projected employment rates. In year 6 and beyond, there is no remaining difference in earnings. These various adjustments are discussed below.

Adjustments of the Data

1) The earnings data for the control group are adjusted for increased earnings that would have occurred without the project merely because individuals are a year older. The age adjustment was made by using the results of regression analysis. The regression equation was specified as:

(4) $$Y_t - 1 = f(A, S, R, G, E, M)$$

where:

Y_{t-1} = earnings of project participants during the year prior to enrollment. This is more fully defined in equation 3 under Y_{cj}.

A = age

S = sex

R = race

G = highest education level completed

E = present enrollment in school

M = marital status

The partial coefficient for the age variable will give us the change in earnings attributable to an increase in age of one year, holding constant the independent effects of the other variables. The results of the regression analysis are presented in Table VI. The upper figure in each row is the coefficient for the variable. The lower figure, in parentheses, is the T- value of the corresponding coefficient.

TABLE VI

REGRESSION ANALYSIS: EARNINGS BEFORE PROJECT ENROLLMENT AND SELECTED SOCIODEMOGRAPHIC VARIABLES

	CONSTANT	AGE	SEX	MARITAL STATUS	ENROLLMENT IN SCHOOL	HIGHEST GRADE COMPLETED	RACE	$\bar{R}^2$
(1)	759.38 (1.60)	340.93 (5.56)	-560.10 (-1.82)					.20
(2)	1,550.67 (1.66)	345.02 (5.59)	-622.77 (-2.00)			-111.04 (-1.43)	-57.67 (-.18)	.20
(3)	1,280.31 (1.37)	285.75 (4.26)	-735.09 (-2.63)	589.77 (2.11)		-112.86 (-1.48)	-70.55 (-.22)	.22
(4)	1,795.51 (1.96)	263.62 (4.04)	-772.53 (-2.55)	481.71 (1.76)	-417.25 (-3.03)	-45.06 (-.58)	-71.39 (-.24)	.27

The results, as shown in equation 4, indicate that there is a $263.60 difference in earnings associated with a one year difference in age. Likewise, males earned $772.53 more than females the year before the project. The marital status variable, while not quite significant at the .05 level (T value = 1.76), indicates that married individuals may have earned more than singles. Present enrollment in school has the expected effect of reducing earnings. The race and highest education level completed variables are not significant.

Marital status and enrollment in school can be expected to change with age. This is also true in general of highest grade completed, but is not true of the population dealt with here. The adjustment for age in this analysis should include these other factors which can be expected to change with age. Thus, the coefficient in equation (2) is used for making the age adjustment.

2) The earnings data of the "control" sample were also adjusted for inflation. The consumer price index (CPI) for Washington, D.C. increased from 123.1 to 130.8 between August 1968 and August 1969, and from 124.9 to 132.0 between November 1968 and November 1969.[1] It is assumed that wage rates, and thus earnings, have increased at the same rate as the CPI. Therefore, a 7.4% upward adjustment in earnings was made.

3) A further adjustment is made because of the relationship between recidivism and low labor force participation and/or unemployment. This can result from any or all of the following: (1) the burden of the conviction record and the resulting discrimination in the employment market, (2) the likelihood of imprisonment for some period(s) during a criminal career, or (3) the rational decision that crime is a feasible income-producing alternative to legitimate employment. In Chapter I it was argued that there exists a population of individuals who will commit crimes if their perception of income accessible through crime--after considering the risk of arrest, prosecution and imprisonment and their attendant costs--exceeds their perception of available legitimate income-producing alternatives. Included in this decision-making process are the value of leisure obtained from the quick rewards of a theft, the disutility of the exertion, frustration, and boredom involved in work, and the psychic value of lawful behavior.

It is assumed in this analysis that the level of employment is inversely related to recidivism. That is, a program which reduces recidivism will increase labor force participation and reduce unemployment among its enrollees over time. In year 1, this effect is assumed to be present in the observed data. In years 2 through 5, participants' earnings are reduced to the level they would have been without the program's employment services. However, earnings of participants are assumed to exceed those of the control group because of the higher projected employment levels resulting from lower recidivism rates.

No quantitative studies have been done on employment levels or labor force participation rates of recidivists. Thus, in this study, the employment levels of the participant and control groups were estimated by using data on post-project employment for former Crossroads participants, both recidivists and non-recidivists. The relationship assumed here can be written:

$$E = -f\ (R_X - R_C)$$

where:

$E = E_X - E_C$

E_X = employment level (percentage of year employed) of Crossroads participants

E_C = employment level (percentage of year employed) of control group

R_X = recidivism rate of Crossroads sample

R_C = recidivism rate of control sample

The estimated difference in employment levels between the Crossroads and control samples is used to measure the earnings benefit from the program in years 2 through 5. Because recidivism is reduced, the cost of crime is reduced; the cost, in this case, is the foregone productivity of offenders. The employment levels of the two groups were derived from data on Crossroads participants. The observed percentage of year employed, by recidivist and non-recidivist categories, is presented in Table VII.

[1]Bureau of Labor Statistics, Consumer Price Index for Urban Wage Earners and Clerical Workers, Washington, D.C. (Washington, D.C.: Bureau of Labor Statistics, U.S. Department of Labor, 1970), p. 1.

TABLE VII

PERCENTAGE OF YEAR EMPLOYED FOLLOWING TERMINATION FROM CROSSROADS PROJECT		
CLASS INTERVALS	PERCENTAGE OF SUB-POPULATIONS IN EACH CLASS INTERVAL	
	RECIDIVISTS	NON-RECIDIVISTS
0: 9%	.41	.24
10:19%	.02	.01
20:29%	.07	.05
30:39%	.02	.01
40:49%	.02	.01
50:59%	.07	.00
60:69%	.02	.03
70:79%	.05	.05
80:89%	.09	.09
90:99%	.23	.52

The observed employment rates for the non-recidivist and recidivist groups in the Crossroads sample are .686 and .436, respectively. The difference in the two rates can be due to higher unemployment rates, lower labor force participation rates, and higher rates of incarceration.

In general, observed unemployment can be the result of voluntary non-participation in the labor force, unemployment while in the labor force,or by exclusion from the non-institutional population. The Bureau of Labor Statistics excludes inmates of institutions and persons under 16 years of age from their population and labor force statistics. The Bureau uses the following definitions:

> EMPLOYED PERSONS comprise (a) all those who during the survey week did any work at all as paid employees, in their own business, profession, or farm, or who worked 15 hours or more as unpaid workers in an enterprise operated by a member of the family, and (b) all those who were not working but who had jobs or businesses from which they were temporarily absent because of illness, bad weather, vacation, labor-management dispute, or personal reasons, whether or not they were paid by their employers for the time off, and whether or not they were seeking other jobs . . .
>
> UNEMPLOYED PERSONS comprise all persons who did not work during the survey week, who made specific efforts to find a job within the past 4 weeks, and who were available for work during the survey week (except for temporary illness). Also included as unemployed are those who did not work at all, were available for work, and (a) were waiting to be called back to a job from which they had been laid off; or (b) were waiting to report to a new wage or salary job within 30 days . . .
>
> THE CIVILIAN LABOR FORCE comprises the total of all civilians classified as employed or unemployed in accordance with the criteria described above. The 'total labor force' also includes members of the Armed Forces stationed either in the United States or abroad . . .
>
> THE UNEMPLOYMENT RATE represents th number unemployed as a percent of the civilian labor force . . .
>
> NOT IN LABOR FORCE includes all civilians 16 years and over who are not classified as employed or unemployed. Those persons are further classified as 'engaged in own home housework,' 'in school,' 'unable to

work' because of long-term physical or mental illness, and 'other.' The 'other' group includes for the most part retired persons, those reported as too old to work, the voluntarily idle, and seasonal workers for whom the survey week fell in an 'off' season and who were not reported as unemployed . . .[2]

With the data on employment levels for recidivists and non-recidivists we can derive an estimate of the employment level of the control group. By weighting the appropriate employment rates by the Crossroads recidivism and non-recidivism rates, the overall employment rate for Crossroads participants can be derived. Likewise, by weighting the appropriate employment rates by the control group recidivism and non-recidivism rates, the employment rate for the control group can be derived. The observed one-year recidivism rates for the Crossroads and control samples were 26% and 36.4%, respectively, exclusive of disorderly conduct charges.[3] Recidivism rates are defined in this study as rearrests. (For a discussion of use of rearrest data see Chapter VX.) The numerical calculations are shown below:

Crossroads $E_X = .686\ (.74) + .436\ (.26) = .621$

Control $E_C = .686\ (.636) + .436\ (.364) = .595$

Thus, a 10.4% difference in recidivism rates was associated with a 2.6% difference in employment levels.

The effect on the employment rates of former project participants is assumed to continue into the future. It is well documented that criminality and recidivism decrease with age.[4] The average age of individuals at the time of project participation is approximately 20. Here it is assumed that the difference in employment rates between both groups is equal to 2.6% in years 2 through 5. The difference in employment rates in years 6 and beyond is assumed equal to zero.

4) Earnings are assumed to increase by a constant amount each year up to five years after termination from the project. The same adjustment is made for the Crossroads and for the control samples. The constant has been estimated with regression analysis on the following equation:

$$Y_{t+1} = f\ (A, S, R, P, G, M)$$

where:

Y_{t+1} = earnings of project participants during the year following project participation. This is more fully defined in equation 3 under Y_{xj}.

A = age

S = sex

R = race

G = highest education level completed

E = present enrollment in school

M = marital status

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[2]Bureau of Labor Statistics, U.S. Department of Labor, Employment and Earnings, XVII(2), (August, 1970), p. 107.

[3]See Chapter V, page 61.

[4]Op. cit., Glaser, p. 22.

The partial coefficient for the age variable, the increase in earnings attributable to one year's increase in age, is the estimate of this constant, a. As in adjustment (1) above, the adjustment for age should include those factors which are correlated with age, such as marital status and enrollment in school. Thus, the age coefficient in equation (2) is used as the estimate of a. This adjustment is equal to $0 in year 1, $246 in year 2, $852 in year 3, $1278 in year 4, and $1704 in years 5 through 15.

The results of the regression analysis are presented in Table IX.

TABLE IX

REGRESSION ANALYSIS: EARNINGS AFTER TERMINATION AND SELECTED SOCIODEMOGRAPHIC VARIABLES

	CONSTANT	SEX	AGE	RACE	MARITAL STATUS	HIGHEST GRADE COMPLETED	ENROLLMENT IN SCHOOL	$\bar{R}^2$
(1)	2,218.65 (3.05)	-1,441.79 (-3.05)	432.12 (4.58)					.18
(2)	3,025.93 (2.09)	-1,420.10 (-3.06)	425.95 (4.46)	-388.02 (-.79)		11.67 (.10)		.17
(3)	2,627.74 (1.76)	1,514.04 (3.10)	412.93 (4.29)	-380.34 (-.78)	419.72 (1.06)	-9.01 (-.07)		.18
(4)	3,699.30 (2.34)	-1,502.47 (-3.11)	389.66 (4.06)	-434.05 (-.90)	307.74 (.78)	45.51 (.37)	-876.52 (-1.94)	.19

Looking at equation (4) in this table, the relationship between post-project earnings and a given sociodemographic variable, independent of other variables, can be observed. It can be seen that there is a $389.66 difference in post project earnings associated with one year's difference in age. Also, males earned $1502.47 more than females. The race, marital status, and education variables show no significant relationships. Enrollment in school again shows the expected effect of lower earnings for those presently in school.

Results

The estimate for increased earnings of Crossroads participants is presented below. This is based on the difference between the earnings of the Crossroads sample and the control sample, adjusted for the total population of 460. In the first year, the estimated benefit is derived from (1) the job placement and counseling services, and (2) the higher employment rates due to lower recidivism. The projections of earnings for other years reflect only the latter effect. Earnings for period t is the difference between participants' earnings during the three-month period and projections of their earnings for the same period, had they not entered the program.

TABLE X

ESTIMATE OF INCREASE IN EARNINGS ATTRIBUTABLE TO CROSSROADS PROGRAM (UNDISCOUNTED)

t	(3 months)	$ 45,853.71
t + 1		102,577.00
t + 2		22,214.50
t + 3		25,843.00
t + 4		29,381.50
t + 5		33,094.00

The present value of this earnings differential, discounted at 5%, 10% and 15%, is as follows:

TABLE XI

PRESENT VALUE: EARNINGS BENEFIT	
DISCOUNT RATE	CROSSROADS EARNINGS BENEFIT
5%	$190,282.00
10%	170,729.00
15%	156,074.00

Comparison of Results of Regression Analysis

Comparison of the results of the regression equations with alternative dependent variables, earnings before and earnings after enrollment yields some interesting insights into the effects of the program. Examining the coefficients in equation (4) of each set, there are rather large differences in the coefficients on some variables. None of these differences are large enough to pass the significance test for differences between two sample means but the direction and magnitude of some warrant discussion. It is important to remember that such variables as age, sex, race, etc., are highly aggregated constructs, and thus rather crude attempts at describing human characteristics. Each of these variables represents many characteristics which are associated with them. For example, age represents experience, maturity, increased need to be self-supporting, and many other things. Since it is those characteristics which the independent variables represent that actually affect the dependent variable, earnings, it is not surprising that the differences between sample means are not statistically significant.

The coefficient on the sex variable increased in the later set of equations, indicating that the program was, perhaps, more effective with men than women. The coefficient of the age variable is larger in the second set; thus, the program was probably more effective with older participants. The race variable is insignificant in both sets, but is much larger in the later set, suggesting greater effect on whites than blacks. Finally, the results indicate that the program had a greater effect on earnings of those not enrolled in school, as one might expect.

C. The Education Benefits

The third benefit of the program is from the education or tutoring assistance rendered. Individuals are provided tutoring by the project's group of seven VISTA volunteers and a sizeable number of community volunteers recruited by the VISTAs. Direct benefits of the tutoring program include: passing the high school equivalency examination, preparation for school examinations and subsequently improved grades in school, increased reading ability, and preparation for tests given in job interviews. Indirect benefits within the province of education which accrue to Crossroads participants who have not received tutoring include: the return to high school of former dropouts, guidance in seeking and obtaining college admission, and, more basically, the changing of the individual's attitude towards education.

It is impossible to quantitatively measure most of these benefits. However, some analysis of the benefits to those who have been assisted in attaining the high school equivalency degree (GED) can be made with the traditional rate of return methods found in the economics of education literature. The benefit from the GED tutoring program derives from the increased productivity over time, as measured by earnings, expected from high school graduates. The benefit should be measured as the expected earnings over time of high school graduates after subtracting the expected earnings over time of high school

dropouts and any costs of the program to the individual, such as transportation and foregone earnings, while preparing for the GED exam. The benefit should also be measured net of costs which the education program shifts to the rest of society. These are primarily the costs of VISTA volunteers who administer the program. These are not a cost to Crossroads, but are a cost to the society when measured in terms of their alternative uses.

Though thus capable of being measured, several problems with analyzing this aspect of the program exist: First, the data on achievement of tutees is very sketchy. Accurate information exists only for those who actually passed the GED exam. No information exists on others who made improvements in literacy and other educational skills. Second, the data on earnings differentials between high school dropouts and high school graduates is badly out of date. The next census information will not be available for two years. It is possible that differentials have increased or decreased over the last ten years. Third, it is difficult to estimate the opportunity cost of services of VISTA volunteers. Even if this could be done satisfactorily, they have allocated a great part of their time to providing similar services to non-participants. The total hours that should be allocated to project participants cannot be estimated with existing data. Fourth, the foregone earnings of students is not known. If students maintained jobs while being tutored at night, it would be necessary to know something of the value to students of foregone leisure.

If all of these problems could be solved, there remain the normal weaknesses of benefit-cost analysis in the field of education. The best summary of the important methodological difficulties is in Blaug, "Rate of Return on Investment in Education in Britain." Blaug lists six problem areas:

1. Education, earnings, endowed ability, individual motivation, and social class are all interconnected and no one has yet succeeded in satisfactorily isolating the pure effect of education on earnings.

2. It is assumed that people are motivated solely by consideration of the financial gains of additional school attendance, thus ignoring both the non-pecuniary attractions of certain occupations and the consumption benefits of education.

3. The calculations depend on the projections of future trends from cross section evidence, thus neglecting historical improvements in the quality of education as well as the effect of the secular growth of education on prospective earnings differentials.

4. Existing earnings differentials in favor of educated people reflect, not differences in their contribution to productive capacity, but rather long established social conventions in an inherently imperfect labor market.

5. The direct benefits of education are quantitatively less important than the indirect spillover benefits.

6. Social rates of return have ambiguous policy implications because educational authorities have other goals than that of maximizing the net national product.[5]

Calculation of the present values of differentials in expected earnings streams for high school graduates and high school dropouts are presented below. These will not be included in the final results because of the difficulties discussed above. Rather, they

[5]BLAUG, Mack, "The Rate of Return on Investment in Education in Great Britain.," The Manchester School of Economic and Social Studies Journal, XXXIII, September, 1965, pp. 212-3.

are presented as indicators to administrators of similar programs of the benefits possible from remedial education services. It is important to note that unlike job placement assistance, education provides a more lasting benefit.

The U.S. Census of Population, 1960: Special Report on Earnings and Education provides data on earnings of males in the labor force for all occupations by age, race, and years of schooling.[6] No cross-tabulation is available for both sex and race with years of schooling. However, data are available on earnings of both males and females, 14 years and older, by years of schooling.[7] From this latter information, it can be calculated that the earnings differential of female high school graduates over those completing one to three years of high school is 75% of the differential of males. Thus, by adjusting the data for males accordingly, we can derive estimates for females.

Some adjustment should be made for variables which are highly correlated with education and thus would also be a cause of higher measured incomes. For example, a highly educated person probably has more ability, motivation, on-the-job training, native intelligence, and mobility than a lesser educated person. Thus, any analysis of earnings and education would also attribute to education an impact which is actually due to these other factors. However, it has been estimated that these other factors account for only 30% to 40% of the differential in earnings, the rest being due to education. Gary Becker, in his book, Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, adjusts the private return from college education from 13% to 11.5%, and for high school training from 13% to 10%.[8] Edward Denison, in his treatise on the sources of economic growth in the United States uses an estimate that 60% of gross earnings differentials between those completing different levels of schooling is due to education.[9]

The present value of earnings differentials between high school dropouts and high school graduates attributable to education, at the alternative discount rates, are presented in Table XII:

TABLE XII

PRESENT VALUE OF EARNINGS DIFFERENTIALS DUE TO COMPLETING HIGH SCHOOL

SEX	RACE	DISCOUNT RATES 5%	10%	15%
Male	White	$5,258.59	$2,813.20	$1,848.16
Male	Black	$5,899.98	$3,382.91	$2,309.08
Female	White	$3,823.43	$2,114.20	$1,321.71
Female	Black	$4,408.79	$2,526.45	$1,723.70

There is, of course, the additional benefit to high school graduation, not measured here, that the graduate has the option to continue his education on the college level.

[6] U.S. Bureau of the Census, U.S. Census of Population: 1960, Subject Report: Occupation by Earnings and Education, (Washington, D.C., Government Printing Office, 1963).

[7] U.S. Bureau of the Census, U.S. Census of Population, 1960, Subject Report: Occupational Characteristics, U.S. Government Printing Office, 1963.

[8] BECKER, Gary S.: Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education (New York: Columbia University Press, 1964), p. 69.

[9] DENISON, Edward F.: The Sources of Economic Growth in the United States and the Alternatives Before the United States, (New York: Committee on Economic Development, 1962), p. 73.

IV. BENEFITS FROM PROJECT CROSSROADS: RECIDIVISM REDUCTION

The original ideas for this section were derived from an article by Alfred Blumstein and Richard Larsen, entitled "Models of a Criminal Justice System."[1] The authors developed a comprehensive model to examine the interrelationships between different facets of the criminal justice system. Two different approaches were used, and are described by the authors as follows:

> First, there is a simple production process, in which the principal concern is the flow through the system, and the accumulation of costs flowing from a single arrest. Such a linear model provides an opportunity (1) to examine at each stage the workload or the personnel requirements that result, (2) to attribute these to different types of crimes, and (3) to project all of these planning variables as functions of future arrest rates.
>
> The second is a feedback model, which considers the recidivism probability associated with each released defendant, and his subsequent processing for future arrests after he has once been released by the criminal justice system. Such a feedback model . . . permits estimating the costs of a total criminal career (considering the succession of rearrests of an individual) and the consequences of alternative actions within the criminal justice system to lower probabilities.[2]

It is the second of these approaches which has been adopted and further developed to estimate the value of reduced recidivism in the Crossroads program.

Several simplifying assumptions are made throughout this section in order to make the estimation of the model feasible. As in all such models, the accuracy of the resulting estimates depends upon the quality of the existing data and the nature and magnitude of the biases which result from simplifying assumptions. In this paper, most assumptions are of a conservative nature; that is, the bias results in <u>reducing</u> the estimated benefits from the program.

A. The Model

The model, in general terms, is constructed to estimate the value of a program or any other measure which results in fewer recidivists who, had they recidivated, would have committed a property crime (here defined as larceny, burglary, robbery, and auto theft). The recidivism rates of offenders committing property crimes is known to be higher than for violent crimes,[3] and there is also a high probability that property crime offenders will commit property crimes if they recidivate.[4] The benefit from or value of reduced recidivism depends on the number of recidivists saved, the expected cost of their crimes, the costs of police services, the expected costs of the correctional process, and the probability of future criminal activity and its attendant costs.

Not all recidivists will proceed through all phases of the system. A recidivist is defined in this paper as an individual who is arrested and charged with a crime; nothing is assumed or inferred about guilt. This model merely describes population flows through the criminal justice system. It is probable that most individuals who are included as recidivists under this definition, and who are erroneously charged with a given offense, will

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[1] Op. cit., Blumstein and Larsen, pp. 199-232.

[2] Ibid., p. 202.

[3] GLASER, Daniel: <u>Effectiveness of Prison and Parole System</u>, (New York: Bobbs Merrill Co., 1964), p. 44

[4] Op. cit., Blumstein and Larsen, p. 224.

exist from the criminal justice process either by a pre-trial dismissal or through a judgment of acquittal. However, just as an indeterminate number of "guilty" defendants are diverted from the criminal justice process, undoubtedly a number of innocent defendants are erroneously processed and convicted.

Many who commit crimes will not be apprehended. Since the only time an individual is connected with an offense is at the time of arrest, nothing can be said about those who may have committed offenses but were never arrested. Also, it is difficult to estimate the number of crimes a given individual actually may have committed. However, given the high offense-arrest ratios, some estimate should be made for aggregates. Many of those arrested will be dismissed by the police or at the pre-trial processing stage at the discretion of the United States Attorney's Office. Those who proceed to the trial stage may choose to plead guilty or request either a jury or non-jury trial. Those who request a trial may be acquitted. Those who plead or request a trial and are not acquitted may be fined, incarcerated, or released on probation.

All of these events have different costs, and it is necessary to know both the probability and expected cost of each event in order to measure the expected costs of recidivism. Furthermore, for each type of disposition of each type of crime, there is a different probability of further recidivism, which will again impose costs on society. Recidivism can be predicted by using recent FBI data on arrest-to-arrest recidivism, broken down by crime, disposition and age.[5] For each crime, the probability associated with each possible route of proceeding through the system will vary. At each stage, different costs are incurred. For example, a recidivist arrested for burglary will have a certain calculated probability of dismissal, acquittal, probation or incarceration.

Nothing is assumed about the severity of an individual's offense, but only that he recidivated. The results will then overstate the cost if a given recidivist committed a relatively minor burglary offense, and vice-versa. But since this is not known at the time decisions are made on investments in programs to reduce recidivism, a method yielding a probability distribution is the more useful.

Once released from the criminal justice system by one of these means, there is a certain probability of further recidivism. Given that a person has recidivated, there is a probability distribution giving the likelihood of his next crime's being burglary, larceny, robbery, etc. With this information we can calculate the expected costs of this further recidivism and so on. It was assumed when work began on this model that Crossroads and control group recidivists would commit primarily one of the four property crimes. The results showed that 71% and 69% of Crossroads and control group recidivists, respectively, did so.

The following equation states that the value of reducing recidivism depends on the number of recidivists saved, the expected cost of their crimes, the costs of arrests, the expected costs of the judicial process, the expected costs of the correctional process, and the probability of future criminal activity and its attendant costs.

$$B_R = 460(Z_R - X_R)\left\{ \left[\sum_{i=1}^{k} \frac{(C_k + C_{pk} + P_{Jk} + P_{Sk}EC_{Sk})}{(1+r)} \right] + \sum_{i=2}^{t} \frac{P_R EC_R}{(1+r)^t} \right\}$$

The expected values can be defined as:

$$E\,C_{Jk} = P_{jk}C_{jk}$$

$$E\,C_{Sk} = P_{sk}C_{sk}$$

[5] Unpublished data, provided by Federal Bureau of Investigation, Statistical Division, Washington, D.C., April, 1970.

$$E\,C_R = \sum_{i+1}^{k} (C_k + C_{pk} + P_{Jk}EC_{JK} + P_{Sk}EC_{Sk})$$

where: 460 = number of participants in program

Z_p = percentage of control group who recidivate in the first year following first arrest

X_R = percentage of Crossroads sample who recidivate in the first year following project enrollment

C_k = welfare cost of property crime k; k = burglary, larceny, robbery and auto theft

C_{pk} = costs of offenses from services of police department for crime k

P_{Jk} = probability of proceeding through the judicial system for crime k; probability of not being dismissed

EC_{Jk} = expected costs of the judicial process for crime k

P_{jk} = probability of jury trial, non-jury trial or plea for crime k

C_{jk} = costs of jury trials, non-jury trials, or pleas for crime k

P_{Sk} = probability of receiving a sentence for crime k

EC_{Sk} = expected costs of sentence for crime k

P_{sk} = probability of sentence s for crime k where s is type of sentence such as 2 years' probation, 1 year's prison, etc.

C_{sk} = costs of sentence j for crime k

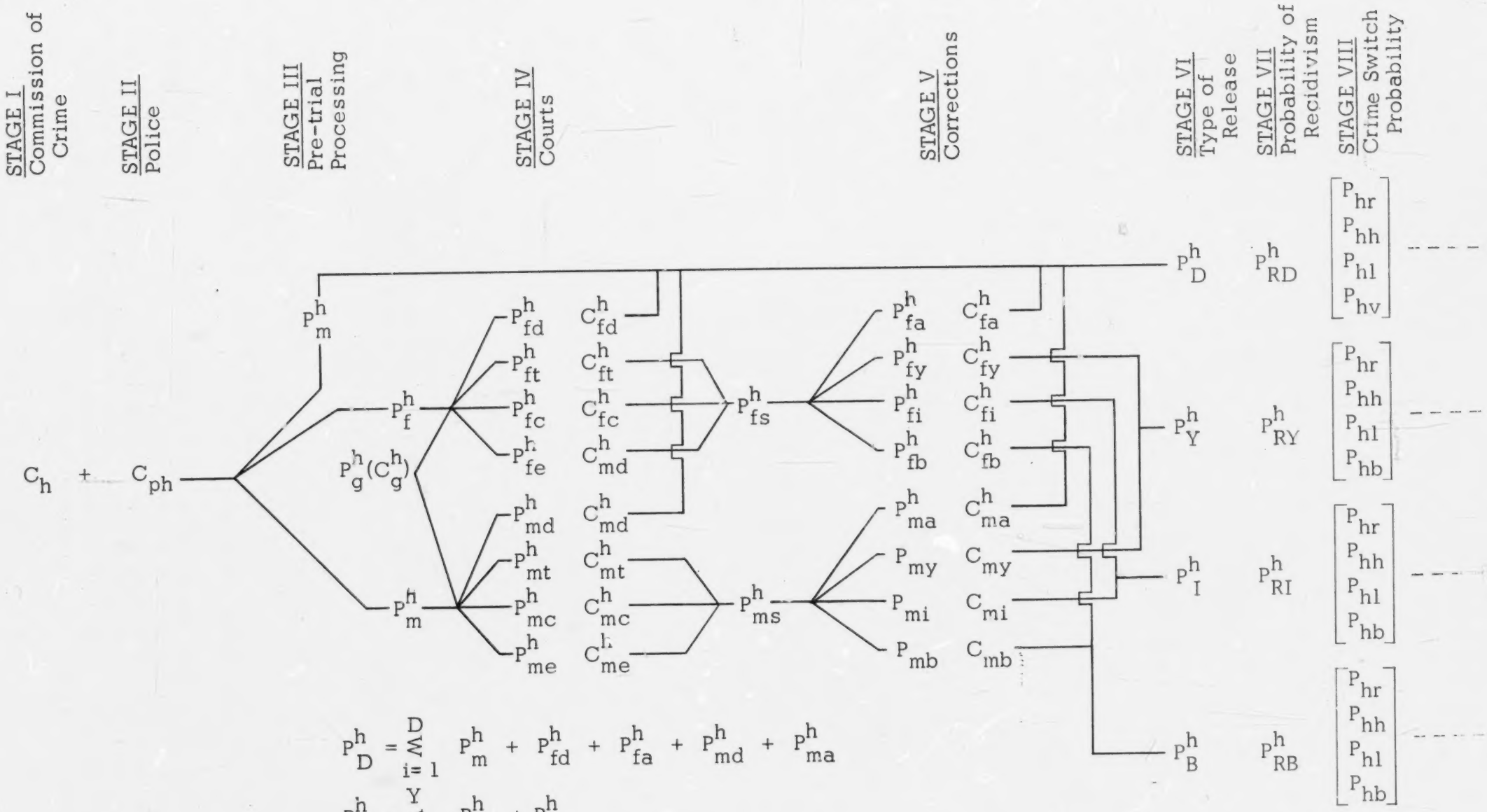
r = social rate of discount

An example of the model is presented on the following page. This example is the detailed calculation of the probable cost to the criminal justice system of a recidivist arrested for burglary, given no prior knowledge of the offender or of the seriousness of the actual crime, but only that it was a burglary. It is based on the costs at various stages in the criminal justice system weighted by the probability of their occurrence. Each cost term represents the cost of specific events, such as police services, jury trials, probation, etc., at different stages in the route through the system for a person arrested for burglary. Each probability term gives the probability of each event's occurring, given a burglary offense.

The probability of exiting from the system in any manner is found in stage 6 of the calculation. The probability of further arrests is assumed to be dependent upon age, the crime and the type of disposition. In stage 7 the probability of further recidivism in the first year after leaving the system is given.

The probability of the next crime being burglary or another property crime is given in stage 8. Stages 9 through 16 (not shown) would be the next "round," which is a repeat of the first round, for those who have been again arrested. These calculations were carried out for four "rounds" for each of the four crimes considered; i.e., 16 sets of calculations. A full discussion of the derivation of these estimated probabilities and the underlying assumptions is presented in subsequent sections of this chapter.

Figure 1. Probability Distribution of Recidivists' Routes of Proceeding Through the Criminal Justice System, with Attendant Costs at each Stage



$$P^h_D = \sum_{i=1}^{D} P^h_m + P^h_{fd} + P^h_{fa} + P^h_{md} + P^h_{ma}$$

$$P^h_Y = \sum_{i=1}^{Y} P^h_{fy} + P^h_{my}$$

$$P^h_I = \sum_{i=1}^{I} P^h_{fi} + P^h_{mi}$$

$$P^h_B = \sum_{i=1}^{B} P^h_{fb} + P^h_{mb}$$

The terms in the preceding diagram represent probabilities and costs, and are defined below. The estimated probabilities and costs, discussed in the remainder of this chapter, are also given.

STAGE I

C_h	= \$184.78	= welfare cost of burglary offenses

STAGE II

C_{ph}	= \$1380.80	= cost of police services for burglary offenses

STAGE III

P^h_n	= .13	= probability of no papers, a decision not to prosecute
P^h_f	= .404	= probability of prosecution as a felony
P^h_g	= .460	= probability of grand jury hearing
C^h_g	= \$26.50	= cost of grand jury hearing
P^h_m	= .467	= probability of prosecution as a misdemeanor

STAGE IV

P^h_{fd}	= .404(.138)	= probability of ignoramus or dismissal in District Court
P^h_{ft}	= .404(.292)	= probability of jury trial in District Court
C^h_{ft}	= \$2211.90	= cost of jury trial in District Court
P^h_{fc}	= .404(.138)	= probability of non-jury trial in District Court
C^h_{fc}	= \$822.40	= cost of non-jury trial in District Court
P^h_{fe}	= .404(.432)	= probability of plea in District Court
C^h_{fe}	= \$100.25	= cost of plea in District Court
P^h_{md}	= .467(.560)	= probability of nolle or DWP in General Sessions Court
P^h_{mj}	= .467(.053)	= probability of jury trial in General Sessions Court
C^h_{mj}	= \$540.00	= cost of jury trial in General Sessions Court
P^h_{mc}	= \$143.30	= cost of non-jury trial in General Sessions Court
P^h_{me}	= .467(.227)	= probability of plea in General Sessions Court

C^h_{me}	= $81.15	=	cost of plea in General Sessions Court

STAGE V

P^h_{fS}	= .862	=	probability of not having case dismissed before trial in District Court
P^h_{fa}	= .404(.862)(.196)	=	probability of acquittal in District Court
P^h_{fy}	= .404(.862)(.089)	=	probability of being sentenced to Youth Center from District Court
C^h_{fy}	= $5998.20	=	cost of Youth Center sentence for felony
P^h_{fi}	= .404(.862)(.393)	=	probability of sentence to Lorton Prison from District Court
C^h_{fi}	= $9894.10	=	cost of prison sentence for felony
P^h_{fb}	= .404(.862)(.321)	=	probability of probation sentence from District Court
C^h_{fb}	= $335.40	=	cost of probation sentence for felony
P^h_{mS}	= .440	=	probability of not having case dismissed before trial in General Sessions Court
P^h_{ma}	= .467(.440)(.121)	=	probability of acquittal in General Sessions Court
P^h_{my}	= .467(.440)(.030)	=	probability of Youth Center sentence from General Sessions Court
C^h_{my}	= $5998.20	=	cost of Youth Center sentence for misdemeanor
P^h_{mi}	= .467(.440)(.576)	=	probability of prison sentence from General Sessions Court
C^h_{mi}	= $1336.60	=	cost of prison sentence for misdemeanor
P^h_{mb}	= .467(.440)(.273)	=	probability of probation sentence from General Sessions Court
C^h_{mb}	= $163.02	=	cost of probation for misdemeanor

STAGE VI

P^h_D	= .538	=	probability of leaving the criminal justice system by acquittal of dismissal or no papers
P^h_Y	= .035	=	probability of leaving the criminal justice system from the Youth Center
P^h_I	= .252	=	probability of leaving the criminal justice system from prison

P^h_B = .175 = probability of leaving the criminal justice system from probation

STAGE VII

P^h_{RD} = .371 = probability of recidivism in first year of those released from criminal justice system by acquittal, dismissal, or no papers

P^h_{RY} = .440 = probability of recidivism in first year of those released from criminal justice system from Youth Corrections Act

P^h_{RI} = .440 = probability of recidivism in first year of those released from criminal justice system from prison

P^h_{RB} = .383 = probability of recidivism in first year of those released from criminal justice system on probation (from beginning of probation)

STAGE VIII

P_{hr} = .149 = probability of robbery, given recidivism and previous crime of burglary

P_{hh} = .506 = probability of burglary, given recidivism and previous crime of burglary

P_{hl} = .311 = probability of larceny, given recidivism and previous crime of burglary

P_{hv} = .034 = probability of auto theft, given recidivism and previous crime of burglary

B. Cost of Crimes of Recidivists

A person is considered a recidivist in this model when rearrested. Clearly, many commit crimes without being arrested, and it is likely that those arrested committed more crimes than the offense for which arrested. While nothing can be said about undetected or unreported crimes a given individual may have committed, it is safe to assume that on the average, or in a probability sense, a recidivist will have committed more than one crime.

The ratio of offenses reported to arrests in 1969 can be derived from data in the 1969 Metropolitan Police Annual Report.[6] Approximately five robbery offenses are reported for each robbery arrest. Using an estimate of five offenses for each recidivist arrested for robbery, however, would yield too high an estimate because of the offenses committed by those who are never arrested in a given year. On the other hand, using an estimate of one offense for each arrest would yield too low an estimate, implying that the four other crimes are committed by those never arrested--an equally unrealistic assumption. In this study, the number of crimes per recidivist is assumed to be approximately one-half of the 1969 reported offense-arrest ratio for a given crime. This approach, of course, assumes that individuals completely specialize within crime types. It is not clear that an individual arrested for robbery would also have committed robbery in his other crimes.

[6]Op. cit., Metropolitan Police Department, Washington, D.C., p. 2.

This method also completely ignores unreported offenses and thus the final estimates of the benefit from reduced recidivism are biased downward, perhaps greatly. The President's Commission on Law Enforcement and Administration of Justice estimated that unreported crimes are three to ten times as many as those reported.[7] The ratio of reported to unreported crime decreases with the degree of violence in the crime. That is, robbery is more likely to be reported than larceny. Since there are no reliable data on unreported crimes, there is no way to satisfactorily estimate the welfare costs of these crimes. The offense-arrest ratios in the Police Department Annual Report for 1969 and the adjusted ratios used in this study are shown in Table I.

TABLE I

ADJUSTED OFFENSE-ARREST RATIOS, 1969, BY CRIME		
CRIME	1969 OFFENSE ARREST RATIO	ADJUSTED OFFENSE-ARREST RATIO
Robbery	5:1	3:1
Burglary	7:1	4:1
Larceny	8:1	4:1
Auto Theft	9:1	5:1

In the model, we multiply the welfare cost of the recidivists' crime (offense for which arrested) as derived in Chapter II, Part A, by the adjusted offense-arrest ratio to derive the cost from his total probable crimes. The welfare cost of the "adjusted" crimes of the recidivist and the value of the transfer (i.e., the value of the property stolen) for each of the four offenses considered are shown in Table II

TABLE II

WELFARE COST OF CRIMES OF RECIDIVIST, GIVEN ARREST			
CRIME	ADJUSTED OFFENSE-ARREST RATIO (R)	COST CRIME x R	VALUE OF TRANSFERS x R
Robbery	3	$201.43	$ 444.63
Burglary	4	$184.78	$ 923.92
Larceny	4	$114.82	$ 574.12
Auto Theft	5	$261.94	$1,309.70

C. Cost of Police from Offenses of Recidivists

To determine the cost of police services attributable to recidivism, the marginal cost of police services per unit of property crime (developed in Chapter II, Part B) must be weighted to account for the relative seriousness of the several types of offenses within

[7] Op. cit., President's Commission on Law Enforcement and Administration of Justice, p. 21.

the "property crime" category. It is clear that society perceives most robberies to be more serious than most larcenies, but it is not clear by how much. The method used here for deriving weights is a weighted average of the time individuals are legally held by the criminal justice system for each crime before released to society.

It is assumed that the differences in the average lengths of time individuals are legally restrained (including pre-trial period) is directly related to the relative seriousness of the different crimes. Derivation of the weights has been done by calculating the time delay before release through each possible means, such as by the courts following trial, by either acquittal or probation, or from prison. The time delays for each possible means of release from the system are then weighted by the probability of leaving the criminal justice system by each route. In terms of symbols used in the flow diagram, this can be written:

$$T_h = \sum_{i=1}^{D} P_n^h \, T_n^h \div P_{fa}^h \, T_{fa}^h + P_{md}^h \, T_{md}^h + P_{ma}^h \, T_{ma}^h +$$

$$\sum_{i=1}^{Y} P_{fy}^h \, T_{fy}^h + P_{my}^h \, T_{my}^h + \sum_{i+1}^{I} P_{fi}^h + P_{mi}^h \, T_{mi}^h$$

$$\sum_{i=1}^{B} P_{fb}^h \, T_{fb}^h + P_{mb}^h \, T_{mb}^h$$

The probability terms are defined in Part A of this chapter. The "T" term is the time delay associated with each possible means of release. The most important determinants of the differences in the time delay factor among crimes are the probability of prosecution as a felony, the probability of incarceration and the average length of incarceration for the offense. Cases prosecuted as felonies take approximately 6 months to complete, while the corresponding interval for misdemeanors is 1 month. Data on these probabilities are presented in Part D, while data on the average length of sentence by crime are discussed in Part E.

The resulting time delay estimates are as shown in Table III.

TABLE III

AVERAGE TIME DELAY BETWEEN ARREST AND RELEASE FROM CRIMINAL JUSTICE SYSTEM	
Robbery	13.5 months
Burglary	8.9 months
Larceny	4.2 months
Auto Theft	5.9 months

The time delay estimates, divided by 4.2, provide estimates of the relative seriousness of the different crimes as indicated by the actions of other sections of the criminal justice system. The weights used to obtain the marginal costs of police services by crime are then derived from the time delay estimates. The equation for deriving the weight for burglary is:

$$W_h = \frac{T_h \left(\sum_{i=1}^{k} N_k \right)}{\sum_{i=1}^{k} N_k \cdot T_k}$$

where:

W_h = weight for burglary offense

T_k = relative time delay for offense k; k = burglary (h), larceny (l), auto theft (v) or robbery (r)

N_k = number of reported offenses, 1969

The cost to society of police services for the offenses of a recidivist, using the adjusted offense-arrest ratio and the weighted marginal cost per offense, is provided in Table IV.

TABLE IV

EXPENDITURES ON POLICE SERVICES ARISING FROM OFFENSES OF RECIDIVISTS

CRIME	ADJUSTED OFFENSE-ARREST RATIO	ESTIMATED RELATIVE TIME DELAY	WEIGHTS	MARGINAL COST OF POLICE SERVICES PER CRIME	WEIGHTED MARGINAL COST PER CRIME	TOTAL COSTS OF POLICE SERVICES
Robbery	3:1	3.2	1.86	$282	$526.00	$1,578.00
Burglary	4:1	2.1	1.22	$282	$345.20	$1,380.80
Larceny	4:1	1.0	.58	$282	$164.38	$ 657.52
Auto Theft	5:1	1.4	.82	$282	$230.13	$1,150.65

D. Data for Trial Choice and Dispositions

To obtain the estimated probability of each route taken through the system for each offense category, samples of cases were taken from the court records. Cases were taken from the 1968 files in order to insure that most cases would have a final disposition. All cases in the sample were taken from the point of entry into the court system as they appear in the files in the Court of General Sessions. Cases often enter the General Sessions Court records as felonies, are reduced to misdemeanors, and then processed through the General Sessions Court. Those remaining felonies are sent to the District Court for a Grand Jury hearing. The dispositions of cases sent to the District Court were found in the District Court records.

Any type of case within the four offense categories had an equal probability of being chosen. The sample was constructed from all entries whose last names began with the letter C, with no discrimination between different charges within an offense category (e.g., grand vs. petit larceny). This yields a distribution of the severity of offenses of a given category (e.g., larceny), as well as a distribution of trial choices and dispositions aggregated over all degrees of severity. That is, the samples yield percentage distributions of jury trials, pleas, etc., and prison, probation, etc., corresponding to the aggregate offense categories of burglary, larceny, robbery and auto theft.

Burglary offenses usually enter the court files as burglary, burglary II (second degree) or attempted burglary. Burglary or Burglary II are often reduced to one of the following: attempted burglary, receiving stolen goods and petit larceny; unlawful entry and destroying property; attempted burglary and receiving stolen goods; and attempted burglary and petit larceny. Robbery offenses usually enter as robbery, attempted robbery or petit

arceny and simple assault. Robbery and attempted robbery are often reduced to simple ssault, and petit larceny; or possessing a prohibited weapon, simple assault, and petit arceny. Larceny offenses were either grand or petit larceny, mostly the latter. Auto heft offenses are prosecuted as either unauthorized use of an auto or attempted unauthorzed use of an auto. Many times when a felony is reduced to a multiple charge misdeneanor, a conviction will only be made on one charge, with the others dropped. In these ases, the conviction is included in the results given below.

All offenses linked with a narcotics charge were excluded, because of complicaions introduced by the nature of addicition. It is assumed in this model that recidivists lo not become involved with narcotics. By excluding the possibility of narcotics addicion among recidivists, the model provides a low estimate of the benefit from reduced recidivism.

The data do not exclude records of first arrests because no information is publicly vailable as to previous arrests of cases appearing in the court files. Since first offendrs are likely to have more dismissals and probation sentences, inclusion of these cases can also result in the cost estimates for repeat offenders being biased downwards. The dispositions of cases sent to the District Court were followed up in the District Court dockets.

The distributions within each sample are shown in Table V.

TABLE V

DISTRIBUTION OF PROCESSING AND DISPOSITION OF CASES, BY CRIME, 1968

ROBBERY

	ABSOLUTE NUMBER	PERCENTAGES	
TOTAL SAMPLE	166		
No Papers	12	.072	
Grand Jury	77		.464
Felonies	71	.427	
Ignored or Dismissed	3		.042
Plea	26		.366
Jury Trial	36		.507
Non-Jury Trial	6		.085
	71		1.000
Not Guilty	13		.191
Youth Corrections Act	16		.235
Prison	34		.500
Probation	5		.074
	68		1.000
Misdemeanors	83	.500	
Nolle	28		.337
DWP	9		.108
Plea	18		.217
Jury Trial	16		.193
Court Trial	12		.145
	83		1.000
Not Guilty	6		.130
Probation	13		.283

	ABSOLUTE NUMBER	PERCENTAGES	
Prison	24		.522
YCA	3		.065
	46	1.000	1.000

BURGLARY

TOTAL SAMPLE	161		
No Papers	21	.130	
Grand Jury	74		.460
Felonies	65	.404	
Ignored or Dismissed	9		.138
Plea	28		.432
Jury Trial	19		.292
Non-Jury Trial	9		.138
	65		1.000
Not Guilty	11		.196
YCA	5		.089
Prison	22		.393
Probation	18		.321
	56		1.000
Misdemeanors	75	.467	
Nolle	31		.413
DWP	11		.147
Plea	17		.227
Jury Trial	4		.053
Court Trial	12		.160
	75		1.000
Not Guilty	4		.121
Probation	9		.273
Prison	19		.576
YCA	1		.030
	33	1.000	1.000

LARCENY

TOTAL SAMPLE	196		
No Papers	16	.081	
Grand Jury	17		
Felonies	17	.087	
Ignored or Dismissed	2		.118
Plea	6		.353
Jury Trial	6		.176
Non-Jury Trial	3		.133
			1.000
Not Guilty	2		.133
YCA	2		.133
Prison	6		.400
Probation	5		.333
			1.000

	ABSOLUTE NUMBER	PERCENTAGES	
Misdemeanors	163	.832	
Nolle	50		.307
DWP	17		.104
Plea	49		.301
Jury Trial	21		.128
Court Trial	26		.160
			1.000
Not Guilty	12		.125
Probation	20		.208
Prison	59		.615
YCA	5		.052
		1.000	1.000

AUTO THEFT

TOTAL SAMPLE	175		
No Papers	28	.160	
Grand Jury Hearing	58		.331
Felonies	52	.297	
Ignored or Dismissed	10		.192
Plea	20		.385
Jury Trial	15		.289
Non-Jury Trial	7		.135
	52		1.000
Not Guilty	6		.143
YCA	2		.048
Prison	25		.595
Probation	9		.214
	42		1.000
Misdemeanors	95	.543	
Nolle	33		.345
DWP	10		.105
Plea	25		.263
Jury Trial	12		.126
Court Trial	15		.158
	95		1.000
Not Guilty	4		.077
Probation	15		.288
Plea	30		.577
YCA	3		.058
	52	1.000	1.000

E. Length of Prison and Probation Sentences

The length of time served on probation is assumed to be equal to the length specified at sentencing (obtained in sample of cases discussed in section D). The length of time served under the Youth Corrections Act is assumed to be 13 months, the current average length of confinement prior to parole at the Lorton Youth Center. Time served under the Youth Corrections Act depends upon the performance of the individual while at the Youth Center, and is relatively independent of the offense. The length of sentence served by

those sent to prison is assumed to be equal to the average length of sentence of those released from Lorton Prison in 1969.[8] The proportion released from Lorton on parole is also estimated by the data on those released from parole in 1969. The average length of probation by offense is shown in Table VI.

TABLE VI

AVERAGE LENGTH OF PROBATION SENTENCES, BY CRIME, 1968

		NO. OF DAYS
Robbery	Felony	585
	Misdemeanor	490
Burglary	Felony	516
	Misdemeanor	429
Larceny	Felony	906
	Misdemeanor	444
Auto Theft	Felony	825
	Misdemeanor	390

The length of sentence of those released from Lorton Prison in 1969,[9] the probability of parole, and the length of parole are presented in Table VII.

TABLE VII

AVERAGE LENGTH OF PRISON SENTENCES SERVED IN THE DISTRICT OF COLUMBIA, BY INDIVIDUALS RELEASED IN 1969, BY CRIME

	LENGTH OF PRISON SENTENCE IN DAYS	PROBABILITY OF PAROLE	LENGTH OF PAROLE IN DAYS
Robbery			
Felony	1087	.230	907
Misdemeanor	315	.040	166
Burglary			
Felony	1214	.354	649
Misdemeanor	164	.085	187
Larceny			
Felony	819	.143	434
Misdemeanor	195	.037	258
Auto Theft			
Felony	673	.292	514
Misdemeanor	118	.031	108

[8]Personal Communication, D.C. Department of Corrections, Office of Research and Planning, May 1970.

[9]Provided by Automatic Data Processing Division, D.C. Department of Corrections, April 1969.

7. Probability of Leaving Criminal Justice System by Given Route

The probability of each type of exit from the criminal justice system is derived from the simple summation of the probabilities of each route taken. For example, the probability of exiting from prison is equal to the probability of receiving a prison sentence from the District Court plus the probability of same from the Court of General Sessions. Table VIII shows these data for each crime:

TABLE VIII

MEANS OF RELEASE FROM CRIMINAL JUSTICE SYSTEM, BY CRIME

CRIME	MEANS OF EXIT	PROBABILITY
Robbery	Acquittal, Dismissal, No Papers	.426
	Youth Center	.115
	Prison	.350
	Probation	.109
Burglary	Acquittal, Dismissal, No Papers	.538
	Youth Center	.035
	Prison	.252
	Probation	.175
Larceny	Acquittal, Dismissal, No Papers	.504
	Youth Center	.035
	Prison	.327
	Probation	.133
Auto Theft	Acquittal, Dismissal, No Papers	.519
	Youth Center	.028
	Prison	.315
	Probation	.138

F. Recidivism Probability

To this point, the model has generated the expected cost of a recidivist who is arrested for a given crime. There exists some probability that the recidivist(s) will go on to commit further crimes after disposition of this offense. The probability of further rearrests is here assumed to be a function of the crime, the type of disposition and age. The FBI has recently gathered data on criminal careers based on a sample of individuals of different ages, types of crimes and types of dispositions. The sample was taken of 18,333 offenders (first and repeat) released from the criminal justice system in 1963. These persons were then followed for new arrests through 1968. The procedure is described in the Uniform Crime Reports - 1968:

> The study is made possible by the cooperative exchange of criminal fingerprint data among local, state and Federal law enforcement agencies. The all-important fingerprint card submitted to the Identification Division of the FBI by these law enforcement agencies contains information which serves as a basis for statistical examination of careers in crime. While there is a lack of uniformity in submissions made by all law enforcement agencies for all criminal charges, generally it is the practice to submit a criminal fingerprint card on all arrests for serious crimes, felonies and certain misdemeanors. Fingerprinting by police is a part of the booking procedure of placing a formal charge against an arrested person. The ar-

rest and charge have substance and differ from temporary detention for questioning or investigation.[10]

There are several problems with using FBI data. First, they are highly aggregated, and there is no way of knowing if the social and demographic characteristics of individuals in the sample resemble the group of recidivists from the Crossroads or control samples. Secondly, the data are derived from many different jurisdictions. Different kinds of people are given dismissals, probation and prison in different communities. Accordingly, persons sent to prison in one jurisdiction may be given probation in another, probably raising the probation recidivism rate and lowering the prison recidivism rate there. Also, recidivism varies according to the community to which offenders are released. For these reasons, recidivism rates based on many jurisdictions may not be representative of recidivism to be expected from individuals released in Washington, D.C. However, the FBI sample is the only available data which is both nationwide in scope and which contains this degree of cross-tabulation.

The FBI data provide recidivism rates for the four crime categories studied here, cross-tabulated with type of release and age. The recidivism rates used in the following table are those for individuals in the age categories of "under 20," and "20 - 24." "Release from prison" includes both mandatory release and parole. Data provided in the Uniform Crime Reports - 1968 indicate that of all who recidivate within five years, 52% do so within one year; 78% within two, and 90% within three years.[10] Recidivism data, by crime, type of release, and year are presented in Table IX.

[10] Federal Bureau of Investigation, Uniform Crime Reports - 1968 (Washington, D.C.: Federal Bureau of Investigation, 1969), p. 35.

TABLE IX

FBI RECIDIVISM DATA, BY CRIME AND TYPE OF RELEASE

CRIME	TYPE OF RELEASE	RECIDIVISM DATA	FIVE YEAR RATE	YEAR I	YEAR II	YEAR III
Burglary	Acquittal or Dismissal	10-14	71.4%	37.1%	18.5%	8.6%
Burglary	Prison	88-104	84.6%	44.0%	22.0%	10.2%
Burglary	Probation	78-106	73.6%	38.3%	19.1%	8.8%
Robbery	Acquittal or Dismissal	26-27	96.3%	50.1%	25.0%	11.6%
Robbery	Prison	47-66	71.2%	37.0%	18.5%	8.5%
Robbery	Probation	18-33	54.5%	28.3%	14.2%	6.5%
Larceny	Acquittal or Dismissal	32-35	91.4%	47.5%	23.8%	11.0%
Larceny	Prison	159-202	78.7%	40.9%	20.5%	9.4%
Larceny	Probation	258-490	52.7%	27.4%	13.7%	6.3%
Auto Theft	Acquittal or Dismissal	136-149	91.3%	47.5%	23.7%	11.0%
Auto Theft	Prison	1027-1265	81.2%	42.2%	21.1%	9.7%
Auto Theft	Probation	671-932	72.0%	37.4%	18.7%	8.6%

G. Crime-Switch Matrix

The FBI recidivism data are used in this model to predict future recidivism, given crime and type of release. Of those who recidivate, it is assumed that they will commit one of the four designated property crimes. The actual probability of this being true is over 90%, independent of which property crime the individual was originally arrested for. The Blumstein-Larsen study, "Models for a Total Criminal Justice System," provides a crime-switch matrix based on a study done by the Minnesota Board of Corrections.[11] That study attempted to find the probability, if an individual is again arrested for an index crime, that it will be one of the other index crimes. (Index crimes are defined as robbery, burglary, larceny and auto theft, murder, rape and aggravated assault.) The authors observe that the matrix as constructed depends only on the crime type of last arrest, not upon age, disposition or upon prior criminal career.[12]

The crime-switch matrix in the Blumstein-Larsen paper was adopted for use in this study. Since this paper is concerned with property crimes, it is assumed that the probability of committing a property crime is equal to unity. To the extent that, in fact, violent crimes rather than property crimes are committed, the estimated benefits of reduced recidivism are undoubtedly biased downward. In Table XI, the upper row gives the coefficient for each crime in the Blumstein-Larsen matrix. The lower row gives the adjusted coefficients to be used in this paper. The adjustment is made by multiplication of each property crime coefficient in the Blumstein-Larsen matrix by $1/P_k$, where P_k is the sum of probabilities of the four property crimes in that matrix. The results yield the P_{hr}, P_{hn}, etc., the terms used in Stage 8, Figure 1.

TABLE XI

REARREST CRIME-SWITCH MATRIX							
LAST ARREST	BURGLARY	ROBBERY	LARCENY	AUTO THEFT	MURDER	RAPE	ASSAULT
Burglary	.459 .506	.135 .149	.282 .311	.031 .034	.010	.020	.063
Robbery	.350 .383	.350 .383	.115 .125	.100 .109	.015	.010	.060
Larceny	.400 .423	.140 .148	.275 .291	.130 .138	.010	.020	.025
Auto Theft	.390 .417	.045 .048	.222 .238	.278 .297	.010	.027	.280

H. Estimated Costs of Recidivist, by Round, by Crime

The next step in the model is to calculate the cost of reduced recidivism. It has been shown in this chapter that for those arrested for a given crime, given no a priori knowledge of the severity of the crime but only the crime category, there exists a certain probability of leaving the system by a specific means (acquittal, incarceration). Furthermore, there exists a certain probability of recidivism in the first year after leaving the system, given the crime and type of release, and a certain probability of this next crime's being a given crime. The expected cost of this crime is assumed to be equal to the cost of this crime in the first round. For example, if the recidivist has been rearrested for

[11] Op. cit., Blumstein and Larsen, pp. 222-225.

[12] Ibid., p. 225.

robbery, the calculated probable costs of robbery offenses are applied to derive the costs of this further recidivism. This assumes the cost of a third arrest is equal to the second. This is highly unlikely because the probability of a prison sentence and the length of same undoubtedly increase with each successive conviction. Data limitations made it impossible to take this into account. Thus, the results are biased downward.

After three or four rounds (cycles of recidivism), the numbers become very small because the probability of repeated recidivism becomes low. For this study, then, the calculations were carried out for four rounds. Also, since not all recidivists who eventually recidivate again do so within the first year following their latest release from the system, the probability of their future recidivism's occurring in the second or third years is also included in the calculations.

The results should be interpreted as the benefit from or the value of a program which reduces recidivism by one person who would have been , had he recidivated, arrested for one of the crimes of robbery, burglary, larceny, or auto theft. This could equally well be applied to a program reducing recidivism by 20, 50, 100, etc., by simple multiplication. A truly large-scale reduction in crime would so far change the cost structure of the system that the results of the model would no longer apply.

The results, by round, are given in Table XII.

TABLE XII

EXPECTED COSTS OF RECIDIVISM, BY CRIME, BY ROUND				
ROUND	ROBBERY	BURGLARY	LARCENY	AUTO THEFT
Round I	$5,352.60	$3,755.45	$2,352.48	$3,973.71
Round II	$1,753.63	$1,400.86	$1,528.58	$1,581.98
Round III	$ 528.36	$ 481.28	$ 522.84	$ 525.98
Round IV	$ 261.30	$ 242.56	$ 297.98	$ 278.46
Round II (one year delay)	$ 834.09	$ 698.12	$ 765.62	$ 787.03
Round III (one year delay)	$ 459.17	$ 320.57	$ 285.30	$ 365.24
Round IV (one year delay)	$ 310.97	$ 293.67	$ 321.02	$ 331.73

The length of a round for a given offense was calculated by using the time delay factor discussed earlier in this section. The average length of a round is nine months (shorter for larcenies, longer for robberies). It is assumed that an individual who recidivates again within a year after leaving the system in a previous round does so, on the average, in the sixth month. Thus there is a 15-month period between his original entry into the system as a recidivist and his next re-entry and round. Accordingly, the time period covered by four rounds is approximately five years.

Table XIII provides the undiscounted benefit, by crime, of preventing the recidivism of one individual who, had he recidivated, would have committed robbery, burglary, larceny, or auto theft. The expected cost of recidivism declines over time because the probability of recidivism after each conviction is less than one.

TABLE XIII

UNDISCOUNTED RECIDIVISM BENEFIT				
	ROBBERY	BURGLARY	LARCENY	AUTO THEFT
Year I	$4,282.08	$3,004.36	$1,881.98	$3,178.97
Year II	$2,790.00	$2,150.11	$1,862.23	$1,704.53
Year III	$1,695.75	$1,383.86	$1,458.75	$1,556.56
Year IV	$ 605.20	$ 524.25	$ 551.62	$ 532.93
Year V	$ 209.40	$ 222.77	$ 238.38	$ 222.77
TOTAL	$9,582.07	$7,285.35	$5,992.96	$7,245.76

The present value of these reductions in future criminal justice system costs is given in Table XIV.

TABLE XIV

PRESENT VALUE OF REDUCED RECIDIVISM BENEFIT				
DISCOUNT RATE	ROBBERY	BURGLARY	LARCENY	AUTO THEFT
5%	$8,735.33	$6,612.79	$5,382.19	$6,572.39
10%	$8,015.79	$6,044.29	$4,870.69	$6,004.61
15%	$7,398.12	$5,558.69	$4,437.68	$5,520.70

I. Use of Model for Measurement of Benefit from Reduced Recidivism in Project Crossroads

The data from the Crossroads and control samples can now be applied to the estimates provided by the model. The overall recidivism rate for the Crossroads and control groups were 26% and 36.4%, respectively. The Crossroads sample consisted of all of the first 200 individuals enrolled in the project. The control sample consisted of 107 individuals chosen from the court records on the basis of the criteria discussed in Chapter I. The recidivism rates for both groups exclude disorderly conduct arrests. They include all other arrests over a period of 15 months from the time of first arrest. Thus, for Crossroads participants, this includes the three months during and 12 months after the project.

Investigation of police department records was conducted by the Metropolitan Police Department to determine the incidence of recidivism in the two samples. These recidivism rates do not include rearrests outside the District of Columbia jurisdiction unless these were reported to the D.C. police. While extra-jurisdictional offenses would result in higher recidivism rates, there is no reason to believe that the differential between the two groups would be altered.

Not all program participants had a full 15-month recidivism follow-up. Eighty-three, or 41.5%, of the participant group had between 11 and 15 months from date of first arrest to date of follow-up. However, of the 58.5% who had a full 15 months, only two recidivated between the 11th and 15th month. Thus, while the program's 15-month

recidivism rate may be biased downward, the effect is probably slight. On the other hand, the control group was selected on the basis of four criteria: age, no prior adult convictions, offense category and eligibility for personal bond. As was observed in Chapter I, there are three factors which were not controlled and which may introduce a bias in the control group. These were: (1) individuals must agree to enter the program, (2) permission to enroll must be given by the U.S. Attorney's Office, and (3) participants are interviewed by a project counselor before enrollment.

The differences between the two recidivism rates, 26% and 36.4%, is not quite significant at the .05 level. The test for the significance of the difference between the two sample percentages yields a T-value of 1.86. The distribution of crimes committed by recidivists in each sample is presented in Table XV. The percentage difference by crime is also given

TABLE XV

RECIDIVISM OF CROSSROADS AND CONTROL SAMPLES BY TYPE OF CRIME

RECIDIVISM OFFENSE	CROSSROADS RECIDIVISTS No.	%	CONTROL RECIDIVISTS No.	%	PERCENTAGE DIFFERENCE	ESTIMATED DIFFERENCES DUE TO CROSSROADS PARTICIPATION
	(2)	(3)	(4)	(5)	(6)	(7)
Larceny	17	8.5%	9	8.4%	0.1%	0
Auto Theft	3	1.5%	6	5.6%	4.1%	-19
Robbery	10	5.0%	7	6.4%	1.4%	- 6
Forgery and False Pretenses	2	1.0%	3	2.8%	1.8%	- 8
Assault	3	1.5%	5	4.7%	3.2%	-15
Burglary	7	3.5%	5	4.7%	1.2%	- 6
Narcotics	4	2.0%	0	0.0%	2.0%	+ 9
Weapons	3	1.5%	4	3.7%	2.2%	-10
Prostitution	3	1.5%	0	1.5%	1.5%	+ 7

These percentage point differences, multiplied by the total Crossroads population of 460, give estimates of recidivists prevented, by crime. The numbers are very small and should not be interpreted strictly. That is, there is no reason to believe the differences in crimes of recidivists will always follow this pattern. However, these results will be applied here to the present value calculations to determine the benefit. That is, the estimated numerical difference in auto theft recidivists is multiplied by the value of reduced recidivism of individuals whose crime at arrest was auto theft (Tabel XIV).

To accurately determine the benefit from reduced recidivism when the offense is forgery or false pretenses, assault, weapons, narcotics, the same kind of model would have to be developed. There is no apparent reason why, had this been done, the benefits from reduced recidivism would not be significantly greater than those presented below. Due to the number of assumptions made throughout this discussion, caution should be exercised in interpreting the results. However, most assumptions were made in a way that

would bias these costs downward. Furthermore, unreported crimes and private crime prevention costs were not included. The present value of resource savings due to reduced recidivism in the Crossroads program, for the four property crimes, is as follows:

TABLE XVI

PRESENT VALUE OF REDUCED RECIDIVISM			
CRIME	5% DISCOUNT	10% DISCOUNT	15% DISCOUNT
Robbery	$ 52,411.99	$ 48,094.74	$ 44,338.92
Burglary	$ 39,676.74	$ 36,265.74	$ 33,352.14
Auto Theft	$124,875.41	$114,037.59	$104,893.30
TOTAL	$216,963.14	$198,448.07	$182.634.36

V. RESULTS AND IMPLICATIONS

A. Benefit-Cost Ratios

The benefit-cost ratio is an investment criteria which states that decision-makers should invest in those projects for which the ratio of the present value of benefits to the present value of costs is greater than unity. This condition can be stated as follows:

$$\frac{\frac{B_O}{(1+r)} + \frac{B_1}{(1+r)^1} + \frac{B_2}{(1+r)^2} + \cdots\cdots \frac{B_t}{(1+r)^t}}{\frac{C_O}{(1+r)} + \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \cdots\cdots \frac{C_t}{(1+r)^t}} > 1$$

where B_t and C_t are benefits and costs in time period t, and r is the social rate of discount.

In the Crossroads project, all costs are incurred in time period O. The total benefit from the program is the sum of the present values of each benefit. The diversion benefit accrues in year zero for foregone court proceedings and over the first year or two for foregone sentences. The other benefits (earnings, reduced recidivism) can be expected to accrue over several years. Future benefits have been discounted at interest rates of 5%, 10% and 15%. The benefits and costs of the program, as developed in previous chapters, are presented in Table I. Benefit-cost ratios at each rate of discount are also presented.

TABLE I

PRESENT VALUE OF SOCIAL BENEFITS TO SOCIETY FROM PROJECT CROSSROADS

	5%	10%	15%
Diversion	$109,994.52	$104,994.77	$100,429.78
Earnings	190,282.00	170,729.00	156,074.00
Recidivism	216,963.13	198,448.07	182,634.36
Total Benefit	$517,240.00	$474,172.00	$439,138.00
Total Cost	$233,256.00	$233,256.00	$233,256.00
Benefit-Cost Ratios	2.2	2.0	1.8

An investment which has a benefit-cost ratio exceeding unity, assuming that the chosen discount rate reflects social time preference or the social opportunity cost of capital, can be considered to be a socially worthwhile or "profitable" expenditure. The use of alternative discount rates here indicates that the benefit-cost ratio is not sensitive to changes in the rate. Thus, the benefit-cost ratios presented above indicate that the Crossroads program has been an efficient use of society's resources.

Many of the benefits from the program were not discussed. The value of the remedial education program was not measured. No estimate of the amount of unreported and undetected crime was made. The benefit estimates do not include private expenditures for

crime prevention equipment and manpower, or the extent of migration, avoidance of normal transportation, community disruption, etc., which may be foregone with reduction in recidivism. The estimate of the value of reduced recidivism did not include such crimes as forgery, assault or narcotics. Omission of these issues may result in seriously underestimating the benefits from this type of program. On the other hand, the measurement of the program's value depends on the ability to successfully control for the performance of enrollees in the absence of the program. The difficulties in developing control groups for measurement of the earnings and recidivism benefits were discussed in those sections.

Table I presented the benefits from the Crossroads program accruing to society as a whole, which includes offenders. This is the more meaningful measure of the change in the welfare of society. However, it is of some interest to know the distribution of the benefits and costs of the program to the non-criminal members of society. Presumably, all of the investment costs of the program are borne by this sub-population. The distribution of benefits to the non-criminal population include: (1) all of the diversion benefit, because these represent reduced criminal justice system costs, (2) that part of increased earnings which will accrue to the rest of society through taxation, and (3) the benefit from reduced recidivism. This latter benefit is greater to the non-criminal population than to the society as a whole. This is because of a theft, excluding the loss in value of a stolen good, was considered a pure transfer and not a cost to society. However, a theft is a cost to the non-criminal members of society. Thus, the reduced recidivism benefit to this population must include the cost of the theft, net of the gain to the purchaser of the stolen good. In terms of the discussion in Chapter II, Part A, V_p is the yield to the criminal from the theft. V_p is thus the net cost to the non-criminal members of society. Using V_p rather than $r(V)$ will increase the benefit to the non-criminal members of society by approximately 7%. In the estimates below, it is assumed that 15% of the increase in earnings will accrue to the rest of society via taxation. The benefits and costs to the non-criminal members of society are presented in Table II.

TABLE II

BENEFITS TO NON-CRIMINAL MEMBERS OF SOCIETY			
Benefits	5%	10%	15%
Diversion	$109,994.52	$104,994.77	$100,429.78
Earnings	28,542.00	25,613.00	23,411.00
Reduced Recidivism	232,150.55	212,339.43	195,418.77
Benefits	$370,688.00	$342,947.00	$299.260.00
Costs	$233,256.00	$233.256.00	$233,256.00
Benefit-Cost Ratios	1.6	1.4	1.2

It is more difficult to estimate the benefit-cost ratio for program participants, primarily because it is difficult to estimate the costs borne by participants. However, the social benefit-cost ratio would not exceed unity unless the private benefit-cost ratio exceeded unity for several participants. Program participants presumably bear none of the investment costs, but do incur private costs in terms of foregone income from theft, foregone leisure, disutility of work, etc. The benefits are the increased earnings over time as well as the reduction in expected costs of apprehension, adjudication, and conviction.

The distribution of benefits among participants, cross-tabulated by selected demographic characteristics, indicates no significant impact upon any given "type" of individual,

i.e., white, male, school dropout, etc. Again, such demographic characteristics are highly aggregated constructs and, thus, it is not surprising that no statistically significant differences are found.

The distribution of the diversion benefit, which depended upon the favorable recommendation of the project, is presented in Table III-A. The distribution of recidivism, by selected demographic variables, is shown in Table III-B.

TABLE III

TYPE OF TERMINATION AND RECIDIVISM OF PROJECT PARTICIPANTS BY SELECTED DEMOGRAPHIC VARIABLES

A. PROJECT RECOMMENDATION

		FAVORABLE		UNFAVORABLE	
SEX	Male	88	(80%)	22	(20%)
	Female	15	(75%)	5	(25%)
AGE	18-20	73	(76.8%)	22	(23.2%)
	21-24	30	(85.8%)	5	(14.2%)
RACE	White	14	(87.5%)	2	(12.5%)
	Black	87	(77.7%)	25	(22.3%)
HIGHEST GRADE COMPLETED	6- 8	7	(70%)	3	(30%)
	9-11	59	(75.6%)	19	(24.4%)
	12-13 & Up	37	(88.1%)	5	(11.9%)
MARITAL STATUS	Married	19	(86.4%)	3	(13.6%)
	Single	82	(77.4%)	24	(22.6%)

B. RECIDIVISM

		NO		YES	
SEX	Male	78	(70.9%)	32	(29.1%)
	Female	18	(90%)	2	(10%)
AGE	18-20	68	(71.5%)	27	(28.5%)
	21-24	28	(80%)	7	(20%)
RACE	White	14	(87.5%)	2	(12.5%)
	Black	80	(71.4%)	32	(28.6%)
HIGHEST GRADE COMPLETED	6- 8	9	(90%)	1	(10%)
	9-11	51	(65.4%)	27	(34.6%)
	12-13 & UP	36	(85.7%)	6	(14.3%)
MARITAL STATUS	Married	19	(86.4%)	3	(13.6%)
	Single	75	(70.8%)	31	(29.2%)

B. Implications of Findings

The effectiveness of a program such as Project Crossroads cannot be analyzed without consideration of the staff which administered it or the general social and economic environment in which it is adopted. It is important to remember that this is not merely an

analysis of the economic feasibility of an alternative to the normal judicial and correctional processes, but a measurement of the success of a program at a certain point in time, in a unique locale, and with a specific staff. Whether such a project is a worthwhile innovation depends not only on its conceptual validity but also on these other factors. Such a program adopted during a recession, in a depressed area, or with inadequate personnel would not meet with as much success as one adopted under more favorable conditions. To more thoroughly test the value of the innovation, the Crossroads concept should be introduced into other cities with different economic and social conditions, and conducted with different personnel. In an article discussing many issues in evaluation of manpower programs, Cain and Hollister state:

> Unless there is good evidence that success can be broadly replicated and that the administrative controls are adequate to insure such replication, then the individual project success is irrelevant. Resources must be allocated in light of evidence that concepts are not only 'successful' on a priori grounds on in particular small scale contexts but that they are in fact 'successful' in large scale implementation.[1]

No definitive statements can be made on the basis of this study about the effect of a Crossroads-type program with more serious offenders. However, in view of the benefit-cost ratios found here, there is at least an economic rationale for greater risk-taking. That is, enrollment of more serious offenders resulting, perhaps, in a lower success rate (in terms of recidivism) would still yield favorable benefit-cost ratios. Obviously at some point, as greater risks are taken, this would no longer be the case. In the introduction to this paper it was pointed out that this program and this study dealt with individuals involved in what is often termed "street crime." Thus there is no reason to believe, on the basis of the results of this study, that the methods of this program could be applied to professional criminals or to individuals involved with crimes of passion or violence. There is also no indication that such programs could be successful with younger individuals, primarily because fewer opportunities are available in the labor market.

These results suggest that alternative approaches to the traditional judicial and correctional processes can be effective. However, this does not mean that this type of program is better than other alternatives to the status quo. Other policies or programs which offer alternatives to the existing structure may have benefit-cost ratios which exceed those found here and under certain budgetary constraints should be adopted rather than this program. There is also no evidence that this program is the best possible pretrial diversion program. Some alternative mix of counseling, job placement, remedial education, and other services over a longer time period may yield higher benefit-cost ratios.

An employment-orientation to offender treatment programs would place much more of the burden of "rehabilitation" of criminals on the community. It is often argued that widespread community recognition of the interaction between criminal activity and socio-economic conditions is necessary for the ultimate solution of the urban crime problem. If the community fails to provide adequate opportunities, then the community can be much more readily identified as a cause of the failure of criminals.

One difficulty with efforts to shift some of the burden of "rehabilitation" to the community via an employment program is that in actuality the burden often is placed on individual employers. Individual firms in more competitive industries are unable to shift the burden to consumers in the form of higher prices and, thus, are unwilling to incur the risks. The risks to firms in hiring this type of employee are two-fold: (1) the higher probability, real or perceived, of employee theft, and (2) higher employee turnover rates.

---

[1] Glen G. Cain and Robinson G. Hollister, "Evaluating Manpower Programs for the Disadvantaged," in G. G. Somers and W. D. Woods, eds., Cost-Benefit Analysis of Manpower Policies (Kingston, Ontario: Industrial Relations Center, Queens University, 1969), p. 131.

The first problem has been somewhat alleviated by the introduction of the U.S. Department of Labor Bonding Program for offenders who have participated in manpower programs. The second problem arises because individuals are usually paid wages which exceed productivity while the necessary orientation and training take place. If firms perceive a significant risk that such employees will remain on the job a relatively short time, they will often be unwilling to incur the costs of the investment in orientation and training. If it is conceded that more of the burden of "rehabilitation" should be placed on the community, some consideration should perhaps be given to providing subsidies or tax credits to individual employers in return for hiring and providing on-the-job training. This would serve to shift the burden from individual employers to the community as a whole.

As well as an evaluation of Project Crossroads, this study has attempted to define the economic criteria necessary for making judgments on the effectiveness of various programs designed to rehabilitate the criminal offender. Much of the approach developed and presented here is applicable to the study of remedial education and job training programs in prisons and in work-release, half-way house, probation, and pre-trial diversion programs in the community. The analysis of this program began with estimation of the economic cost of crimes and of the services of police, courts, probation and corrections departments. These estimates were then integrated into the discussion of the benefits from the program. The benefits from the program were defined as: (1) the reduced resource costs from diversion of cases from the criminal justice system, (2) the increased earnings or productivity due to the job development and placement program and higher employment rates over time due to lower recidivism, and (3) reduced criminal justice system costs due to reduction in recidivism. Comparison of these measured social benefits with the costs of the investment showed benefit-cost ratios which exceed unity at discount rates of 5%, 10%, and 15%.

Further research is needed on several issues discussed in this paper. The extent of undetected and unreported crime is unknown. Data on the cost to individuals for crime prevention equipment and manpower are largely unavailable. The extent of migration, avoidance of normal activity and community disruption attributable to criminal activity is, at present, unknown. Development of a flow model such as that used in the recidivism reduction benefit for such crimes as forgery, assault, and narcotics would provide greater knowledge of the benefits from rehabilitation programs. Further work should also be done on the relationship between criminal behavior and labor force participation. Data on earnings of individuals is now available in aggregates of five from the Social Security Administration. Use of this source of information would yield more accurate knowledge of earnings than estimates based on interview data. Finally, estimates of the costs of police, corrections and, especially, court services need further development.

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VT 013 292
THE JOB DESCRIPTION: ACTION TOWARD CAREER DEVELOPMENT.

TALENT CORPS, INC., NEW YORK, N.Y.
MF AVAILABLE IN VT-ERIC SET.
COLLEGE FOR HUMAN SERVICES, 201 VARICK STREET, NEW YORK, NEW YORK 10014 ($0.50).
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IDENTIFIERS - *CAREER DEVELOPMENT

ABSTRACT - CAREER DEVELOPMENT FOR PERSONS OF LOW INCOME MINORITY GROUPS CANNOT BE ACCOMPLISHED WITHOUT THE PERMANENT ESTABLISHMENT OF NEW JOB LINES WITH FORWARD-LOOKING REQUIREMENTS AND JOB QUALIFICATIONS. LIKEWISE, JOB LINES CANNOT BE ESTABLISHED WITHOUT THE DEVELOPMENT OF MEANINGFUL JOB FUNCTIONS. THIS PAMPHLET INCLUDES JOB DESCRIPTIONS COMPRISED OF TOTAL FUNCTIONS WHICH HAVE BEEN ABLY PERFORMED BY TALENT CORPS STUDENTS AT FIELD TRAINING PLACEMENTS THROUGHOUT COMMUNITIES OF NEW YORK CITY, AND REPRESENT SUCCESS IN MANY AREAS OF COMMUNITY SERVICE. INFORMATION PRESENTED FOR PARAPROFESSIONAL POSITIONS INCLUDES THE CAREER CLASSIFICATIONS AND THE TYPES OF AGENCIES INTO WHICH THEY HAVE BEEN BUILT. THIS INFORMATION IS INTENDED TO BE USEFUL IN DEVELOPMENT, TRAINING, AND NEGOTIATION OF POSITIONS FOR CAREERS. (AUTHOR/JS)

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(41)

THE JOB DESCRIPTION:

ACTION TOWARD CAREER DEVELOPMENT

Talent Corps, Inc.
201 Varick Street
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TALENT CORPS
(The Job Description

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INTRODUCTION

The Talent Corps established for itself two primary objectives: (1) to orient and train persons from low income communities to become competent and effective assistants in agencies of community service and (2) simultaneoulsy to work toward the (establishment) of permanent career lines in public and private institutions of New York City. It is this particular combination of objectives which creates the uniqueness of the Talent Corps. To assume this double responsibility is to assume and anticipate the meaninglessness of training which will lead nowhere: it is also to assume that existing institutions are a fertile ground for effective change.

Career development for persons of low income minority groups cannot be accomplished without the permanent establishment of new job lines with forward-looking requirements and job qualifications. Likewise, job lines cannot be established without the development of meaningful job functions. Within this context, the job description becomes a significant factor: this provides evidence of what is being done and why new job lines must be created for new careerists.

The following job descriptions are comprised of total functions which have been ably performed by Talent Corps students at field training placements throughout communities of New York City, and represent success in many areas of community service.

They are preliminary job descriptions that have been jointly developed and proven by Talent Corps staff and students and administrative and supervisory staffs of the cooperating agencies, working together constantly to maintain the integrity of goals for paraprofessional new careersmen and women, and improved and expanded community service. This joint endeavor well served the needs of Talent Corps students in developing skills and capabilities, and the needs of institutions by filling manpower and service gaps.

The information presented in the following pages includes the career classifications and job descriptions and the types of agencies into which they have been built.

It is hoped this information can be usefull to other persons and/or groups currently engaged in the development, training and negotiation of positions for careers.

PARAPROFESSIONAL CAREER CATEGORIES

Case Work Assistant
Social Work Assistant

..... in hospitals, neighborhood centers, rehabilitation services, mental health services, halfway houses

Community Health Assistants

..... in Comprehensive Care Services of hospitals, for children or adults

Community Liaison

..... in NYC Housing and Development Administration

Liaison Assistant
Health Aide
Education Assistant
Guidance Assistant
Library Assistant

..... in private schools and NYC public school system

Community Aide
Legal Services Assistant

..... in NYC Legal Aid, Mobilization for Youth Services, Community Action for Legal Services and other law offices specializing in community service

Occupational Therapy Assistant
Recreational Therapy Assistant

..... in various departments of municipal and private hospitals

Research Assistant

..... in institutes or programs designed for developmental studies

Lay Group Therapy Leader

..... in rehabilitation services

Community Mental Health Assistant

..... in independent or hospital-directed community mental health projects

Mental Health Worker

..... in community halfway houses and other rehabilitation centers for former patients of mental institutions

Teacher Aide

..... in independent community and NYC sponsored day care centers

Lay Advocate

..... in community welfare rights centers

Family Planning Technician

..... in private and municipal hospitals, and private family planning services

Case Work Assistant

Social Work Assistant

.....in various settings, according to agency needs, perform the following functions:

Interview clients

Complete or assist clients with the completion of application forms

Schedule and follow up on client appointments

Locate needed community facilities or services for clients

Escort clients referred to other community agencies

Collect and catalog information on community resources

Make home visits to clients

Collect data for statistical survey

Observe and participate in staff conferences

Make verbal and written reports

Write case histories

Interpret to individuals and community groups the role and functions of the agency

Participate in agency special programs (such as ward recreation programs in hospitals, or community discussion groups in social agencies)

Community Health Assistants

Functions:

Conduct initial patient interviews and fill out necessary forms

Explain health services to patients

Complete and record simple medical procedures (such as taking temperatures and weights and measuring heights)

Collect specimens as directed by medical staff

Schedule and follow up on patient appointments

Make home visits to patients, for follow up, delivery of medications, etc.

Observe and participate in patient conferences with medical staff

Make verbal and written reports

Assist patients in obtaining needed community services

Accompany patients to other community agencies, assist with shopping, etc.

Community Liaison

Functions:

Interview clients

Inform clients of rights and benefits

Conduct commercial surveys, relocation surveys

Compile statistical data

Make home visits

Assist families with problems that might arise in needing medical care, welfare aid, employment, education and camping services

Organize community groups to participate in agency activities

Conduct or assist at community meetings

Participate in community recreation programs, cultural programs, etc.

Write reports on all activities

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Liaison Assistant

(In public and private schools, with student population resident in institutions such as hospitals, orphanages, etc.)

Functions: Pick up children, escort to school Communicate special instructions to school and Residence

Assist with student registrations and discharges

Coordinate student daily activities Tour halls, check recess and lunch periods

Assist with disruptive children in classrooms

Report to teachers, school Guidance Office and Residence on observations and suggestions

Act as surrogate parent at teacher conferences

Arrange and participate in staff conferences at Residence

Assist with special program (medicals, etc.) arrangements for children as required by school or Residence

Health Aide (Schools)

Functions: Interpret services to the community

Meet and greet children and parents, make welcome and discuss services

Vision testing and recording

Hearing testing

Take temperatures, weigh and measure, and simple treatments as assigned

Maintain supplies, check equipment and keep medical room in order

Assist with: referrals to appropriate agencies as required

Escort and transport children, parents or material when necessary

Schedule and follow up on patient appointments

Make verbal and written reports

Observe and participate in staff conferences

Education Assistant

Functions:

Work with small groups and/or individual students

..listen to oral reports

..do remedial work in reading and arithmetic

..teach English to non-English speaking children

..homework assistance

..reading aloud to children

..handling classroom "emergencies"

Assist teacher with classroom work and preparation

..correct papers

..list homework on blackboard

..take class to auditorium

..supervise arts and crafts

..assist in dramatics

..check classwork

..keep attendance sheets

..use office machines

..update bulletin boards

..give spelling tests

..organize class for dismissal

..escort children to special classes

Education Assistant (continued)

Functions:

..give continuity to class when visitor or substitute teacher comes in

..play piano for assembly or rehearsals

..conduct opening exercises

..act as monitors for testing

..plan class visits

..read stories

..distribute supplies

..monitor at mealtime

..lead outdoor play duties

..conduct library programs

..prepare special holiday programs

Home Visits

..visit parents of child having difficulty in school

..visit sick child

..visit shut-in parent

..take sick child home

..visit parents in order to invite them to school conferences

Parent conferences in school (with teacher or alone)

Help to interpret school to community and vice-versa

ce Assistant

Functions:

To assist counselor in work with individual and groups, with special empasis on establishing closer ties with parents and other members of community

Receive students and parents as they come into office

Determine whether problem can be handled by assistant or whether immediateor future appointment should be made with Counselor

Answer telephone

Distribute applications for working papers, lunch and transportation

Interview students regarding:

New admissions

Remedial assistance

Incentive interviewing (students who are doing well or showing improvement)

Follow up on students with history of truancy or absence

Filling out college application

Programming for individual students

Discussing absenteeism

Gather information on:

School records

Report cards

Teacher evaluations

College transcripts

Guidance Assistant (continued)

Functions:

Assist Guidance Counselor and school staff in bi-lingual interviews and writing letters in Spanish.

Assist Counselor with court reports, welfare forms and medical suspensions.

Visit homes and other institutions to obtain relevant information for benefit of students.

Attend P.T.A. and other neighborhood action meetings

Assist in mass distribution of guidance material

Basic Clerical Duties:

..filing, pulling out folders, some data

..typing (limited)

..maintain records

..arranging appointments

Assist in testing situations

Corrective Reading

..working with individual or small group of students who exhibit reading difficulties

Help interpret goals of educational process to parents toward school, school policies and children's progress.

Work with small guidance groups

Work in "Students on Suspension", a special project in District Office in Bronx

..work out school program for individual child

..plan and participate in games with individual child

..plan and carry out simple academic assignments with individual child

Guidance Assistant (continued)

Functions:

..relate back to supervision teacher her observations and findings regarding child· incorporate these in future program plans

participate in weekly group conferences with B.C.G. psychologist, guidance counselors and supervising teacher re progress of children

Participate in conferences with Social workers, psychologists, Guidance Counselors, teachers and other pupil personnel re progress of children

Participate in other Guidance Projects as they relate to the particular needs of the school or district

Help with and go on field trips with students in the area particularly related to Guidance, i.e., articulation with other schools

Give interim supportive help to a youngster in a crisis situation

Interpret school to parent and children

Help pupils become acquainted with community jobs, distribute occupational material

Organize requests for camp and distribute information on camp situations available

Work with welfare mother and caseworker

Library Assistant

Functions:

File catalog cards, alphabetize

Type catalog cards

Prepare orders for books

Repair books

Classify books, shelve them

Inventory library materials

Check magazine arrivals

File magazines

Open and sort mail

Help children find books

Card books

Write overdue notices

Make up packets of books for primary grades and circulate

Check books received against orders

Put jackets in books

Keep daily records of books borrowed and returned

Community Aide

Legal Services Assistant

Functions:

Conduct initial interviews alone, to determine what the problem is and whether or not the office can handle it or will have to make referrals (with advice of lawyer)

Conduct follow up interviews alone after client has seen lawyer, to complete standard forms as required

Interpret to clients instructions, information, advice, etc., the lawyer has given

Serve summonses and subpoenas

Make home visits to conduct interviews, collect information for lawyers

Accompany clients to courts

Help locate community resources as needed, negotiate with them for clients

Arrange client appointments for lawyers

Work independently on problems, after discussing with lawyers and at their instruction, such as welfare problems

Interpret for non-English speaking clients

Write reports on all activities

Deliver documents to courts

Simple legal research

Meet with community groups to interpret roles and functions of agencies

Sit in on interviews with lawyers when requested, to assist in interpreting to clients, collecting information

Community Aide

Legal Services Assistant (continued)

Functions:

Verify violations and investigate client complaints on instructions of attorney

Search titles, other legal records

Fill out affidavits

Write Show Cause Orders

Complete various forms to initiate legal action, such as Suspension Deportation forms, divorce proceedings, custody and adoption cases, rent control and housing violations.

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Occupational Therapy Assistant

Functions:

Conduct supportive therapy on wards:

- establish relationships with patients
- observe needs of patients, relate back to Occupational Therapist and other staff
- discuss with medical supervisor type of therapy indicated

Intensive therapy--instruct in:

sewing	copper tooling
cooking	jewelry making
beauty culture	woodworking
embroidery	sculpture
ceramics	collage
leatherwork	crocheting

Organize groups for programs in drama, writing, gardening and music

Accompany patients on field trips

Assist with management of supplies, including purchase and distribution

Assist with inventory and maintenance of supplies

Escort special visitors or entertainers through wards and units

Participate in staff conferences

Write reports

Recreational Therapy Assistant

Functions:

Assist with, and carry out planning and preparation of all ward activities, working with individuals and/or small groups

Supervise group activities, such as games, parties, plays

Teach arts and crafts, improvising with materials

Intensive therapy--instruct in:

sewing	crocheting
cooking	painting
ceramics	games
knitting	

Supervise patient group discussions

Distribute toys to patients, teach games to be played with them

Read stories to patients

Accompany patients on outings

Assist in the maintenance and repair of equipment

Assist with management of supplies--including purchase, inventory and distribution

Attend and participate in case conferences

Write reports

Research Assistant

Functions:

Assist with development of questionnaires

Conduct surveys

Schedule and conduct survey interviews

Compile statistical data

Organize community discussion groups

Participate in staff conferences

Write reports

Lay Group Therapy Leader

Functions:

Initial patient interviews (including completion of forms for patient records)

Schedule and follow up on patient appointments

Locate needed community facilities or services for clients

Escort clients referred to other community agencies where necessary

Observe and participate in staff conferences

Make verbal and written reports

Observe and participate as co-therapist in peer groups and multiple family groups

Make home visits for follow-up

Community Mental Health Assistant

Functions:

Case Finding (teamwork, including):
initial patient interviews
interpretation to patients of mental health services

Schedule and follow up on patient appointments

Make home visits to patients and families

Observe and participate in patient conferences with medical and social work staff

Make verbal and written reports

Assist patients in obtaining needed community services

Escort patients to other community agencies and facilities

Mental Health Worker

Functions: (To assist professional mental health staff in relating to members in order to help patients returning from institutions to adjust to community life and demands. All tasks are done with patient population.)

Setting up personal schedules and routines

Shopping

Assist with cooking and other kitchen duties

Escort patients to hospitals and other city agencies

Make home visits

Handle crises and emergency problems brought to attention either directly by patients or through observation of their actions

Make verbal and written reports on observations, findings and recommendations

Observe and participate in staff and patient conferences

Teacher Aide (Day Care Centers)

Functions: Work with small groups and/or individual students

Assist with program planning

Supervise arts and crafts

Plan and conduct class visits

Read stories

Distribute, collect, and maintain supplies

Lead outdoor play activity

Update bulletin boards

Monitor at mealtime

Observe and participate in staff/parent conferences

Make verbal and written reports

Lay Advocate

Functions: Interview clients

Interpreting welfare rights

Assist clients in making application for or adjustment of welfare benefits

Prepare arguments for Fair Hearings

Prepare forms, files, all necessary records for Fair Hearing

Maintain correspondence regarding Fair Hearings

Represent clients at Fair Hearings

Assist clients in Locating needed community facilities or services

Collect and catalog information on community resources

Observe and participate in staff conferences

Make verbal and written reports

Family Planning Technician

Functions:

Interpret program to hospitalized patients and visitors to agency

Respond to Community requests for information on family planning

Establish contact with individuals and/or community agencies to acquaint them with existing and potential programs, their philosophies and their goals

Schedule and follow up on patient appointments

Escort patients to and from Family Planning Center as necessary

Babysit with patient's children while parent is being cared for

Gather data and assist in Family Planning surveys as requested

Assist in development of questionnaires for Family Planning surveys

Work with individuals and small parent groups in discussing family planning and sex education

Complete and record simple medical procedures (such as weights and measuring heights)

Interpreting for physicians

Make verbal and written reports

Observe and participate in staff conferences

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ABSTRACT - THIS MANPOWER REPORT IS CONCERNED WITH IMPROVING MANPOWER UTILIZATION, STIMULATION OF IMMIGRATION, AND INTEGRATION INTO THE ISRAELI ECONOMY OF THE ECONOMIES OF THE OCCUPIED AREAS. POSSIBLE IMPROVEMENTS IN MANPOWER POLICY ARE CONSIDERED, WITHIN THE CONTEXT OF PAST ECONOMIC DEVELOPMENT AND PROJECTED FUTURE CHANGES. IMPLICATIONS ARE INCLUDED FOR EDUCATION, MANAGEMENT, WAGE POLICY, LABOR, GOVERNMENT ROLE, TARIFFS, INFLATION, DEFENSE INDUSTRIES, AND RESEARCH. (BH)

VT 013 324

STATE OF ISRAEL
MINISTRY OF LABOUR
MANPOWER PLANNING AUTHORITY

Fifth Report on Manpower in Israel

By
PROF. ELI GINZBERG

June 1968

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June 1968

Manpower Planning Authority

Jerusalem, 31st. May, 1968

P R E F A C E

We are again grateful to Prof. Ginzberg for another incisive analysis of the manpower situation in Israel.

As an American closely identified with our attempts to encourage aliyah his cautious and long-range approach merits special attention.

The same applies to his initial assessment of the manpower implications of the occupied areas. The very rapid rate of economic recovery in Israel will shortly bring the problems he outlines into sharper focus.

The bulk of the report is centered around the problems in more effective manpower utilization and suggested directions for manpower policy.

In preparing this frank and open report, Prof. Ginzberg has once again done us an invaluable service.

Chanoch Smith

I. Introduction

1. Prior Boom

This Fifth Report on Manpower Utilization in Israel is based on several weeks of consultation and field studies in September, 1967. In response to the suggestions of the Director of the Manpower Authority of the Ministry of Labor, I addressed myself to the following three priority problems:

a) The more effective utilization of manpower in the Israeli economy.
b) The problems and prospects of stimulating the flow of immigrants into Israel from western countries, particularly the United States.
c) The articulation of the economies of the occupied areas with that of Israel.

The Israeli economy is sui generis in many regards and it is not possible to assess it at any point in time without some perspective. Only as one sorts out the ephemeral from the long-run forces that have been operating to shape and reshape the economic life of Israel, can he develop a sense of where the economy currently is and how it is likely to change in the years immediately ahead.

My Fourth Report was based on a visit in September 1964 when the economy was nearing the crest of a long-sustained expansion based on a construction boom, major development projects, and the stimulation of consumption by large-scale German restitution payments. At the time of that visit, there were many evidences of manpower shortages particularly at the skilled level but also in other occupational categories. The

unemployment rate was quite low except in development towns.

Nevertheless something was awry in the picture in 1964 as assessed by an outsider. It was difficult to see how the forces sustaining the boom could long continue: construction was beginning to run ahead of market demand; the Government did not contemplate entering upon new development projects on the scale of those nearing completion; and the German reparations and restitution payments were soon to decline.

In addition to qualms engendered by the prospective weakening of these important dimensions of demand, the outside observer could not fail to be restive about the foundations of the Israeli economy because of the limited number of enterprises that were able to compete in the world's markets. Moreover, the sustained domestic expansion had obscured the extent to which employers in every sector of the economy-governmental, cooperative, and private--were operating with swollen work forces whose productivity was adversely affected by lax discipline and poor work habits. Even at the crest of the boom, most of the labor stringencies could have been relieved had the labor market not been forced to operate under so many hobbling influences.

By 1965 the boom had run its course and the period since then has witnessed substantial declines in output and employment intensified by government policy that was deflationary in intent and execution. The authorities hoped that by rigid controls over money and credit, they could shift resources from construction to the export industries and thereby help to close at least a part of the foreign trade gap. Their

policy reinforced the deflationary tendencies stemming from the exhaustion of the construction boom, the completion of major development projects, and significant declines in transfer payments from Germany.

2. Recession

As a consequence, the economy failed to grow in 1966 and unemployment mounted rapidly until it exceeded 10 percent, reaching 12 percent in the winter of 1967. There was some reduction in the trade gap, largely reflecting the lessened demand for imports incident to the reduced level of production and a significant expansion in the demand for one of Israel's principal exports--cut diamonds. But the deflationary policy of government did not succeed. The export potential of Israel's industry had not been significantly strengthened while the economy failed to grow and tens of thousands of workers lost their jobs. In the spring of 1967 the Government recognized the need to increase spending to reduce unemployment. After the Six Day War in June, the Government reaffirmed this policy by passing a second supplementary budget aimed at stimulating the economy through large-scale public expenditures and through new tax policies aimed at increasing consumer demand.

The recession led to the bankruptcy of a considerable number of firms with consequent dismissal of their employees. The release of workers from the construction industry was particularly large. But in neither of these cases was the redundant manpower absorbed by an expanding export sector. Employment in manufacturing declined. The declines would have been still larger had not the Government, worried by mounting unemployment especially in development areas, decided to

increase its subsidies so that still more people would not lose their jobs.

The recession did, however, enable certain managements to establish more realistic manning tables by dismissing excess workers. One large chemical company released several hundred workers, representing about a third of its work force, with no decline in output. But this was not typical, in general, output fell more rapidly than employment.

Israeli employers frequently operate with a bifurcated work force: a substantial group of regular employees who have seniority and a supplementary group whom they hire and fire as their requirements change and who do not acquire seniority. Unemployment fell particularly heavy on the latter.

Unemployment also came to weigh very heavily on young people who were entering the labor force for the first time. It was quite difficult for a young man or a young woman to find a job, especially one commensurate with his education and training and which offered some prospect of advancement.

One other group that was particularly vulnerable to the weakness in the labor market were mature women who lost their jobs as well as those who were ready and willing to enter or reenter employment.

There has been considerable disagreement among various groups about the extent and seriousness of unemployment. Those who seek to minimize it refer to the number of persons coming to the Labor Exchanges seeking work. Those who know the limitations of these data believe that the quarterly report of

the labor force is a more reliable indicator. This much is certain. The latter method provides a better gauge of the manpower resources of the nation that are running to waste because of an inadequate demand for labor.

3. Future Prospects

It is never easy to forecast the future trend of an economy especially if, as with the Israeli economy, it has recently passed a turning point. The optimists hold that since the long drift downward has been halted and there are signs of a strengthening of demand, reflected in a modest increase in employment, the outlook is favorable. The forces of expansion should be able to reinforce each other until the economy is close to full employment. Their optimism is strengthend by the recent action of the government to pursue a much more expansionary monetary and fiscal policy.

Others, who do not deny that the economy should be able to continue its recent modest expansion, question how much momentum it is likely to achieve. The inflow of new immigrants, a major force in previous booms, remains at a low level. Residential construction shows few if any signs of reviving. The profitability of industry is not encouraging substantial new investments. It is difficult to see how the economy can regain in the near future the high levels of activity prevailing up to 1965.

From the viewpoint of employment there are signs of shortages of certain types of skilled workers and professionals. The numbers on the work relief rolls have declined significantly from the peak of over 25,000. But it is a recognized phenomenon that

in the early stages of a recovery. output can increase substantially with little increae in employment. Only a substantial and sustained boom is likely to sop up most of those young people and mature women who have delayed their entrance into the labor market, in addition to providing jobs for others who will reach working age.

The Israeli economy has been characterized by a substantial increase in prices year in and year out but this trend was broken during the recent recession. If the Government pursues the policy on which it is now embarked of forcing expansion through increased public spending, there is a risk that prices will once again begin to rise as consumers and investors seek to hedge against further rises. It is less certain whether the investment climate will change for the better. If the investment climate remains the same, the country may confront inflation with continuing if receding unemployment. If these developments come to pass it is difficult to see how the trade gap can be substantially narrowed.

The Government is well aware of these dangers; some officials are recommending an early closing of the spigots to prevent inflation. But even this policy has risks. If the forces underlying the present expansion peter out--as well they might--the desired increases in output and employment will not be achieved.

An assessment of the short-run outlook of the Israeli economy is difficult because of the uncertainty of response to the investment policy recently adopted by the Government. Recognizing that Israel needs a much broadened and deepened manufacturing base if it is to become fully self-supporting in the years ahead,

the Government has adopted a program aimed at encouraging private investment based on easy access to capital, lower interest rates, special tax benefits. The success of the program would require a response not only from local but also from foreign investors. It is difficult to know whether this law, reinforced by Israel's outstanding success in battle with its consequent greatly improved security position will succeed, and soon, in changing the investment climate. If it does the Israeli economy will in truth have turned the corner but until this happens one cannot be sure that the current expansion will be maintained.

4. Economic Lessons

Several lessons can be precipitated from this summary review of recent economic developments that should prove helpful in the design of future economic policy. The social and political climate of Israel makes it difficult for any government to tolerate for any length of time a policy that results in substantial unemployment. Government officials will find themselves under great pressure to prevent the closing of firms in order to protect the jobs of the work force who if released would be hard pressed to find alternative employment. And if the unemployment figures mounted the Government would be under strong pressure to undertake various work relief projects.

Whatever the merits of a stringent deflationary policy--and the prevailing view among economists is that they are few--the important fact is the social and political unacceptability of the consequences of such a policy in contemporary Israel.

A second finding extractable from recent experience is the difficulty of Israel's sustaining a high level of employment and output in the absence of a high level of construction activity, which in turn is closely linked with substantial inflows of new immigrants. While the dependence of the economy on construction can undoubtedly by lessened over time, the assumption that it can be done quickly and successfully through a rapid expansion of manufacturing for export, as the planner hoped, has been proved wrong.

The difficulties involved in shifting resources among the sectors is underscored by the fact that total employment in manufacturing declined in the face of a policy that aimed at its rapid expansion. With a limited domestic market, significant expansion of manufacturing in the short-run requires the successful penetration of new markets abroad which is difficult for any country, even one with a more sophisticated economy than Israel's, to accomplish.

Much the same conclusion must be reached about the potentialities for a vastly expanded inflow of tourists. There is every reason for optimism that this will occur in response to the improved security, if that can actually be achieved, of the area and the reduction of barriers to travel through the Holy Land and beyond. But here too time is a basic ingredient. New hotels and rest homes cannot be sited and built, new groups of tourists cannot be attracted and new arrangements for inclusive tours cannot be worked out over-night.

The shifting of manpower and capital from construction to manufacturing and services can and probably will come about but such substantial changes require considerable time. For example,

the disinclination of skilled construction workers accustomed to high wages to contemplate working in industry where the conditions are more onerous and the wages much lower will continue as long as they anticipate a revival in their own field. Only if construction remains at a standstill, or revives only slowly, will construction workers finally accept the nesessity of finding a new job.

A final lesson extractable from recent experience is the anomaly of manpower shortages of skilled workers at a time when the numbers without skill who are unemployed remain substantial. The modest expansion of the economy in the second half of 1967 has made it difficult for various employers, especially those with specialized requirements, to find skilled workers to add to their work force.

This phenomenon of labor shortages coexisting with labor surplus has characterized the American economy since the late 1950's. However, it has not been part of the experience of the countries of Western Europe during the past two decades during which they have maintained a high level of employment.

Unless the Israeli authorities direct their attention specifically to this anomaly and design effective programs to cope with it, it is unlikely to be resolved. If Israel stresses quality output for export, it must make more effort to bring its poorly educated, unskilled workers to a higher level of competence. As we shall see, to raise the productivity of Israeli industry involves more than raising the quality of Israeli labor. But unless the working population is better educated and trained, the economic independence that Israel is seeking cannot be achieved. Handicapped in many regards in

industrial competition, Israel must maximize the potential advantages in her human resources.

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II. Paths to More Effective Manpower Utilization

There is no single way for a country to improve its manpower utilization. A successful program requires efforts along a great many different fronts. Moreover, these efforts must engage the continuing concern of all who are in a position to affect the outcome. The following paragraphs suggest the major fronts along which continuing efforts are required. Attention is directed specifically to areas of weaknesses where changes in policy and program are likely to yield differentially high returns.

1. Basic Preparation for Work: The Challenge to the Schools

We have noted that even with a slight improvement in labor market conditions in the summer of 1967, employers found a shortage of skilled workers. When this fact is juxtaposed to the new orientation of Israeli economic policy, which is to expand as rapidly as possible its export industries, particularly those with a high labor component, we can postulate that in the years ahead the challenge of expanding and deepening the pool of skill and competence should be a major objective of national policy. While a great many adjustments must be undertaken to bring about this expansion,

it should be emphasized that the ease or difficulty of accomplishing the objective will depend in considerable measure on the educational preparation of the young people who will be entering the labor force. Unless they have received solid grounding in the communications arts and in mathematics, they will not have the learning tools required to master manual, technical and service skills on which the viability of the economy will depend.

The absence of a broad secondary educational system has long been a serious bottleneck in expanding Israel's human resource base. For the most part, Israel has followed the elitist pattern of European countries of pre-World War II, in which the academic secondary school was a narrow tunnel through which a minority passed on their way to the university. Recent Israeli policy has aimed at and succeeded in substantially enlarging the numbers and proportion of elementary school learners who continue with their education. But the crux of the matter is the structure of the curriculum in the secondary schools, particularly for the large numbers who are not enrolled in the academic program.

The dominant tendency has been to stress "vocational education" for the ever larger numbers who pursue post-elementary schooling. Admittedly it would be an error to assume that all young people should be placed on the academic track with their eyes focused on gaining admission to the university. Even in a wealthy country not more than one-third of the age group is likely to enter college and not more than one-fifth graduate.

The more relevant considerations are the division between the academic and vocational stream; the content of vocational education; and the length of time that young people should remain in school. Preferred solutions would be to delay as long as possible the establishment of multiple tracks; to be sure that the curriculum in vocational education is solid and serious and is not limited to simple exposure to tools and machines; and that many people are encouraged to remain in school as long as they can demonstrate that they are eager and able to learn.

Serious problems will arise in Israel as the number of students completing elementary school from recent immigrant families from Africa and Asia begin to outnumber those who are native-born or who come from the families of immigrants from Europe. There is no blinking the fact that for a whole complex of reasons the former experience more difficulty in negotiating the formal educational system successfully. Despite various experiments, the educational leadership has not found any way to narrow significantly the achievement gap between the two population groups. Additional time for the Oriental immigrants to adapt to the new environment is unquestionably one of the important variables in this equation. The government is to be commended for creating special opportunities for talented Oriental youngsters to attend and complete university training. But the future vitality and viability of Israel will in large measure depend not on what happens at the margin but on the performance of the basic educational institutions through which young people are now proceeding.

The major challenge facing the Ministry of Education is not to hold more and more young people in school past their fourteenth year--essential as that is-- but to assure that those who remain

are successfully educated in the essentials required for the acquisition of skills both for the world of work and for citizenship.

What does successfully educated imply? It does not mean that the high schools should take on the responsibility of turning out young people who will be able to operate a loom, set and wait on tables, serve as a craftsman's helper, know how to cut a simple piece of metal, or do any one of a large number of other useful tasks. These simple operations can, and should, be learned on the job in a day, a week, a month. If the schools shun this form of instruction, employers have no option but to undertake it. And from the view-point of social accounting they can do it much more quickly and better.

Nor should the schools rationalize such vocational training on the ground that many young people have no respect for manual work and hanker after technical and professional employment beyond their talents and the ability of the country to provide.

Since it is next to impossible even in a wealthy country to build up a strong system of vocational schools that can provide instruction appropriate to the technology of today and more importantly to tomorrow, the result of an inferior program will not help to change faulty attitudes about manual work but will reinforce them since those who pass through these schools will not be well positioned for employment.

The critical issue is not a vocational versus an academic curriculum but how to instruct effectively young people who cannot profit from continuing along the academic track. The crucial point is that they too, if they are to become productive

workers and constructive citizens, must be able to read effectively so that they can continue to learn; they too must have some control over the manipulation of numbers which is basic to most skilled employment, and they must acquire some understanding of the relation between the efforts required to learn new materials and the rewards that attach thereto. If the products of vocational schools acquire these basics then the schools have done their work well. If the students cannot read, if they cannot handle numbers and quantitative relations, if they balk at making the effort required to learn new materials--then the schools have failed. The argument does not pertain to the curriculum as much as to student competence. There are many different ways for the school to succeed--and many ways in which it can fail--depending on its perception of what needs to be accomplished.

This much is clear: Israel cannot hope to meet its objective of economic independence without raising its labor productivity. And to accomplish the latter it must have an ever larger proportion of its new workers capable of coping with language, numbers, and able and willing to learn new subjects. This is the overwhelming challenge to the educational system and one that it has not yet met.

2. Adult Educational Opportunities

The presence in Israel of large numbers of immigrants whose lives have been unsettled and whose education and training have been interrupted, together with the many young people now entering the labor force who have had no more than nine or ten years of formal schooling makes it important that opportunities be available for adults to pursue education and training.

Many people first become serious about learning in adulthood when they recognize the close linkage between their interests and goals and their need for additional knowledge and training. The ability of people to add to their stock of knowledge and competence is always a function of their motivation. This is why many adults make excellent students. While Israel has a considerable number of adult educational opportunities available especially in its principal cities, and while certain organizations such as the Israel Defense Forces have long recognized the critical importance of a large educational and training effort for the upgrading of its career personnel, there is need to broaden and deepen these educational and training opportunities for both blue and white collar workers in every sector of Israel society--governmental, cooperative and private.

The fact that it is easier for a large organization to establish and maintain a large in-service training program must be put next to the fact that most of the Israeli economy is composed of small units. It is not possible therefore to rely solely or even primarily on the initiative of the employer. Moreover, when the labor market is taut, employers are loath to engage in large scale training for fear that many of those whose skills are enhanced will be bid away from them.

However there is another side to the coin. Good training opportunities--that is in structured work situations, with efficient machinery and competent supervision--are rare. Therefore, from the viewpoint of the national interest it is an error not to exploit to the full the training capabilities of the most advanced sector, even if many of those who are trained find employment elsewhere.

The reconciliation between the need to expand training and the lack of incentive on the part of the individual enterprise to train in excess of its own needs is possible only through a national training plan which monitors the prospective demand and supply for skills and which has at its disposal governmental funds to subsidize employers who train in excess of their own needs.

With the country's present development it is probably not desirable for the government to contemplate a special tax on employers for a specific contribution to national training to be remitted against evidence that they are making an investment in training equal to or in excess to their liability. But the time may come when the government will want to explore this approach, which was recently implemented in Great Britain.

An effective training structure requires in addition to sound policy, appropriate facilities, staff, curricula, qualified learners, and a work load that is in reasonable balance with the capabilities of the training system.

Israel has been expanding its training efforts over the past years but the structure for out-of-school young people and adults has not been planned nor is it presently operating in a relation to the current and evolving manpower needs of the nation. A strengthening of this structure requires closer and continuing cooperation among government, trade unions, and employer groups.

If a more effective framework for adult training could be established it would be important for the leadership to remain sensitive to the following problem areas: the need for increasing the educational achievement of many who are seeking to improve their skills; the recognition that Israel's economy will have increasing need for a higher level of skill among

service workers--from those working in the ports to hotel personnel; the special needs of mature women who will be entering or reentering the labor market in their thirties and forties; the challenge presented by the need for large scale retraining of the work force in development towns where existing plants have proved unprofitable and must be closed down; special attention to the transitional problems faced by men and women who have completed their military service and who desire to build on their prior experience; the probability of improved articulation between young people who are out of school but but yet liable for military service and training opportunities that would enable them to assume operational assignments when they enter active service.

These are but some of the important areas where a more effecive training effort could pay off. Some programs are currently operating in each of these areas, but from the evidence available it appears that they are inadequate both in scope and in quality. Strengthening adult training remains a critical element in raising Israel's manpower utilization.

3. Wage Differentials for Skill

As we have seen, in general, employers invest in skill training only when they confront present or prospective shortages which they believe can be most effectively resolved through investments in training and upgrading of their work force. But the total skill pool of a country will not increase at optimum rate if sole reliance must be placed on the individual employer. If the rate of skill acquisition is to be speeded, it is essential that the self-interest of workers be tapped as well. This will be possible only if training opportunities are

available and only if prospective trainees make the effort. Learning is an effort and many men are loath to make it unless they see specific advantages which will result to themselves.

The wage structure and the criteria governing promotions therefore play a major role in encouraging skill acquisition. Israel is committed ideologically to a highly egalitarian income policy, where the gross and net differences between men at the top and bottom of the occupational structure are much narrower than in most other capitalistic, socialistic or communistic nations. While there has been some increase in differentials during the past years, the present structure it appears operates as a drag on the acquisition of skills. Many workers see little point in making the extra effort required to enhance their skills both because their net earnings will increase only slightly and they may not be promoted more quickly.

Ideology, institutions, and practices have reinforced each other to keep the wage structure flat and to make promotions turn heavily on seniority. It would be foolish to minimize the difficulties in the way of loosening the hold on these ingrained approaches and practices . Nevertheless, since the future of Israel's economy hinges on the improvement of its labor productivity, the leadership has no option but to encourage the population as a whole, and working men in particular, to see the need for greater flexibility. It would be unrealistic to expect a sudden reversal in wage structures and promotions but it would deflect future trouble if the leadership were to press an educational campaign aimed at greater flexibility.

4. Labor Discipline

Most countries that have enjoyed a long period of prosperity with a tight labor market experience some order of difficulty in maintaining high work standards. The extent of their difficulties will also be affected by their traditions in the work place, the organization and functions of trade unions and by power relations. On each of the foregoing counts Israel faces special difficulties. For the most part Israeli enterprise has been heavily directed toward output for the local market and it has thus had considerable protection from the discipline that is met by economies that must meet the standards prevailing in the world's markets. This protective shell has inhibited the growth of high levels of workmanship.

Israel is strongly organized with the result that the balance of power has been on the side of the trade unions. For the unions have great strength not only as a consequence of their own organization but because they have been closely aligned with other centers of power--financial, political, ideological. It must be remembered that the majority of the early settlers and those who gave a definitive cast to the country's development were concerned with building a Jewish state, and a socialist state.

The mutual reinforcement of these powerful trends has made it difficult for a largely inexperienced and weak management to insist upon high standards.

Two references can help clarify the issues involved. One source of pride of the trade union movement is the elaborate health insurance system to which all members of the work force

belong. The Kupat Cholim is the worker's own health system. When a man leaves his work place because he is unwell to report to a neighboring clinic where he may have to wait for a considerable period of time, the physician, in reaching a determination of his condition and in considering what he should prescribe, cannot help remembering that his own position and advancement will be determined by how well his patients are satisfied with him. Although there has been no definitive study of work absences due to health, there is widespread agreement among management and trade union leaders alike that the system invites abuse .

Another aspect of work discipline relates to plant safety. Here too tradition has contributed to laxness. Many workers believe that they are entitled to make the decision whether one or another type of protection is essential, and many managements believe it more important to protect themselves against a suit in the event of injury than to assure that the injury rate is reduced and kept at the lowest possible level.

High absenteeism because of minor illnesses and high injury rates are evidence of a degree of slackness that does not augur well for a country that wants to raise its productivity. They are important as evidence of wastes and lead to higher costs but they are also important in what they suggest about the quality of discipline in the work place. Here too improvements will not be easy to institute because there is much tradition to militate against change but there are no real options but to convince both management and labor of the need of and the gains from higher work standards.

5. Foremanship

It is startling and revealing that there is no adequate Hebrew word for "foreman". Yet the foreman plays a critical role in the industrial life of most advanced nations by assuring that the specific work group for which he is responsible meets its production goals. While management may have the determining voice in the setting of goals, and the foreman is a representative of management, workers have always played a part in setting the norms of work. The foreman's role is acknowledged to be somewhat equivocal since, although he is a management man, he must win and hold the support of his workers. His task is to do whatever is necessary to help the work group perform better--from assuring that the tools and materials are available to coping with a number of workers, but above all by helping, cajoling, encouraging, reprimanding, rewarding those who report to him. The key to successful foremanship is that a leader is on the spot--a man who knows what the goal is and whose task it is to see that it is accomplished. He rides herd on the workers but he also serves as a buffer between them and management.

Israeli industry cannot grow rapidly in sophistication without institutionalizing the role of the foreman. Among the important duties of a foreman is to help orient the newcomer and to see that he acquires the requisite skill to perform his task as rapidly as possible. The good foreman is above all else the good instructor.

The slow development of foremanship in Israeli industry is unusual in light of the fact that the Israel Defense Forces rely heavily on the non-commissioned officer. The industrial foreman should discharge functions that parallel in many respects those of the

non-commissioned officers. If an explanation were sought for the lag in the development of foremanship it would have to be the small size of many Israeli enterprises in which the "boss" frequently plays this role; the resistance of the trade unions to a strong intermediary between the workers management; and a democratic ethos that balks at the establishment of additional layers of authority. Why should one workman give orders to other workingmen? But if Israel industry is to grow in scale and sophistication, the growth of foremanship must be speeded.

6. Management Skills

As noted, Israel's industry has been slowly transforming from small workshops owned and managed by one man to larger units engaged in making a wider range of products and involving a larger number of managerial personnel. There have been two major developments: an increase in the number of specialists in general management positions from production to accounting, and, in a parallel development of professional and technical personnel who are responsible both for overseeing the complex operations and for seeking improvements in processes and new products.

Many entrepreneurs in Israel started as traders. With time some of them have gained mastery over the many new and different techniques that are required for the effective management of industrial undertakings. It is inevitable that such a learning process is difficult, that many do not succeed in making the transition, and that along the way many enterprises fail because of poor management.

A major improvement in manpower utilization can come about only as quickly as the general level of managerial competence is enhanced.

Weakness at the top will inevitably be reflected in weakness down the line--in manufacturing, storage, selling. It is difficult to grow a native crop of good managers quickly. And while schools and special courses can help, the making of money remains an art; there is no substitute for experience; the only true testing ground is the market.

One American expert has recently argued that more should be done to lift the level of management know-how in Israel through improved in-service and extra-mural training programs. Some efforts have been made in this direction both by the institutions of higher learning and by the Productivity Institute. And it appears likely that such efforts will accelerate. Schools of business and executive development programs can help to raise the level of managerial competence. But in general these programs can contribute more to sophisticated economies with large organizations that use a great many specialists than to an economy like Israel's in which the small and medium-sized firm is the prototype and where the principal challenge is to find a product which can be profitably marketed at home and abroad.

Israel's major challenge is to shorten the time before they can compete successfully abroad. For this they need help from entrepreneurs and managers who already know the ropes. It must have know-how, even if it later adapts it; it must get into foreign markets on the backs of established enterprises: it needs the goodwill of overseas Jewry who can help to make contacts with potential purchasers; it needs foreign enterprises to start or help expand plants in Israel with methods they have previously tested and found successful. Above all they need the presence in Israel of experienced managers and specialists who can help

tutor the entrepreneurial group in approaches and techniques.

Israeli management needs help if its enterprises are to expand, particularly overseas, and to make a profit. As more competent Israeli managers go into the science and art of production and distribution, the chances of Israel's success are enhanced. But managers can be sophisticated and still have barriers that they cannot scale without a helping hand from established foreign enterprises. The length of time it will take Israel to gain economic independence will be determined in considerable measure by the amount of effective help that it is able to elicit from successful firms overseas who are willing to lend a helping hand because of the economic advantages that they see, or for sentimental reasons, or both.

There are further aspects of the managerial scene that should be noted. Many of the largest enterprises in Israel are government corporations or corporations in which the government has a substantial financial stake. Consequently the selection and discharge of the key managers has been determined by political considerations. Without a managerial tradition in Israel it was inevitable that the political process would often result in poor choices and would delay the discharge of persons who demonstrated that they lacked the competence to perform effectively. While the government has sought to reduce its investment by selling some or all of its interests in such companies, it still remains a dominant factor in many of them and political considerations continue to dominate managerial selection.

Much the same difficulties with the same consequences have plagued the powerful trade union movement which is likewise a major

employer with partial or complete control over many business enterprises. Through its large revenues it has kept many unprofitable enterprises afloat long beyond the testing period; and it has frequently been slow to replace management that has proved incompetent.

In addition, government has found so few opportunities to expand industrial undertakings in development towns to provide jobs for newcomers that it has instead subsidized enterprises. Once it decided to back a man or group of men who subsequently failed, it was loath to remove its support for fear of speeding the disappearance of badly needed jobs. At such a point, government has frequently opted to put additional funds into the operation without always demanding managerial changes. Incompetent management was rarely reformed; the additional capital was often lost.

This involvement of government on every side has made it difficult for the market to operate so that the more competent could be distinguished from the less. And without a market test it has been moderately easy to hide for long periods of time the incompetence of many managements.

A more positive note emerges when we look at the quality of the career leadership in the Armed Services. By general acknowledgement, a considerable number of able men reach the top of the services; today many of them hold key positions in the civilian economy. The superior record of the military reflects the seriousness with which the leaders regard their mission; the relative freedom of the military from politics; the establishment of and respect for objective measures of evaluation; a well

developed and implemented plan for advanced study for carefully chosen men interspersed with new and more demanding assignments, and the funds to underwrite educational and training programs.

Israel can learn from a critical review of career development in its own military although the lessons cannot be transferred to the civilian sector without adaptation. The country has developed an impressive managerial group within the military. It should be able to do the same outside the military. The challenge is to define the problem and the appropriate remedies.

7. Economic Policies

Government subsidies and their influence on management selection and education and on labor productivity is only one of many ways in which broad investment, tariff, tax, and related economic policies influence the utilization of manpower resources. Other important relationships between economic policy and manpower utilization are briefly indicated below:

a) Development Towns: As suggested above, the government has found it difficult to provide a solid economic base for a number of development towns. Part of the difficulties reflected its failure to attract and retain the competent managerial, professional, technical and related types of skilled manpower which alone could provide a leadership cadre for spearheading the growth of the local economy. The investment decision in favor of the basic aspects of spinning and weaving was probably faulty in that the country's total capacity is too weak; and the profitability

margins even under the best of circumstances too small.

The critical issue now is not the mistakes which were made but how they can best be remedied. The contribution of labor in the least viable industries may even be negative when calculations are made of the true cost of all input factors ralative to the net value added. Hence the need for drastic and early reform. In a manpower surplus economy, particularly at the level of simple operative skills, the task of transferring unprofitable ventures into profitable ones is difficult. But it must be placed high on the planners' agenda; energetic efforts must be made to find competent management abroad, if not at home, who might be enticed to take over the existing plants and much of the labor supply in the manufacture of a potentially more profitable line of products. Until this is done, manpower utilization in the disadvantaged development towns will remain low.

Wherever there is a possibility of transporting a significant portion of a town's labor force to an area within daily commuting distance where the economic base is firmer and where the demand for labor is not met adequately from local resources, subsidized transportation might be by far the best short-run palliative.

b) Tariff policy: Several years ago the government recognized that its efforts to spur Israeli manufacturers to compete in the international market would succeed only if pressure were exerted on them by removing their protection against foreign imports. But the government also had to make it difficult for Israelis to increase quickly their

consumption levels, especially by buying more imported goods. Hence it moved slowly to reduce tariffs. This means that many manufacturers in Israel are under relatively little pressure to improve their products and to control their costs, with the consequence that their labor force is not spurred to meet international standards of workmanship.

While it is difficult for the government to find the right balance among its several priority objectives, it should probably look to a gradual and continuing lowering to tariffs on many consumer goods items where local industry could be expected to hold its own if it were put under more pressure. This would be an advantage for the Israeli consumer and it would also contribute to the long-run objective of making Israel more competitive on the international market by forcing management to tighten its own operations and to strive for a higher level of manpower utilization.

c) Wage Policy: As noted earlier, egalitarian doctrine runs deep in Israel. Moreover, until the last few years the prevailing doctrine was anti-capitalist and anti-profit in consonance with the widespread adherence of the mass of the working population to the virtues of socialism. Because of this orientation and the dominant political context within which wage policy was determined, the country has lived for the last decade and a half with an inflationary wage policy. Government had to acquiesce to wage increases whenever prices advanced and frequently it had to accede to wage increases in advance of price changes.

To compound matters, Israel early linked wage levels to changes in the cost of living which further contributed to inflationary pressures.

The government has finally succeeded in breaking this tie. However, it has not yet developed an income policy which would provide the frame within which wage changes could be negotiated. Given the power of the trade unions in many sectors of the Israeli economy, substantial advantages could accrue from specific negotiations in which the unions would be willing to bargain away some of their controls over work for higher wages that would be reflected in higher productivity. In short, there are considerable gains that could be made in manpower utilization if the employer had more scope with respect to hiring, promoting, firing, and other critical matters that help to determine labor productivity. It is clear that no responsible union would forego advantages that it now enjoys without some quid pro quo. If local wage arrangements could be geared to increases in productivity, management, labor and the nation at large would benefit. It is important in any case to tie wage increases more closely to productivity gains within a broad incomes policy.

d) Closer articulation between military and civilian enterprise: One of the principal constraints on the growth of the Israeli economy and on improvements in manpower utilization is the smallness of the domestic market and the limitations that this places on specialization and economies of scale. Because of the critically important role of defense in the nation, sizable budgetary allocations have

been made and will inevitably continue to be made to modernize and improve the Israel Defence Forces. The Ministry of Defense is without question the single largest customer in the nation. Operating under budgetary stringencies and concerned about quality, the Ministry of Defence has taken the lead in many areas to develop a military industrial complex. This has proved highly successful in many sectors because the military enterprises were able to move ahead with greater degrees of freedom, tighter management, and superior labor morale.

But there has also been a cost in this bifurcation of a small economy. If the demand of the military for a broad range of items can be placed on the civilian economy; if the standards which the military requires can be established as norms within the civilian economy; if the advanced sectors of the military industries can penetrate foreign markets as part of a larger Israeli export effort; if military requirements can be used as a basis for developing import substitutions, the entire economy will be stimulated. The fact that the military is increasingly dependent on advanced technology, particularly in the field of electronics, means that it can stimulate branches of that industry, not only to meet military needs but also to develop civilian specializations.

Lately, more attention has been paid to the potential gains from more closely articulating the military and civilian economies. But the military is understandably cautious in its desire not to become vulnerable by relying on local manufacturers who have not yet proved their capabilities;

in its desire not to spend more of their precious pounds at home than abroad for the same item; and in its reluctance to accept less secrecy and control by purchasing items rather than producing them in their own establishments.

But since the survival and prosperity of Israel depends on the strengthening of its economy, as well as the maintenance of strong defense forces, important gains would accrue by extending to the civilian economy the leadership of defense industries in design, production, distribution, quality control. Some movement has been made in this direction but more can and should be done to diffuse the many points of strength that the defense industry has acquired.

8. Manpower Policies

Although the distinction between economic and manpower policies is hard to establish and maintain, it may be helpful to deal with such considerations as the size of the work force, hours, work relief and related matters under the rubric of manpower policies. However they are dealt with there can be little question that they exercise and influence on manpower utilization.

a) Excessive staffing: There is considerable evidence that most enterprises are overstaffed, which is a reflection of the historic difficulties of the economy to provide suitable employment for all who are able and willing to work. As a consequence, a major objective of trade union activity has been to make it difficult to discharge workers once they have acquired regular status. Moreover, the tendency

to overstaff has been pursued in the governmental and cooperative sectors where considerations of profitability do not normally prevail and where finding jobs is a major task for those who seek political support. In addition, the direction of certain ministries has been assigned to political groups with an implicit understanding that they would have considerable freedom in determining staffing, promotion and retention.

While it would be ill advised in a period of slack employment to seek a remedy for the swollen work forces which are characteristic of the economy, remedial action should be initiated when the economy returns to a higher level of activity and a substantial tightening of the labor market. Remedial action will require cooperation between management and the trade unions, but there is little prospect of Israel's substantially improving its manpower utilization and moving speedily toward an international competitive position without shedding some of the practices that it has tolerated including ubiquitous overstaffing.

b) Hours Regulations: Israel's concern with building a modern economy sensitive and responsive to human needs led it to adopt most of the liberal labor legislation of Western Europe and the United States aimed at protecting the worker, particularly those with special vulnerability, such as women and children. But in other countries much of this protective legislation, especially concerning the hours of work and work schedules as they relate to women workers is anachronistic. Israeli women do not need the protection the laws offer and employers' flexibility and costs are

adversely affected by the fact of the laws. An early reconsideration of labor legislation, particularly the regulations governing hours of employment, would probably point to the removal of constraints which today are interfering with effective manpower utilization whthout contributing to the welfare of those at whom they are aimed.

c) Work Relief: Israel has long used a system of work relief for various groups of workers--new immigrants, the temporarily unemployed, the hard-to-employ. The projects have been reforestration, land reclamation and the like. When work relief projects were geared primarily to meet the needs of special groups such as new immigrants or the physically or emotionally handicapped, they had much to commend them. They are easy to launch, they utilize a high proportion of unskilled labor, and they do not threaten the private or cooperative sector. However, the substantial increase in work relief during the recent recession was directed at a different group of workers, those who had been integrated into the economy but who lost their jobs when employers cut back or went out of business. These men and women needed work and income, but needed more. Many needed to acquire more skill or a new skill if they were again to play a productive role in the economy.

In the design of work relief projects in a period of widespread unemployment, it is necessary to consider how the government's money and the worker's time can be used to raise the skill pool. If possible, every work project should have a training component. And if training is to be meaningful it must be related to the type of work that is

likely to expand when the economy begins to recover. The more careful design and execution of a large-scale work relief program can contribute to more effective manpower utilization.

d) Labor Exchanges: As the Israeli economy becomes modernized and specialized, it needs labor market institutions that can contribute to the effective matching of men and jobs. The labor exchanges have been the province of the trade union movement and have operated primarily as hiring halls. The control of the jobs that must be filled through the labor exchanges represents important leverage in an economy which frequently has operated with a labor surplus.

But whatever contribution to manpower utilization the labor exchanges have made in the past, there is mounting evidence to suggest that they are not properly organized or staffed to meet the needs of Israel's economy today. Early consideration should be given to how the labor exchange structure which today can be defined as quasi-governmental should be changed so that it can play a much larger role in meeting the needs and desires of workers for jobs and the general and special requirements of employers for workers. Here is an important arena where significant gains in manpower wtilization could be achieved if the institutions were more responsive.

e) Statistics and Operations Research: An important factor in policy-marking is the existence of reliable bodies of information from which guidance can be obtained as to which existing policies and programs might be modified,

expanded, or scrapped and new ones established that could cope more effectively with pressing and emergent issues. A weakness, in the Israeli economy is inadequate current labor market information because of the restricted activities of the labor exchanges among other reasons. Moreover there are no effective mechanisms currently available to tap systematically knowledge which employers, the trade unions, and governmental agencies have. While considerable progress has been made during recent years through the establishment and growth of the Manpower Authority within the Ministry of Labour, the effectiveness of such a unit requires coordination among the ministries and between government and non-governmental bodies. If more coordination is effected, we can look forward to a sounder basis for both short and long run manpower policy which will be reflected in better utilization of the nations's manpower resources .

An approach which could contribute to the same end would be a mechanism to provide a feed-back of the efforts that Israel is making and plans to make in penetrating foreign markets. The strengths and weaknesses of Israel's efforts abroad with regard to the quality and range of products, prices, delivery dates, stocks, and a host of related matters should be known and evaluated by those who are in a position to take constructive action--the manufacturer, the trade association, a governmental bureau. The collection and evaluation of business intelligence is not easy-- and to make constructive use of it is even more difficult; yet the rewards from a sound program appear substantial.

A parallel effort aimed at speeding the diffusion of "best practices" within the domestic economy might likewise pay off. There are limits to such an effort in a competitive economy in which managements vie with one another. But there would be no danger, for example, if a hotel in Haifa which has been successful in manpower training and utilization were to make its know-how available to hotels in other cities with which it is not competing. Likewise many processes developed in one industry may have applicability to others. There is room--and there is need--for mechanisms whereby technological and managerial advances could be more effectively diffused with an aim of improving the nation's manpower utilization.

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III. Aliyah

During the past several years several untoward population trends have become obvious: immigration has reduced to a trickle; the sources from which Israel drew most of her immigrants since the beginning of the State have been exhausted; Russian Jewry, the single largest group outside of the West, is still cut off from active contacts with Israel; the birth rate of recent immigrant families from Africa and Asia is much higher than that of the earlier settlers from Europe, which carries the threat that "Oriental" Jewry with values and goals different from the

older population will soon form a majority of the citizenry; that many educated Israelis are going abroad for study and work and that many are delaying their return for such long periods that they must be counted as emigrants; that the number of immigrants from the West--Europe, North and South America, and South Africa--remains low.

Against these demographic facts, to which must be added that the newer immigrants are apparently opting for smaller families, the Arab population within Israel and in the countries surrounding Israel, all of whom maintain an aggressive and hostile stance, continues to multiply at high rates; the gross disparities in manpower in quantitative terms is certain to worsen in the decades ahead.

In light of the ominous implications increasing attention has been devoted to devising ways and means of increasing the inflow of immigrants from the West--the only immediately available source. During the past years, several small-scale efforts have centered on attracting Americans with professional and technical training to Israel for short periods, usually three years. These programs must be adjudged as only moderately successful. Israeli employers have not specified their requirements; it has been equally difficult to build up an effective network in the United States to identify potential recruits; and the several agencies in Israel have been unable to provide adequately and on time the perquisites of housing, telephones, schooling which are usually part of these arrangements.

In addition, Israeli employers understandably were disinclined to hire a man at a high salary without an interview.

In turn, prospective recruits were doubtful because they did not have first-hand acquaintance with the firm that they were scheduled to join and the community in which they were to live. Many tentative arrangements therefore fell through at the last minute. And in other instances, in which an American family actually made the move, employment or living conditions turned out to be at such variance with expectations that the family did not remain for the full three years; when they did, the experience was often unfortunate for both sides.

The importance of reviewing these developments is to help identify the basic issues involved in accelerating the flow of trained manpower from the West to Israel, especially since the present Israeli stance is that it is desirable to increase this flow by all possible means. The following factors must be assessed.

1. Capacity to Absorb Trained Manpower

Can the present Israeli economy absorb large number of trained manpower? It is one thing to recognize that a broadened and deepened modern industrial sector needs large numbers of trained scientists and engineers, but it is another to find suitable employment for large numbers of trained personnel from abroad without an enlarged industrial base. To state that if several thousand such persons were willing to emigrate annually the expansion of Israeli industry might be speeded does not answer the question of how these men and their families are to exist in the interim, nor how long the interim might be. To ask a professional man to move himself and his family from the country where he was educated and is

employed--usually with attractive career prospects in front of him--without a defined place for him implies an order of commitment and involvement far beyound that of most Diaspora Jews.

The government has recently passed legislation aimed at speeding the flow into the country of trained manpower which provides valuable benefits including scaled down income taxes and stipends to cover the education of children. While these explicit provisions are superior to the more informal arrangements that had to be worked out in the past, there is little likelihood that the plan will succeed. The basic difficulty remains. Israel cannot specify a real need for the services of these highly trained persons. The demand is not so broad or deep that it can assure meaningful assignments for trained immigrants. The hallmark of a professional is that he wants to practice his skill at his optimum level. And it is this opportunity that most potential immigrants would not have in Israel.

2. Reservation at high level positions

If Israeli leadership wants to speed the inflow of trained persons from the West--and it is argued below that it might be desirable to shift the emphasis to a younger and less trained group--it is essential to review existing manning tables in both public and large private enterprises and then to reserve a proportion of high level positions for new immigrants. Unless the local population is willing to agree to such a drastic proposal, which carries with it the implication that the rate of their own advancement is likely to be slowed, aliyah of professionals and technically trained persons is not likely to advance much beyond the stage of discussion. The reality of the

situation is simple: occupational opportunities are too few to absorb many trained immigrants unless the local population is willing to share the available opportunities.

3. Outflow of Trained Manpower

Another factor of the equation is the significant outflow from the country of trained manpower, and the delay in returning of some natives who have gone abroad for training. Why should it be made more difficult for sabras to earn a living at home after the completion of their education and training? There is a clear relation between the number of suitable opportunities for trained manpower and the fact that if more capable persons from abroad are attracted to fill them there will be fewer opportunities for the native-born, many of whom will be forced into extended or permanent exile.

4. Improved Recruitment

The demand for trained manpower is never frozen. The ability of an enterprise to make room for one additional person with competence depends on whether the management sees an opportunity to expand its operations by virtue of the accession of the new personnel. Thus it should be possible to find room for limited numbers of trained persons even in organizations that appear to be adequately staffed. But if this method of absorption is to be used a way must be found to enable the prospective employer and the prospective employee to discuss the situation before binding arrangements are entered into. Improved reconnaissance both in the United States and especially in Israel may prove far more fruitful than alternative schemes. Better personnel searching in the Unites States,

more visits by Israeli managers to the United States which would include time and effort directed to interviewing likely candidates, better information about possible favorable openings in Israel together with subsidized transportation to enable prospective recruits to reconnoiter the situation in Israel might lead to a limited but significant expansion of successful immigration.

5. Costing of Programs

In assessing costs versus gains it is important to remember that attracting a trained person to Israel with a three-year contract does not guarantee his permanent relocation. A temporary relocation will become permanent only if the individual has a positive response to his initial experience and he and his family feel confident about the future. In the costing of a program, allowance must be made for substantial losses at the end of a first or second contract. But by the time six years or so have passed the odds are likely to tip in the direction of permanent relocation especially if one's children have taken root in Israel and desire to remain.

6. The American Potential

So far we have considered potential immigration from the United States which contains by far the largest number of educated and trained Jews in the Diaspora. But employment conditions in the United States for trained people have been highly favorable since the end of World War II; the outlook continues propitious; and much of the discrimination against Jews which primarily existed in employment and in social relations has been moderated or has disappeared. Moreover, while there have been discordant tendencies in the quality of Jewish life in the United

States, the day-school movement has grown; the anti-Zionism of the Reform Movement has been almost completely liquidated; much warmth and large-scale financial support for Israel has been elicited. However, another, less favorable trend must be noted. The basic elements in a vibrant Judaism are being steadily weakened: religious affirmation, Jewish tradition, avoidance of intermarriage. This means that only a small minority of American youth are brought up and imbued with a commitment to Jewish values that includes the injunction to return to Eretz Yisroel at the earliest possible time.

7. Organizational Changes

Some leaders in Israel and in Diaspora believe that this unfavorable situation can be remedied by organizational changes. They point to bureaucrats in and out of government who have not succeeded. They make much of the opportunities which were lost because of inadequate planning and follow-through when the several thousand volunteers arrived in Israel in response to the crisis precipitated by the war. Some contend that the government has never given the problem the visibility it needs and has failed to establish the organizational structures and the staffing to carry out a truly large-scale effort. But this is presumption, not evidence. A more reflective view would deal with the realities earlier identified and would attempt to find real answers to real problems. Wishes are one thing; realities another. The fact that many Israelis firmly believe in the need for large-scale aliyah from the West does not mean that they can bring it about regardless of organizational changes.

8. Other Sources of Potential Supply

Economists deal with problems of emigration and immigration in

terms of "push and pull". Using this simple scheme we must conclude that the push forces are particularly weak in the United States at present and are likely to remain so. We have dealt in some detail with the difficulties that Israel faces in pulling trained manpwer from abroad, particularly from the Unites States, where the employment outlook is so favorable. But it does not follow that the same reading must be made of all other countries in the West. Two areas in particular might be much better recruiting grounds: Latin America and South Africa. In both of these areas the outlook for individual Jews may be satisfactory or even good but this does not apply to Jewish communities. The political and social environments are too unstable and racial and religious intolerance too pervasive to give the thoughtful man much confidence in the future. While both areas have provided a small number of immigrants to Israel in recent years, it is possible that a more organized effort might increase this number many times always with the proviso that Israel will have found at least temporizing answers to how newcomers can be constructively fitted into the economy and society.

Some believe that substantial numbers of new immigrants might come from certain countries in Western Europe, for instance the Jews from Algiers who in recent years relocated in France. Among those who have not sunk roots in their new locations, there undoubtedly are some, possibly a considerable number, who might be willing to make a second move, this time to Israel. But the fact that they did not go to Israel when they left Algiers suggests that this may not be so. And again, the potential immigrants cannot be expected to assume all of the risks. He must know where he is needed and what work he will do.

9. American Youth

As a man becomes older, his habits become more fixed, the number of his dependents larger, and it is more difficult for him to change his way of life, especially to make such a radical change as moving to a new land, even to Israel, the home of his fathers. Therefore, the government should concentrate on the possibility of a vast expansion in the flow of young people, particularly Americans because of the likelihood that their families can cover the financing, to come to Israel for travel, for study and for work. A substantial proportion of all American Jewish families are in an income bracket where they are able and willing--and in fact eager--to invest $1,000 or more to assure that their sons and daughters have an enjoyable and profitable summer. They look for such opportunities when their offspring are 15 or so and they continue to be interested until their children have finished college. This then implies a six to eight year span.

Since more American Jewish youth would want to throw in their lot with Israel it they respond warmly to experiences in the country during the impressionable years of adolescence and young adulthood, efforts directed to encouraging the flow of large numbers of such youth should be given high priority. There are opportunities now for a young person to spend a summer in Israel studying, working on a kibbutz or combining the two. But the scale of these programs has been small. Moreover, they have not been planned so that a young person who spends three summers in Israel, has achieved mastery of Hebrew as a language. Nor have these summer programs been integrated with opportunities for continuing experiences during the winter months at home which could serve as reinforcement of a summer's

experiences and as preparation for next summer's program. With the heavy concentration of Jewish population in a few major American cities, it should be possible to develop dovetailed programs

A related effort should be made to expand substantially the opportunities of Jewish young people to spend a college year at one of the institutions of higher learning in Israel. This could only follow a number of changes: in the restructuring of the curriculum, in the building of dormitories, in experimentation in bilingual instruction with some courses in Hebrew amd other in English. These and other changes would not be easy to introduce. But as with all aspects of aliyah, no significant gains will come easily. If Israel wants to attract and hold much larger number of American youth, it must start now on programs such as have been outlined above.

10. Americans to Teach English:

A related approach would be to attract, preferably for two years, considerable numbers of young American women and some young men who are not liable for military duty, to serve as instructors in English throughout the secondary school system. Here the need is clear. The quality of instruction in English is poor. Moreover, the successful expansion of the Israeli economy is closely geared to widespread mastery of spoken and written English. Once again, if many come to teach, some would remain.

11. Need for Experimentation:

Until radical changes occur in Soviet Russia which will make possible the emigration of considerable numbers of Jews, many

of whom will want to settle in Israel, the leadership must recognize that if its declared objectives to speed aliyah are to be more than a verbal barrage intermingled with self-criticism and recriminations against the Diaspora, the most careful explorations must be made to determine where the prospective pools really are and how they can be most effectively tapped. The ideological base is too weak to support a self-propelled in-flow, and without commitment there is no known alternative that will assure the desired result. Many efforts must be launched, monitored, evaluated. It is hoped that some will prove successful. If aliyah there must be, then commensurate effort must be made.

12. Multi-Cornered Flow:

It is difficult to see the future of aliyah beyond recognizing that inflows into Israel from the West will probably be quite small. Equally difficult is to foresee the future level of emigration but unless the economy enters upon a strong and sustained expansion a certain number of educated and trained persons will leave every year to take up assignments abroad and some may not return. The danger to Israel's future from small immigration is serious; the danger is greater if emigration continues. And yet, the problem is more complex than a simple arithmetic approach might suggest. Israel and the Diaspora are linked in many complex ways. The Diaspora needs to be nourished from the cultural well-springs of Israel and many Jewish communities will be able to maintain themselves and educate their children only if they are able to attract teachers and rabbis from abroad. Israel should look on the export of teachers as an asset not a liability, for each man who is lost,

and many will be lost only temporarily, may eventually be responsible for the aliyah of two or three.

But the multi-cornered flow of persons into and out of Israel, temporarily and permanently, must be viewed in the larger context of the development and vitality of both Israel and the Diaspora. The security and welfare of each will be strengthened as the bonds between them are made closer. When an Israeli scientist goes abroad to assume a position in a major industrial company, no one can tell whether and when he may be the direct or indirect cause of new business ties which can aid in stimulating the growth of the Israeli economy. And the ability of Israel to attract trained people from the West depends more on the rate of its economic expansion than on any other single factor. It is inevitable that Israel, with a small population, views askance the absence of large new inflows and becomes concerned about any outflows. The burden of this analysis, however, has been to point to the more complex relations that exist between Israel and the Diaspora which, as they are strengthened and made more meaningful, can add to the security and welfare of each. These relations may require a more circular flow of people than is suggested by a direct approach to aliyah--important as it is for Israel to increase the number of Jews who opt to make their future in their homeland.

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IV. Manpower and the Occupied Areas

1. Legacy of the War:

The end of the Six Day War in June 1967 left Israel in control of substantial new territories. Jerusalem was quickly incorporated; the Golan Heights and Sinai (Middle and Southern) are so sparsely populated that no special difficulties are involved for Israel as the occupying force. The three problem areas are Gaza, Northern Sinai (El Arish), and particularly the West Bank. On the assumption that no more than 200,000 or so people can support themselves in the Gaza area, and since about 350,000 settlers and refugees are now living there, policy must aim at the relocation of approximately 150,000 Arabs. Without industrialization, which would be slow and difficult to achieve in this area, the only alternative to perpetuating the misery which has characterized the lives of most of the refugees since 1948 is to remove many of those who cannot support themselves in the narrow strip so that they, as well as those who remain behind, have an opportunity to normalize their lives.

2. Gaza:

The present policy of the Israeli government to interpose no objections to the voluntary movement of Gaza residents to the West Bank or to any country, near or far, is sound in that it brings the land-to-people ratio one step closer to balance. But the opportunities for voluntary relocation are seriously limited even if, as would be desirable, the Israeli government found it possible to make lump sum payments to all who were willing to reestablish themselves elsewhere.

The solution for the larger numbers who can be relocated only

with substantial governmental and voluntary help must await the resolution of the political issues. If peace talks eventually become possible between Israel and Egypt and Jordan, the relocation of the excess Gaza population should be high on the agenda. The help and support of major nations and international agencies will also be worked out.

In the event that peace negotiations are long delayed, the Israeli government will face the more difficult problem of determining whether the transfer of the surplus population from the Gaza area to the West Bank or to Northern Sinai is practical in terms of the costs involved, the prospects of the refugees becoming economically viable in the new region, and in terms of their relations to the population groups settled there. Even if all of the foregoing were answered in the affirmative, relocation will be costly and will require international assistance on a substantial scale.

3. Northern Sinai:

The problem of Northern Sinai is relatively simple. About 30,000 people whose economic life was derived from supporting the troops and military installations in the area and secondarily from the profits from smuggling contraband into Egypt are now left without a source of sustenance. At present the area has no proved water resources. But until more systematic exploration has been completed one cannot be certain that water may be discovered sufficient not only to permit the people of El Arish to make a living from the land but possibly even to support some of the surplus population from the Gaza area. If water is not found, the people of El Arish will have to be relocated to an area where they can eventually be self-supporting. In the

interim there is no option but for the Israeli authorities to provide minimum income to the heads of families through various work relief programs.

4. The West Bank:

The most difficult problem involves the West Bank with its approximately 750,000 inhabitants including 120,000 refugees who did not flee to Jordan during or after the war. The economy of the West Bank prior to the war was based on the sale of agricultural products to the East Bank and to the Arab countries in the area; services provided for the Arab Legion located on the West Bank; earnings from Christian and Arab tourists; remittances from relatives who had obtained employment in Kuwait or elsewhere; funds from UNWRA for refugees; and the activity, including construction, that was stimulated by a consumer market of almost one million persons.

Several of these props were removed by the dislocations of war and its aftermath. The Christian tourists at present are much reduced and the Muslim tourists do not come; the Legion has withdrawn eastward; the remittances cannot be relied upon. On the other hand, the trade in agricultural products continues; so does UNWRA support for the refugees who have remained. Israel has taken over the support of the officialdom and Israeli tourists have cushioned in some small measure the losses from other tourist sources. Construction is down because of the uncertainty on both the political and economic fronts. Israel has initiated various public works, particularly several construction projects, to provide minimum income for unemployed construction workers and others who have lost their earning power because of the war.

Since a substantial part of the West Bank population earns its livelihood from agriculture, no major problems need arise as long as the ad hoc arrangements, which were worked out after the war and which permit the region to ship its agricultural surpluses to the East Bank and beyond, continue.

It is not difficult to institute policies that, in the short run, will assure that the standard of living of the West Bank population does not seriously slip. A more serious challenge will arise if peace negotiations are long delayed and a policy must then be developed to rationalize the relations of the West Bank's economy with that of Israel.

5. Integrating the Economics:

It might appear at first that a rationalization between these two economies would not be difficult since only some of the agricultural products raised on the West Bank are directly competitive with highly protected Israeli agriculture. However, a successful rationalization would involve much more than the dovetailing of two partially competitive agricultural areas.

One of the most difficult problems for which no ready solution is at hand would be the necessity to interdict employment opportunities in Israel to West Bank Arabs. The Israeli wage structure is substantially higher than that of the West Bank, especially for unskilled work, and pressure from unemployed and underemployed West Bank workers to find employment in Israel would be great once policy moved in the direction of integration. To give access to jobs to several hundred thousand Arabs, a number recently increased by the absorption of Jerusalem, would substantially complicate any and all measures of control if a

general policy toward integration became the order of the day.

If integration became the watchword it would also be difficult to maintain indefinitely the large spread now existing between the level of basic social services in Israel and that on the West Bank. This would obtain particularly for health and education. The improvement of the economy of the West Bank would require increasing expenditures for these and related services.

Before long even more difficult decisions involving business investments would have to be reached. It might turn out that economic logic dictates the location of certain plants on the West Bank area. But if the capital and management of such enterprises were Israeli, a decision to locate in the West Bank would be difficult to make unless a prior political determination to fully absorb the area into a greater Israel had been made. Otherwise it is unlikely that much new Jewish investment will be made in the West Bank.

Similarly, difficulties might arise in competition for tourists. In the winter months Jericho is much closer to the centers of the resident population and to the flow of tourists than Elath. Some day the level of the tourist trade may be great enough to make the two complementary. But for the interim they may well be at least partially competitive.

Additional issues might be raised such as the desirability of moving toward an integrated monetary and banking system; the linking up of power and telephone systems; the expansion of water resources and their allocation among the two populations.

6. The Political Framework:

Economic development is greatly affected by the political framework within which it is bounded. The June War broke the West Bank's economy loose from its political moorings. The most conspicuous impact was the almost complete cessation of new construction in the area reflecting the uncertainty about the future. At present and for some little time improvisation can remain the order of the day while Israel waits to see whether peace with territorial readjustments will be reached. But if, after more months of waiting, it appears that no political settlement through direct negotiations is imminent, Israel will have to choose among three economic policies: minimum interference in the economy of the West Bank which would mean continuation of the policies it has followed to date; partial integration in which it moves to dovetail the agricultural structures of the two territories and takes other selected actions to have the economies of Israel and the West Bank become more interdependent; and finally a series of measures aimed at eventual full integration.

7. Manpower Implications:

I will set out briefly the implications from a manpower point of view in these alternatives.

At present there are substantial differences between the Israeli and the West Bank work forces reflecting differences in their preparation, productivity and level of earnings. As suggested above, given the substantial unemployment and underemployment in the West Bank and the much lower wage rates and earning prospects, it is inevitable that the inhabitants will seek employment in Israel. The problem of keeping down the number of Arabs

at work will be increased as policy is directed to higher degrees of integration between the two economies. Even if little is done to dovetail the two economies, considerable pressure for Israeli jobs will develop.

As the two economies are aligned, more pressure will be exerted on the Israelis to provide a higher level of educational and training opportunities for the West Bank population. Since it has no industrial base, the West Bank can best increase its pace of economic development through selective industrialization. But it can move in this direction only if, in addition to capital resources, it receives assistance in building up its skill pool. This would require additional investments in vocational and technical education together with some expansion in the level of general educational expenditures. Since Israel must increase its investments in human resource development as rapidly as possible to speed itself on the path to economic independence, moves toward the integration of the two economies will be costly.

As Israeli policy explicitly aims at a higher degree of integration, more pressure will be exerted on it to narrow the substantial gap that currently exists in the whole range of other public services including health, welfare, housing. Once again, as the claims of the West Bank receive consideration the pace of improvement in these areas within Israel proper will be slowed.

8. New Markets:

This cautionary view about the manpower pressures that would flow from a policy of closer integration would have less merit

if we could look forward to the Israeli economy's reaching and maintaining a level of output that would result in the substantially full employment of its own labor force. But such an expectation is not sufficiently imminent to serve as a basis for planning. The only other ground on which a more venturesome policy toward integration might be based--and it has been advanced by those who believe that the most powerful force in the development of Israel is the grasping of every opportunity in the expectation that solutions not currently visible will emerge with time--places heavy weight on what a sudden 25 to 33 percent increase in the potential market can mean for the stimulation of the Israeli economy.

Israeli industry has been handicapped by the small scale of the domestic market and here, at once, is an opportunity to enlarge it. While more consumers should stimulate the market, the Israeli economy would be plunged into a prolonged period of confusion and turmoil while the West Bank economy and it were brought into alignment. The Arab consumer will represent a boon to the Israeli manufacturer only when his standard of living advances considerably above its present level; and if that is to occur he must be able to compete for employment in the Israeli sector. But few among the advocates of an integrated economy really contemplate this happening.

9. The Uncertain Future:

Even greater barriers remain on the political front. It will not be possible to speed the integration of the two economies unless the populations of both areas are committed to such a plan, support it wholeheartedly, and are willing to make sacrifices in favor of long-run benefits. But as long as

uncertainty continues about the political future of the West Bank there will be overt and latent opposition from many of the local population to any actions that would bind the area more tightly to Israel.

Similarly, as long as the Israeli leadership recognizes that it may be preferable to release control over much of the occupied area in favor of other objectives such as a peace treaty and normalization of relations, it will be loath to make large public investments and to encourage private investments in the West Bank. But without large and continuing investments the area cannot be brought to a level which would make the integration of the two economies feasible.

The existing gap in the economies of the two areas is great and the political differences between them are even greater. And one additional consideration must be weighed. The leitmotif of Israel has been the establishment of a Jewish state in which Jews for the first time in two millenia could be in control of their lives and destiny. The arithmetic of demography suggests that if all the occupied areas--and particularly the West Bank--were fully integrated into a greater Israel it would not be long before Arabs would become a large minority and only a little longer before they became a majority. It might be possible to work out a binational Israel with large spheres of local autonomy for each group but such a state would be significantly at variance with what is now the essence of Israeli development. Hence while all decisions about economic integration must be weighed in terms of political feasibility, they must finally be determined by the underlying values of the people of Israel who dare not ignore the realities of demography.

V. Directions for Manpower Policy

The major sections of this report have been addressed to the three overriding problems facing Israel as it seeks to strengthen its manpower resources and thereby enhance its prospects of acquiring economic independence. In this concluding section the major implications of the preceding analysis will be summarized by emphasizing a limited number of directions toward which manpower policy should be directed.

1. Secondary Education:

Even though the day when the Israeli economy will be based primarily on science-research industries is still far off, the fact remains that the key to Israel's continuing development and increasing prosperity is the improvement in the quality and competence of its labor force. In turn, the key to such an improvement lies primarily in the strengthening of its secondary schools. The mass of pupils who now continue their education beyond elementary school but who are not university-bound need to acquire more breadth and depth so that many of them can become skilled workers, technicians, foremen, entrepreneurs. All educational and training policy both within the formal school structure and outside should be critically assessed in terms of their present and potential contribution to this end.

2. Foremanship:

The level of competence that workers are able to reach depends on the schooling which they have achieved, the supervision they receive, and the standards to which they are held in the work place. Israeli management, in association with the Histadrut, must be alert to the necessity of pressing for higher

standards of performance and of providing the foremanship and supervision that alone can enable workers to meet them. Training for foremanship must be strengthened and cooperative arrangements developed between management and labor that will enable them to carry out their functions effectively without prejudice or harassment of the work force.

3. Management Development:

Management must improve its capabilities in every aspect of its functioning from exercising tighter controls over production, to assuring quality control, to strengthening its marketing procedures and improving its personnel and accounting controls. To this end, efforts at internal and external management development programs need strengthening; key persons should be sent abroad for both in-plant and school instruction and to establish relations with foreign firms in the expectation that they will make available competent persons to help local counterparts in Israel raise their competence and know-how.

4. Wage Policy:

The strong egalitarian orientation in national wage policy must be modified. In the past this policy permitted only narrow differentials; now, incentives and rewards for additional skills must be strengthened. Good schools and good management are essential for enlarging the pool of skills but unless workers see a personal advantage they are unlikely to put out the additional effort required to enhance their knowledge and skill.

5. Labor Management Policy:

Employers and employees together must reconsider many rules and regulations governing the labor market with particular reference to safety, absence for illness, hours for women, criteria for promotion and discharge and other matters affecting the productivity of the work force. Many practices and formulas were established years ago to meet challenges that no longer exist. Today they serve as barriers to more effective performance. The objectives of a joint review and revision should be to eliminate or modify those practices that are impediments and to assure that the new ones protect the legitimate interests of both labor and management.

6. Government Direction:

Earlier, it was inevitable that the government be heavily involved, directly and indirectly, in the financial support and in the management of many large enterprises. Recent efforts of government to remove itself from direct managerial responsibilities should be accelerated. If political considerations are not involved in the selection of business management, the prospects of finding the right man are enhanced. Moreover, it is more difficult for government than for non-governmental groups to acknowledge errors in judgment and to take the consequences, including agreement to reorganization or bankruptcy. The development of an effective managerial group in Israel can be accelerated if direct involvement of government is reduced.

7. Tariffs:

In a small country in an early stage of industrialization, selective tariff protection and subsidies may well be the only way to stimulate the growth of new enterprises. But if business

managements are not to be corrupted by excessive assistance and if consumers are not to be overcharged unduly, it becomes essential that special protection and benefits be lowered and removed after a period of time. While policy has begun to move in this direction there is room for further action to expose more of Israel's protected industry to the cold air of international competition. Raising the quality of Israel's output will prove difficult unless Israeli management and workers are increasingly forced to meet the standards prevailing in the international markets.

8. Inflationary Pressure:

The recent recession should have made clear that it is an error to pursue policies which have the likely consequence of generating high levels of unemployment. On the other hand if a high level of employment is to be achieved and maintained efforts must be made to assure that high employment policy does not prevent adjustments in the reallocation of manpower required for sustained growth. In addition, care must be taken to restrain inflationary wage pressures. Both of these objectives are difficult to achieve in a full employment economy but if their importance is recognized and policies are fashioned with these ends in view at least partial success should be possible.

9. Defense Industries:

The defense industries are among the most dynamic in the Israeli economy. The small size of the civilian market increases their importance. Policy should aim to dovetail whenever possible the defense and civilian sectors so that the strength of the former can assist in the development of the latter by providing an assured market; by helping manufacturers meet detailed

specifications; by speeding the diffusion of various production and management techniques. While steps have been taken to break down the isolation of the defense industries, much more can and should be done along these lines.

10. Information and Research:

Manpower policy can never be sounder than the information and research on which it is based and on the understanding of the interested groups and the general public. While considerable advances have been made to strengthen the data base significant gains can result from improving current labor market information, undertaking studies of manpower utilization, evaluating in depth the relations between education and training and later career performance, and other research into such matters as the peripheral labor force, the transitions from civilian life into military service and the return to civilian life, etc. Equally important is the greater involvement of key groups such as management, labor, education, the military, to consider manpower issues from their special vantage point but within a national frame, and to encourage more public discussion of the alternative solutions to pressing manpower problems. Manpower policy in a democracy can never be stronger than the public's understanding of the issues and its commitment to seek constructive solutions.

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ANALYTICAL TABLE OF CONTENTS

I. Introduction 1

1. Prior Boom 1
2. Recession 3
3. Future Prospects 5
4. Economic Lessons 7

II. Paths to More Effective Manpower Utilization 10

1. Basic Preparation for Work: The Challenge to the Schools 10
2. Adult Educational Opportunities 14
3. Wage Differentials for Skill 17
4. Labor Discipline 19
5. Foremanship 21
6. Management Skills 22
7. Economic Policies 26
   a. Development Towns 26
   b. Tariff Policy 27
   c. Wage Policy 28
   d. Closer Articulation Between Military and Civilian Enterprise 29
8. Manpower Policies 31
   a. Excessive Staffing 31
   b. Hours Regulations 32
   c. Work Relief 33
   d. Labor Exchanges 34
   e. Statistics and Operation Research 34

III. Aliyah 36

1. Capacity to Absorb Trained Manpower 38
2. Reservation of High Level Positions 39

3. Outflow of Trained Manpower 40
4. Improved Recruitment 40
5. Costing of Programs 41
6. The American Potential 41
7. Organizational Changes 42
8. Other Sources of Potential Supply 42
9. American Youth 44
10. Americans to Teach English 45
11. Need for Experimentation 45
12. Multi-Cornered Flow 46

IV. Manpower and the Occupied Areas 48
1. Legacy of the War 48
2. Gaza 48
3. Northern Sinai 49
4. The West Bank 50
5. Integrating the Economies 51
6. The Political Framework 53
7. Manpower Implications 53
8. New Markets 54
9. The Uncertain Future 55

V. Directions for Manpower Policy 57
1. Secondary Education 57
2. Foremanship 57
3. Management Development 58
4. Wage Policy 58
5. Labor-Management Policies 59
6. Governmental Direction 59
7. Tariffs 59
8. Inflationary Pressures 60
9. Defense Industries 60
10. Information and Research 61

VT 013 351
NEWTON, DAVE
ENVIRONMENTAL HEALTH TECHNOLOGY. (INFORMATION PACK). THREE PROGRAMS OF TRAINING AND EDUCATION IN ENVIRONMENTAL TECHNOLOGY (POTEET).

NATIONAL SANITATION FOUNDATION, ANN ARBOR, MICH.
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IDENTIFIERS - *ENVIRONMENTAL TECHNOLOGY; PROJECT POTEET

ABSTRACT - THIS DOCUMENT CONTAINS AN OUTLINE OF THREE PROGRAMS IN ENVIRONMENTAL TECHNOLOGY. ONE PROGRAM, ENVIRONMENTAL HEALTH TECHNOLOGY, IS AT BROOME TECHNICAL COMMUNITY COLLEGE IN NEW YORK; A SECOND, ENVIRONMENTAL SANITARIAN ASSISTANT, IS AT FERRIS STATE COLLEGE IN MICHIGAN; AND THE THIRD, ENVIRONMENTAL HEALTH ASSISTANT, IS AT KIRKWOOD STATE COLLEGE IN IOWA. A CURRICULUM OUTLINE AND A BRIEF DESCRIPTION OF MOST COURSES ARE PRESENTED. (GEB)

VT 013 351

THREE PROGRAMS
IN
ENVIRONMENTAL TECHNOLOGY

Environmental Health Technology
Environmental Sanitarian Assistant
Environmental Health Assistant

VT013351

18 May 1970

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
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	BROOME TECHNICAL Community College	FERRIS State College	KIRKWOOD Community College
Zoology	4	4	
Biology		4	
Microbiology	9	4	
Chemistry	12	3	
Physics	9		
Mathematics	3 Algebra	3 Algebra	2 Technical Math
Statistics	3	3	
Drafting, Plan Reading	1	2	

18 May 1970

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Zoology	4	4	
Biology		4	
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	BROOME TECHNICAL Community College	FERRIS State College	KIRKWOOD Community College
English	9	9	6
Speech	3		
Economics	3		
Political Science		6	
Psychology	3	3	4
Sociology	3	3	
Personal & Cultural Appreciation		3	

18 May 1970

	BROOME TECHNICAL Community College	FERRIS State College	KIRKWOOD Community College
Community Health Practices		3	7 Introduction to Public Health; Comm. Improv
Environmental Health Practices	6	3	
Environmental Health Techniques		4	
Water Supply & Pollution Control	8	6	7
Shelter Environment		6	3 Housing Inspection
Vector Control		4	3
Food	3 Food Sanitation	4 Food Technology	3 Food Sanitation
Milk Sanitation	4		3
Environmental Sanitation	4		4 Recreational Sanitatio Institutional Sanitation
Limnology	4		
Parasitology	4		4 Diseases of Man
Atmospheric Pollution	5		
Radiological Health	3		

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	BROOME TECHNICAL Community College	FERRIS State College	KIRKWOOD Community College
Electives		4	
Cooperative Work Experience		12	16
Public Health Seminar		3	2
Solid Waste Disposal			3
Industrial Health			4 Industrial Safety; Occupational Hygiene

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	BROOME TECHNICAL Community College	FERRIS State College	KIRKWOOD Community College
Orientation		1	
Physical Education		1 1/2	
Health Education		1 1/2	1 First Aid

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Programs of Training and Education in Environmental Technology
(POTEET)

INFORMATION PACK

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Environmental Health Technology
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610

18 May 1970

CURRICULUM

ENVIRONMENTAL HEALTH TECHNOLOGY

First Year	Credit
English	3
Algebra and Trigonometry	3
Chemistry	4
Zoology	4
Engineering Drawing	1
Physical Education	1
	16
English	3
Statistics	3
Chemistry	4
Physics	3
Environmental Health	4
Physical Education	1
	18
English	3
Chemistry	4
Limnology	4
Atmospheric Pollution	5
Physics	3
Physical Education	1
	20

Second Year	
Economics	3
Psychology	3
Milk Sanitation	4
Microbiology	5
Water Supply and Pollution Control I	4
Physical Education	1
	24
Effective Speaking	3
Microbiology	4
Environmental Sanitation	4
Food Sanitation	3
Physical Education	1
	15
Sociology	3
Parasitology	4
Physics	3
Water Supply and Pollution Control II	4
Radiological Health	3
Environmental Health Administration	3
Physical Education	1
	21

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Environmental Sanitarian Assistant

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18 May 1970

FERRIS STATE COLLEGE
Big Rapids, Michigan

ENVIRONMENTAL SANITARIAN ASSISTANT

First-Year Schedule	Quarter Hours
College Orientation	1
English	9
Community Health Practices	3
Environmental Health Practices	3
General Biology	4
Introductory Inorganic Chemistry	3
Microbiology	4
Environmental Health Techniques	4
Drafting and Plan Reading	2
Fundamentals of Algebra	3
General Zoology	4
Man and Society	3
Personal and Cultural Appreciation	3
Physical Education	1 1/2
Elective	4

Second-Year Schedule	
Public Health Statistics	3
Water Supply and Pollution Control	6
Shelter Environment	6
Vector Control	4
Principles of American Government	6
Food Technology	4
Introductory General Psychology	3
Health Education	1 1/2
Public Health Seminar	3
Cooperative Work Experience	12
	48 1/2

COURSE DESCRIPTIONS

Community Health Practices - Three quarter hours.

An introductory course for students interested in the health sciences and arts. A survey of community health services and practices with particular emphasis upon occupational relationships and the role of the technician.

Environmental Health Practices I - Three quarter hours.

A study of the development and organization of environmental health practices and the related public health services. Special emphasis will be placed upon the scope and fundamentals of environmental systems and their related technologies.

Environmental Health Techniques - Four quarter hours.

An introduction to the environmental health laboratory with emphasis upon the specialized testing, measuring, and evaluation systems used in pollution control, food and milk control, swimming pools, industrial hygiene, land use, radiological health and related areas of environmental control. Pre-requisite: Chemistry 120A.

Public Health Statistics - Three quarter hours.

Emphasis is given to the collection, evaluation and use of public health data, including laboratory and survey findings. Sources of vital statistics, methods of tabular and graphical presentation of data and statistical procedures for determining rates, ratios, reliability, and variability of data are emphasized.

Water Supply and Pollution Control I - Three quarter hours.

A study of water management and systems of water supply and pollution control practices. Emphasis is upon water composition and quality, the development and protection of ground and surface water supplies and water treatment processes. Correlated laboratory testing and field trips stress the practical application of class room lectures.

Shelter Environment I - Three quarter hours.

A study of the basic principles and concepts of modern housing programs. Emphasis is placed upon the community practices essential to healthful housing, including planning processes, residential and institutional sewage disposal and water supply requirements, nuisance control and specialized shelter problems confronting the sanitarian. A study is made of housing codes and laws applicable to rural and urban areas.

Vector Control - Four quarter hours.

A general survey of the endoparasites and arthropods of public health importance. Emphasis is placed upon environmental and chemical control of vectors which affect man.

Air Pollution - Four quarter hours.

A comprehensive survey of community air pollution. Emphasis will be upon the air pollution problems and the strategies used for its control. The student will be taught the use of air monitoring and meterological equipment and to effectively use the facts, ideas, or concepts learned to interpret and solve air pollution problems.

Environmental Chemistry - Five quarter hours.

An applied course in sanitary chemistry, including the examination of air and water with emphasis upon pollution control. The chemistry of antiseptics, disinfectants and cleaning compounds is studied from the standpoint of field use.

Environmental Management - Three quarter hours.

A study of approaches and processes essential to the management of the environment in terms of modern health concepts. Community planning practices, comprehensive health relationships and current and emerging environmental issues will be discussed. Case histories and field studies will be correlated with lectures.

Public Health Problems - One to six quarter hours.

Hours and credit to be arranged.

An individual study of a public health project or topic approved by the instructor. A written report and oral review of the work planned and completed is required.

Environmental Engineering - Four quarter hours.

This course is designed to acquaint the student with the study and use of soils information in the urban environment; with the problems of Engineers in land development which would include the use of topography maps, drainage problems, the problems of cut and fill, the measuring of flows of liquid in closed and open systems; and in the use of surveying instruments to level and secure elementary topographic information, the reading of maps, and serial photographs in relation to land use.

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Programs of Education and Training in Environmental Technology
(POTEET)

John Reddington
Director of Education
313/663-8581

INFORMATION PACK

Kirkwood Community College
Cedar Rapids, Iowa 52406

Environmental Health Assistant
(one-year certificate program)
Harold Kort
319/366-5321

18 May 1970

KIRKWOOD COMMUNITY COLLEGE
Cedar Rapids, Iowa 52406

Division of Vocational-Technical Education
Health Occupations Education Department

ENVIRONMENTAL HEALTH ASSISTANT

General Information: The Environmental Health Assistant is prepared to be employed in city, state and county public health departments and industry. Male or female Assistants perform under the direction of a Sanitarian in:

Safeguarding the health and safety of the community, inspecting housing conditions, milk, water, sewage, rodent or vector control, air, food and nuisances.

They work closely with a Sanitarian, have laboratory and field duties and write reports on observations, judgments and laboratory findings.

Length of Course: Four (4) quarters (48 weeks) - acquired in classroom, laboratory, and field work experiences. Thirty contact hours a week. Field opportunities during the 4th quarter.

Starting date: September 1968

Course Content:

- Technical Mathematics
- Technical Science
- Technical Writing
- Diseases of Man
- Water Control
- Food Control
- Inspection of Water/Plumbing
- Public Health Organizations
- Human Relationships
- Economics of Business
- Laboratory Analysis
- Vermin-Vector Control
- Control of Physical Contaminants
- Milk Control
- Supervised Field Experience

Faculty: All instructors are approved by the State Department of Public Instruction and are members of the professional organization.

Placement: Kirkwood Community College will assist graduates of this program in obtaining employment.

Graduation: Students successfully completing the program are awarded a diploma.

CURRICULUM

ENVIRONMENTAL HEALTH ASSISTANT

First Quarter	Credit Hours	Contact Hours
Introduction to Public Health	3	4
Diseases of Man	4	5
Water Sanitation	4	6
Technical Math	2	2
Psychology I	2	3
Housing Inspection	3	6
First Aid	1	2
Projects Lab	0	2
	19	30

Second Quarter		
Psychology II	2	3
Communication Skills I	3	3
Food Sanitation	3	6
Sewage Disposal	4	6
Milk Sanitation	3	6
Vectors	3	3
Projects Lab	0	3
	18	30

Third Quarter		
Recreational Sanitation	2	4
Industrial Safety	2	3
Occupational Hygiene	2	2
Solid Waste Disposal	3	6
Community Improvement	4	5
Institutional Sanitation	3	4
Communication Skills II	3	3
Projects Lab	0	3
	19	30

Summer Session		
Field Training	16	32
Seminar	2	2
	18	34

VT 013 352
NEWTON, DAVE
ENVIRONMENTAL HEALTH TECHNOLOGY (INFORMATION PACK). SIX PROGRAMS OF TRAINING AND EDUCATION IN ENVIRONMENTAL TECHNOLOGY (POTEET).

NATIONAL SANITATION FOUNDATION, ANN ARBOR, MICH.
BROOME COUNTY TECHNICAL COMMUNITY COLL., BINGHAMTON, N.Y.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - 18MAY70 27P.

DESCRIPTORS - *ENVIRONMENTAL EDUCATION; *PROGRAM DESCRIPTIONS; *PUBLIC HEALTH; *CURRICULUM DESIGN; SANITATION; AIR POLLUTION CONTROL; WATER POLLUTION CONTROL; COMMUNITY COLLEGES; TECHNICAL INSTITUTES; EDUCATIONAL PROGRAMS; TECHNOLOGY; TECHNICAL EDUCATION
IDENTIFIERS - *ENVIRONMENTAL TECHNOLOGY; PROJECT POTEET

ABSTRACT - THIS DOCUMENT CONTAINS AN OUTLINE OF THE FOLLOWING SIX PROGRAMS IN ENVIRONMENTAL TECHNOLOGY: (1) ENVIRONMENTAL HEALTH, (2) POLLUTION ABATEMENT, (3) WATER SANITATION, (4) ENVIRONMENTAL ENGINEERING, (5) AIR POLLUTION, AND (6) WATER AND WASTEWATER. EACH PROGRAM OUTLINES A CURRICULUM FROM ONE OF SIX DIFFERENT SCHOOLS WHICH IS EITHER A COMMUNITY COLLEGE OR A TECHNICAL INSTITUTE. ALONG WITH THE CURRICULUM OUTLINE, A BRIEF DESCRIPTION OF THE SCOPE AND CONTENT OF MOST COURSES IS GIVEN. (GEB)

VT 013 352

C1

SIX PROGRAMS

IN

ENVIRONMENTAL TECHNOLOGY

Environmental Health Technology

Pollution Abatement Technology

Water Sanitation Technology

Environmental Engineering Technology

Air Pollution Technology

Water & Wastewater Technology

8 May 1970

VT013352

U.S. DEPARTMENT OF HEALTH, EDUCATION, & WELFARE
OFFICE OF EDUCATION
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Ann Arbor, Michigan 48106

Programs of Training and Education in Environmental Technology
(POTEET)

INFORMATION PACK

Broome Technical Community College
Binghamton, New York 13902

Environmental Health Technology
Dave Newton
607/724-4391

621

18 May 1970

CURRICULUM

ENVIRONMENTAL HEALTH TECHNOLOGY

First Year	Credit
English	3
Algebra and Trigonometry	3
Chemistry	4
Zoology	4
Engineering Drawing	1
Physical Education	1
	16
English	3
Statistics	3
Chemistry	4
Physics	3
Environmental Health	4
Physical Education	1
	18
English	3
Chemistry	4
Limnology	4
Atmospheric Pollution	5
Physics	3
Physical Education	1
	20
Second Year	
Economics	3
Psychology	3
Milk Sanitation	4
Microbiology	5
Water Supply and Pollution Control I	4
Physical Education	1
	24
Effective Speaking	3
Microbiology	4
Environmental Sanitation	4
Food Sanitation	3
Physical Education	1
	15
Sociology	3
Parasitology	4
Physics	3
Water Supply and Pollution Control II	4
Radiological Health	3
Environmental Health Administration	3
Physical Education	1
	21

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Programs of Training and Education in Environmental Technology
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John Reddington
Director of Education
313/663-8581

INFORMATION PACK

Charles County Community College
LaPlata, Maryland 20646

Pollution Abatement Technology

Carl Schwing
301/934-2251

18 May 1970

CHARLES COUNTY COMMUNITY COLLEGE
LaPlata, Maryland 20646

POLLUTION ABATEMENT TECHNOLOGY

First Semester	Credit Hours
Introduction to Pollution and Pollution Control	3
English (Rhetoric)	3
Applied Mathematics (lec. - lab.)	3
Biology (lec. - lab.)	4
Chemistry I (inorganic)	3
	16

Second Semester	
Speech (lab)	2
Principles of Waste Management	3
Applied Statistics and Systems Concepts	3
Chemistry II (inorganic-organic)	3
Microbiology (lec. - lab.)	4
	15

Summer Session	
Experimental Ecology (lec. - lab.)	5
Instrumentation Laboratory	2
	7

Third Semester		
Technical Report Writing	2	
Applied Physics (lec. - lab.)	4	
Applied Analytical Chemistry (lec. - lab.)	4	4
Technical Electives:	3	
Solid Waste Management & Micropollution		
Aquatic Ecology and Water Pollution		
Non-Technical Electives:	3	
Humanities		
	16	

Fourth Semester	
Waste Water Operations	3
Sanitary Chemistry & Microbiology (lec.-lab.)	4
Non-Technical Electives (behavioral science)	3
Community Problems	
Sociology	
Psychology	
Political Science	
Industrial Management	3
Applied Economics	3
	16

18 May 1970

BRIEF COURSE DESCRIPTIONS

Introduction to Pollution and Pollution Control

An overview course introducing the "Pollution Abatement" students to the general area of pollution and pollution control. Sources, and indicators of pollution, water uses and water quality standard, municipal and industrial liquid waste disposal methods, characteristics of water, water treatment and protection of ground water. This course will include seminars with speakers drawn from the vast pool ot the Washington technical community.

Principles of Waste Treatment

A course designed to familiarize the students with water supply, liquid waste collection, basic hydraulics, and hydrology and the principles of water purification. Unit processes involving sedimentation, biological filters, chemical treatment filtration and disinfection will be studied.

Applied Statistics

Prereq: Algebra. Understanding of probability and statistics in engineering and biology. Sampling problems and analysis. Probability, normal distribution and measure of variance and linear regression analysis.

Microbiology

Prereq: Biology. Three lectures and two laboratory periods a week. General microbiology and water microbiology including studies of bacteria yeasts, molds, actinomycetes, algae and protozoa.

Experimental Ecology

Prereq: Biology. Experiments will be designed to focus on the creation of the desired environment as the end product of water management system. Emphasis will be placed upon the effects of water pollutants (and various techniques for collecting and processing) on the total environment. Demonstration of systems approach by reference to the ecological balance and the use of mathematical modeling techniques.

Technical Report Writing

Prereq: English I. Study of the different types of technical reports; experimental write-up. Emphasis is on engineering, business, and experimental report preparation. Students will be required to write short reports and several formal extensive reports.

Applied Physics

A study of the basic principles of mechanics, heat, hydraulics, and electricity with emphasis on the practical application of these principles. Studies of the operation of pumps, valves and weirs.

Applied Analytical Chemistry

Prereq: Chemistry I and II. Two lectures and two labs a week. Methods and techniques of modern analytical chemistry. Emphasis is placed on standard methods of water (marine and waste water) analysis.

Aquatic Ecology

Two hours a week. Interactions of flora and fauna of marine and fresh water systems with their environment. Effects of modification of the environment of the aquatic biota.

Waste Water Operations

A study of liquid waste treatment facilities including instrumentation and controls. Students will become familiar with the operation and maintenance of waste water treatment plants. This includes understanding and use of hydraulic, pneumatic, mechanical, electrical, and electronic control systems and components.

Sanitary Microbiology

A course in which the students apply as a unit the biological and engineering principles learned in the previous courses. This includes application of biology and engineering sciences to municipal, conservation and industrial processes. Principles of applied biology such as aerobic and anaerobic treatment, photosynthetic processes for conversion of waste to feed, and resources conservation.

Community Problems

Study of social, economic, and political aspects of water quality control problems including the need for new institutional arrangements. Public relations, elements of planning, and pollution control.

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INFORMATION PACK

Clackamas Community College
Oregon City, Oregon 97045

Water Sanitation Technology

Deryl Hampton
502/656-0615

19 May 1970

COURSE DESCRIPTIONS

Introduction to Environmental Science (2 theory, 3 lab hours per week) 3 credits

This course will be an introduction to the whole field of Environmental Science. Topics covered will include history, development, and philosophy of environmental science, career opportunities, and related topics. The laboratory periods will usually be field trips to municipal, industrial, agricultural, and other agencies.

Environmental Science (3 th hr/wk) 3 credits

This course will cover community health problems, communicable and environmental disease control, atmospheric pollution, and related topics.

Prerequisite: "Introduction to Environmental Science" or consent of instructor.

Introduction to Water Sanitation Technology (2 th, 2 lab hr/wk) 3 credits

Topics included in this course will be a general introduction to public and private water supply, sewage and waste disposal, pollutants affecting health, sanitary codes and specifications, and related topics.

Prerequisite: "Environmental Science" or consent of instructor.

General Biology (3 th, 3 lab hr/wk) 4 credits

Biological principles applied to both plants and animals. May not be taken for credit if student has completed six or more hours in a college-level course in a biological science. Three lectures, one three-hour laboratory period.

General Chemistry (2 th, 3 lab hr/wk) 3 credits

For students who have had no previous training in chemistry and for those whose college aptitude test scores indicate need for a more elementary approach. Two lectures, one three-hour laboratory period.

Technical Mathematics I (4 th hr/wk) 4 credits

This is an applied course in mathematics on the technician level covering the slide rule, tables and interpolation, additional applications in geometry, a review of algebraic operations, systems of linear equations, functions and graphs, advanced applications of exponents and radicals, quadratic equations in one unknown, and introductory trigonometry.

Prerequisite: High school algebra or equivalent.

Technical Mathematics II (4 th hr/wk) 4 credits

Mathematics on the technician level including logarithms, right and oblique triangle problem-solving, trigonometric applications, vectors, trigonometric formulas, identities, and equations, and graphs of trigonometric functions.

Prerequisite: Technical Mathematics I or equivalent.

Technical Mathematics III (4 th hr/wk) 4 credits

Mathematics on the technician level covering simultaneous guadratic equations, ratio and proportion, binominal theorem, arithmetic and geometric progressions, exponential functions, complex notation, and vector algebra.

Prerequisite: "Technical Mathematics II" or equivalent.

Sanitary Chemistry & Microbiology I (2 th, 3 lab hr/wk) 3 credits
Sanitary Chemistry & Microbiology II (2 th, 3 lab hr/wk) 3 credits
Sanitary Chemistry & Microbiology III (2 th, 3 lab hr/wk) 3 credits

Theory and laboratory techniques for control tests of water purification including: bacteriology, color, turbidity, pH, alkalinity, hardness, coagulations, chlorides, fluorids, iron, manganese, nitrates, detergents and bactericides. Theory and laboratory techniques for the determination of solids, dissolved oxygen, oxygen consumed, bacteria, biochemical oxygen demand, and other topics will be included.

Prerequisite: General Biology and Chemistry, or consent of instructor.

Water Supply Systems (2 th, 3 lab hr/wk) 3 credits

Water quality and composition, ground and surface water supplies, water treatment processes, plant equipment operation and maintenance, and related topics.

Prerequisite: Completion of 1st year program in Water Sanitation Technology, or consent of instructor.

Water Purification (3 th, 3 lab hr/wk) 4 credits

A study of basic principles of water purification including: aeration sedimentation, rapid sand filtration, chlorination, treatment chemicals, taste and odor control, bacteriological control, mineral control, design criteria, maintenance programs, and operational problems. New processes and recent developments are studied. Criteria, rules, regulations, forms, and records associated with the field are considered.

Prerequisite: To be taken concurrently with Water Supply Systems.

Wastewater Systems (2 th, 3 lab hr/wk) 3 credits

A course to familiarize the student with the elementary engineering aspects of wastewater systems.

Prerequisite: Completion of 1st year of Water Sanitation Technology, or consent of instructor.

Wastewater Treatment (3 th, 3 lab hr/wk) 4 credits

This course is designed to familiarize the student with the elementary engineering aspects of design, operation, process control, and maintenance of wastewater treatment plants and facilities.

Prerequisite: To be taken concurrently with Wastewater Systems.

19 May 1970

Instrumentation for Water Sanitation Technology (2 th, 3 lab hr/wk) 3 credits

An elementary study of hydraulic, pneumatic, mechanical, electrical and electronic control systems and components. It includes a basic description, analysis, and explanation of operation of instrumental controls for water and wastewater plants. Typical performance characteristics, accuracy, and applications of instruments are studied.

Prerequisite: Hydraulics and Algebra or Tech Math I

Hydraulics (Water and Wastewater) (3 th, 3 lab hr/wk) 4 credits

A basic study of closed conduit and open channel flow, including stream flow, subterranean flow, runoff, pump characteristics, and wave action.

Prerequisite: Algebra or Technical Math I

Water Sanitation Technology Field Projects (1 th, 20 lab hr/wk) 6 credits

Practical work experience with municipal plants, industry, public or private agencies will be arranged. Assigned observation will be provided where on-job experience is not feasible.

Prerequisite: Sixth quarter standing in Water Sanitation Technology.

Drafting Fundamentals (5 lab hr/wk) 2 credits

This is a basic course designed for the on-the-job tradesman or foreman who comes in contact with sketched and completed production drawings. It also enables this person to make intelligible sketches and for small production or fabrication shops, detail or working drawings. Emphasis is placed in three areas: sketching, drawing, and blueprint reading

Prerequisite: High school graduation or equivalent, or approval of instructor.

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INFORMATION PACK

Fayetteville Technical Institute
Fayetteville, North Carolina 28303

Environmental Engineering Technology

Dean Painter
919/484-4121

18 May 1970

ENVIRONMENTAL ENGINEERING TECHNOLOGY

Our ever-increasing population and industrial expansion carries with it the demand for many services, one of the most vital of these services is the production and safeguarding of our water supply and the adequate control over air pollution. The production and protection of our water supply represents an economic investment in which North Carolina alone is spending over 20 million dollars per year for the construction of water and waste treatment facilities. Our industries use tremendous amounts of water daily in industrial processes and are spending thousands of dollars each year in research on treatment of liquid waste before it is returned to the streams and rivers.

These activities require increasing numbers of highly-skilled technical personnel to perform the many specialized tasks involved.

These technicians are also being utilized for inspection and safe operation of milk production and processing, meat packing, food processing and service, together with housing and allied health problems, and the control of diseases.

The graduate of this curriculum will have a knowledge of laboratory procedures and skill in performing many types of tests on liquid and solid wastes, foods, and water to determine bacteriological characteristics, acidity, etc. He will be qualified for entry into a variety of positions such as public health engineering aide, sanitarian aide, treatment plant operators, stream sanitation technicians, industrial waste technicians, technical sales and services of equipment and chemicals, water plant operators and engineering technician positions with federal, state, and local governments and municipalities. Opportunities are also expanding in the field of technical data collecting and equipment operation for air pollution control.

CURRICULUM

ENVIRONMENTAL ENGINEERING TECHNOLOGY

FIRST YEAR	CREDIT
Fall Quarter	
Grammar	3
Technical Math	5
Properties of Matter	4
Technical Drafting	2
Environmental Sanitation	4
	18
Winter Quarter	
Composition	3
Technical Math	5
Work, Energy, Power	4
Applied Microbiology	3
Air Quality Management	3
	18
Spring Quarter	
Report Writing	3
Technical Math	5
Environmental Biology	3
Basic Hydraulics: Principles of Flow	4
Surveying	4
	19
SECOND YEAR	
Fall Quarter	
Oral Communication	3
Sanitary Chemistry & Biology	5
Water Supply and Liquid Waste	4
Water Purification	4
Applied Electricity	4
	20
Winter Quarter	
Applied Economics	3
Sanitary Chemistry & Biology	5
Liquid Waste Treatment	4
Control Systems	4
Drafting	2
	18
Spring Quarter	
Applied Psychology	3
Sanitary Chemistry & Biology	5
Liquid Waste Treatment	4
Codes, Contracts, Specifications and Estimates	3
Air Pollution Sampling	3
	18

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INFORMATION PACK

Santa Fe Junior College
Gainesville, Florida 32601

Air Pollution Technology

John Turner
904/378-5311

18 May 1970

SANTA FE JUNIOR COLLEGE
Gainesville, Florida 32601

AIR POLLUTION TECHNOLOGY

General Core		Hours
BE 100	Individual in Changing Environment	3
GE 100	The Sciences	3
MS 100	Principles of Mathematics	3
EN 100	English Language	3
HM 100	The Humanities	3
SO 100	The Social Sciences	3
		18

Technical Core		
AP 101	Introduction to Air Pollution	3
AP 103	Air Pollution Field Survey	3
BY 102	General Biology	3
BY 103	General Biology	3
CY 101	Elements of Chemistry	3
CY 102	Elements of Chemistry	3
PC 101	Applied Physics	4
EM 101	Technical Math I	3
EM 102	Technical Math II	3
		28

Field Core		
AP 102	Air Pollution Sources	3
AP 201	Air Pollution Sampling	3
AP 202	Air Pollution Control	3
AP 290	Major Project	6
		15

Suggested Electives	
Elementary Statistics	3
Electronics Instruments	3
Computer Programming	3
Electric Circuits	2
Report Writing	3
General Zoology	4
Human Anatomy and Physiology	4
Introduction to Logic	3
Human Relations in Industry	3
Sociology of the Community	3
Technical Math III	3

18 May 1970

Summary of the Program

General Core		18
Technical Core		28
Field Core		15
Electives		14
	Total	75

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INFORMATION PACK

Texas State Technical Institute
James Connally Campus
Waco, Texas 76703

Water & Wastewater Technology

Ken Bird
817/799-2572

19 May 1970

SCOPE

This curriculum includes the study of the technical subjects and the laboratory experiences required to prepare competent technicians for employment in the water and sewage industry. Instruction is designed to develop an understanding of, and skill in, water purification, maintenance of treatment facilities. chemical treatment, filtration, water softening, corrosion, disinfection, elimination of tastes and odors in water, and pump operation and maintenance. Also, knowledge and skill will be developed in the treatment of sewage and industrial wastes by means of chlorination, aeration, sedimentation, digestion, and filtration.

CONTENT

Instruction in related subjects includes pressure systems and hydraulics, inorganic chemistry, microbiology, applied electricity and mechanics, mathematics, principles of operation and design of water and sewage treatment equipment, metering devices, automatic controls and recording instruments, blueprint reading, safety, public health laws, recording and interpreting operating data and preparation of reports.

Laboratory experience will include the procedures for testing, analyzing, interpreting and computing chemical reactors for water utilities operation, including detection and treatment for hazardous chemical agents. Also, experiments will be performed to develop the principles of hydrostatics and water flow as applicable to water and sewage plant operation. Practice will be provided in the techniques of water bacteriology to develop proficiency in the performance and utilization of the coliform determination, and the filter technique of water examination. Field trips to various municipalities will be scheduled to study water storage, distribution and treatment systems and sewage and industrial waste treatment systems.

CAREERS

Graduates of this program may find employment as assistants to water purification or sewage plant superintendents, as water laboratory assistants, in technical sales or equipment and chemicals, or in engineering offices.

CURRICULUM

First Year

First Trimester	Credit
Occupational Orientation (1 class hour & no lab)	1
Introduction to Water Supply and Waste Water (2 & 3)	3
Water Chemistry Laboratory Techniques (3 & 6)	5
General Drafting (1 & 3)	2
Basic Mathematics (3 & 0)	3
Technical Communications I (3 & 0)	3
	17

Second Trimester	
Applied Water and Waste Water Chemical Techniques (3 & 6)	5
Fundamentals of Hydraulics (4 & 0)	4
Applied Electrical Theory (3 & 0)	3
Technical Mathematics I (3 & 0)	3
Applied Physics I (3 & 3)	4
	19

Third Trimester	
Water and Waste Water Microbiology (3 & 3)	4
Water Distribution Systems (2 & 3)	3
Waste Water Collection Systems (3 & 3)	4
Technical Mathematics II (3 & 0)	3
Applied Physics II (3 & 3)	4
	18

Second Year

Fourth Trimester	
Surface Water Production (3 & 3)	4
Ground Water Production (2 & 0)	2
Application of Accounting (2 & 3)	3
Technical Drafting (3 & 3)	4
Instrumentation (Controls and Measuring Devices) (3 & 3)	4
Technical Communications II (3 & 0)	3
	18

19 May 1970

CURRICULUM

Fifth Trimester	Credit
Waste Water Treatment Methods (4 class & 3 lab hours per week)	5
Water and Waste Water Equipment Maintenance (2 & 3)	3
Water and Waste Water Administration and Finance (3 & 0)	3
Surveying (1 & 4)	2
Computer Programming (3 & 3)	4
	17

Sixth Trimester	
Advanced Hydraulics (1 & 3)	2
Advanced Water Treatment Practices (4 & 6)	6
Industry Practices and Trends (3 & 0)	3
Human and Industrial Relations (3 & 0)	3
Research Projects and Field Problems (2 & 3)	3
	17

COURSE DESCRIPTIONS

Occupational Orientation (1 credit)

This course is presented in order to give the students an understanding of the operation and principles in general of technical education, Texas State Technical Institute in particular, and the career possibilities in the water utilities industry.

Introduction to Water Supply and Waste Water (3 credits)

A course primarily intended to introduce students to the water utilities industry in general. Guest speakers will be invited to give the students a comprehensive overlook of the industry.

Water Chemistry Laboratory Techniques (5 credits)

This course is designed to give the student an understanding of water utilities laboratory control procedures and techniques. Proper manipulative skills in the laboratory will be coordinated with the theories of general chemistry and oriented toward the water utilities industry.

Applied Water and Waste Water Chemical Techniques (5 credits)

This course includes the aspects of water utilities laboratory examination primarily oriented toward organic and biochemistry. Aspects of microbiological metabolism and nutrition are introduced. Application of laboratory data obtained to systems operation is stressed.

Prerequisite: Water Chemistry Laboratory Techniques.

Water and Waste Water Microbiology (4 credits)

Specific emphasis is placed on bacteriology as related to the safety of water supplies and taste and odor control. Relationships will regard to metabolic processes in pollution control facilities are stressed.

Prerequisite: Applied Water and Waste Water Chemical Techniques.

Water Distribution Systems (3 credits)

The student is taught general construction equipment and maintenance techniques. Pump stations, water storage, valves, hydrant installation, maintenance and repair are presented in theory as well as practice. State agency requirements, with relation to health and fire protection are covered.

Prerequisite: Introduction to Water Supply and Waste Water.

Waste Water Collection Systems (4 credits)

General construction and maintenance practices and equipment are presented. Waste water pump stations, design, and operation features, and safety are stressed.

Prerequisite: Introduction to Water Supply and Waste Water.

Fundamentals of Hydraulics (4 credits)

A study of the basic concepts of hydrostatics, fluid mechanics, metering devices, pressure control and flow rate controllers, as well as principles of pump operation.

Prerequisite: Basic Mathematics or equivalent.

Special Problems (Credit 1-10)

An intensive study of selected topics in water and wastewater.

Prerequisite: Permission of department head.

Surface Water Production (4 credits)

This course is constructed to give the student an understanding of water resources and conservation. Unit operation methods and equipment are presented with emphasis on conventional coagulation, sedimentation, and filtration practices.

Prerequisite: Introduction to Water Supply and Waste Water, and Water and Waste Water Microbiology.

Ground Water Production (2 credits)

The course content deals primarily with the geology and hydraulics of ground water supplies, well production yields, maintenance, and well field concepts.

Prerequisite: Introduction to Water Supply and Waste Water.

Waste Water Treatment Methods (5 credits)

Pollution control facility analysis and operation will be taught in this course with emphasis on sludge handling and treatment, trickling filter operation, activated sludge, and other conventional processes.

Prerequisite: Introduction to Water Supply and Waste Water, and Water and Waste Water Microbiology.

Advanced Hydraulics (2 credits)

A continuation of the study of fluid flows in both pressure and gravity systems with emphasis being placed on efficiencies of materials and equipment.

Prerequisite: Fundamentals of Hydraulics, and Technical Math II, or equivalent.

Water and Waste Water Equipment Maintenance (3 credits)

A course designed to make the student aware of sound practices in general equipment repair and maintenance. Specific tools, protective coatings, and record keeping are to be stressed.

Prerequisite: Introduction to Water Supply and Waste Water.

Water and Waste Water Administration and Finance (3 credits)

Sound practices in project and service costs, rate structures, municipal finance, safety programs, and personnel practices are to be taught. Guest lecturers representing various water utilities will present their views, methods and practices.

Advanced Water Treatment Practices (6 credits)

This course is designed to teach fundamentals in water softening, stabilization, industrial requirements, and specialized pollution control practices.

Prerequisite: Surface Water Production, and Waste Water Treatment Methods.

Industry Practices and Trends (3 credits)

A study of the more advanced concepts in the industry. Introduction to new or revolutionary practices and techniques will be presented. Experimental and pilot study techniques will be practiced.

Prerequisite: Introduction to Water Supply and Waste Water.

Human and Industrial Relations (3 credits)

This course of study is designed to give the student a sound understanding of public relations and individual relations as it applies to the water utilities field.

Research Projects and Field Problems (3 credits)

This study is designed to allow students to exhibit intiative and originality in specific areas of the industry which require individual development or research.

Prerequisite: Surface Water Production, and Waste Water Treatment Methods.

Special Problems (Credit 1-10)

An intensive study of selected topics in water and waste water.

Prerequisite: Permission of department head.

D.O.T. Code No. 954.782

Description of the Occupation

of the

WATER UTILITY OPERATOR

Studies water utility management, stressing organization, public and employee relations and safety practices. Studies the operation and maintenance of water wells including underground water strata. Learns to operate and maintain surface water treatment plants including laboratory tests for hardness, chlorine residuals, alkalinity, turbidity, taste and odor, identification and significance of algae. Learns to operate filters, chemical feed machines, rate controllers and sedimentation basins. Studies filters, chemical feed machines, rate controllers and sedimentation basins. Studies water distribution system including pipe layouts, valves, fire hydrants, pipe resistance to flow, water meter repair, ground and elevated storage tanks, pumps and basic hydraulics.

Studies the operation and maintenance of waste water treatment plants and the laboratory analysis for the control of these plants: biochemical oxygen demand, dissolved oxygen test, settleable solids, pH and others.

CURRICULUM

First Trimester	Credit
Occupational Orientation (1 class and no lab hours per week)	1
Basic Mathematics (3 & 0)	3
General Drafting (1 & 3)	2
Water Production (Wells) (3 & 6)	5
Basic Hydraulics (4 & 6)	6
Technical Communications I (3 & 0)	3
	20

Second Trimester	
Applied Water Chemistry (2 & 6)	4
Water Distribution Systems (3 & 6)	5
Water Production (Surface) (2 & 3)	3
Wastewater Collection Systems (3 & 3)	4
Applied Mathematics I (3 & 0)	3
	19

Third Trimester	
Wastewater Treatment Plants (2 & 6)	4
Applied Electricity and Instrumentation (2 & 0)	2
Water Utility Management (3 & 0)	3
Water Measuring Devices (3 & 6)	5
Bacteriology of Water (2 & 6)	4
	18

19 May 1970

WATER UTILITY OPERATOR
COURSE DESCRIPTIONS

Occupational Orientation (1 class and no lab hours per week) 1 credit

This course is designed to acquaint the student with the Water Utility Field, the different courses and how they prepare the student to become a water utility operator for municipalities or industry. The use and care of tools, shop practices, and safety will also be stressed. The relation of the water utility with our State Health Department and other state agencies will be discussed.

Well Water Production 5 credits

This course will cover a review of basic geology and the origin of ground water, water well location and sanitation, well development and testing. Well pumps and motors, operational problems and remedies will be discussed.

Basic Hydraulics 5 credits

The student will study the behavior of liquids at rest and in motion. Conditions which cause resistance to the flow of water will be discussed. Pressure, flow, and velocity of liquids under certain conditions will be discussed. The operation and maintenance of different types of pumps will be practiced in the shop.

Applied Water Chemistry 4 credits

This course is prepared to teach the student chemistry and laboratory procedures that pertain to the quality control of water for the water utility profession.

Water Distribution Systems 5 credits

A study of pipe size considerations, service lines, pumping installations, and maintenance is included. Water storage tanks, valves and hydrants and water main construction will be studied. Shop work in distribution line repair and sanitary protection will be explained.

Surface Water Production 3 hours.

This course covers water conservation and sanitary protection of our lakes and watersheds. The processes of coagulation, sedimentation, filtration and chlorination are studied.

Wastewater Collection Systems 4 credits

The course is prepared to give the student a knowledge of wastewater system construction materials, wastewater system design, pumping, and system operation and maintenance.

Wastewater Treatment Plants 4 credits

This course will include a study of the operation of the different types of wastewater treatment plants, primary and secondary treatment, the activated sludge process, extended aeration plants and the construction and operation of biological stabilization ponds is included.

19 May 1970

Water Utility Management 3 credits

This course will show the relation of the Water Utility with the other departments of the municipality or industry. The organization structure and personnel relations will be studied as will the duties of the supervisory personnel.

Water Measuring Devices 5 credits

The study of the principles of operation and maintenance of the different types of water meters including - positive displacement, compound, torrent, venturi, pitot tube, orifice, and weirs.

Bacteriology of Water 4 credits

Bacteriology of water with regards to the potability of public water supplies. Bacteria as utilized in the treatment of wastewater will also be studied. Organisms causing taste and odors will also be studied.

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ENVIRONMENTAL INFORMATION (INFORMATION PACK).
PROGRAMS OF TRAINING AND EDUCATION IN
ENVIRONMENTAL TECHNOLOGY. (POTEET).

NATIONAL SANITATION FOUNDATION, ANN ARBOR,
MICH.
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DESCRIPTORS - *BIBLIOGRAPHIES; *ENVIRONMENTAL
EDUCATION; *TECHNOLOGY; *REFERENCE MATERIALS;
*RESOURCE MATERIALS; TECHNICAL EDUCATION;
ANNOTATED BIBLIOGRAPHIES; POST SECONDARY
EDUCATION; POLLUTION
IDENTIFIERS - *ENVIRONMENTAL TECHNOLOGY;
PROJECT POTEET

ABSTRACT - THIS DOCUMENT CONTAINS LISTS OF
REFERENCES THAT WOULD BE USEFUL IN
ENVIRONMENTAL TECHNOLOGY PROGRAMS. AN
ANNOTATED BIBLIOGRAPHY FOR TECHNICAL
EDUCATION, A NATIONAL SANITATION FOUNDATION
PUBLICATIONS LIST, PAPERBACKS IN PUBLIC
HEALTH, AND OTHER REFERENCES ARE PRESENTED IN
THE FIRST SECTION. OTHER SECTIONS INCLUDE A
BIBLIOGRAPHY OF PUBLICATIONS DEALING WITH
ENVIRONMENTAL POLLUTION, A LIST OF GOVERNMENT
AGENCIES WHICH PUBLISH LITERATURE DEALING
WITH POLLUTION, A BIBLIOGRAPHY OF
EPIDEMIOLOGY, AND A LIST OF POST-SECONDARY
CURRICULUMS IN ENVIRONMENTAL TECHNOLOGY.
(GEB)

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National Sanitation Foundation
Box 1468
Ann Arbor, Michigan 48106
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Programs of Training and Education in Environmental Technology
(POTEET)

INFORMATION PACK

ENVIRONMENTAL INFORMATION

As a national organization we have access to much that relates to environmental technology. We attempt to screen material from government, industry, and education and to excerpt that which would seem to be pertinent and helpful. This information is then passed along via the information pack to those in the field.

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ANNOTATED BIBLIOGRAPHY
for
TECHNICAL EDUCATION

1. Area Vocational Education Programs: U. S. Department of Health, Education and Welfare, U. S. Office of Education, Washington 25, D. C.; OE-80005, 1960; 7 pp.

Reprint of article from School Life, January, 1960. Presents the background of Title VIII, objectives of the title, program standards, and use of funds. Describes early developments in the program, progress and accomplishments, programs and courses, high school and post-high school programs, and gives information on the organization of Title VIII programs.

2. Borow, Henry, Man in a World at Work, Boston, Mass.: Houghton Mifflin Co., 1964

Work is important to mentally healthy and mature persons. In Chapter 7 Wolfbein covers "Labor Trends, Manpower and Automation." In Chapter 8 Tyler discusses"Work and Individual Differences." In Chapter 13 Shartle discusses "Occupational Analysis and "Worker Characteristics."

3. Clark, Burton R., Educating the Expert Society, San Francisco: Chandler Publishing Co.,

Chapter 1-2-3 gives a good coverage of needs of society for more "expertise" for filling occupational jobs and for cultural development.

4. Education for a Changing World of Work "Appendix I, Technical Training in the United States, " Federal Security Agency, Office of Education, 1963, 170 pp.

An excellent detailed discussion of what, why, where, and how Technical Education must be considered as a part of education.

5. The Engineering Technician: American Society for Engineering Education, Technical Institute Division, 330 West 42nd St. New York, New York, 1960; 21 pp.

Describes the engineering technicians, and outlines their duties in such fields as aeronautical, air conditioning, automation, building construction, chemical electrical, electronic, mechanical, and instrumentation technologies.

6. Graney, Maurice R., The Technical Institute, The Center for Applied Research in Education, New York, 1964

Outlines very well the role of "Technical Institute" education, its background and present day concepts. Although it draws on a number of recent writings concerning technical education in public and higher education, the viewpoint is from that of somewhat disinterested but objective observers who recognize the great need for technicians in our industrial society. The text discusses the organization and administration, curriculum content, faculty and students of programs classified as technical.

7. Harbison, Frederick and Myers, Charles A., Education, Manpower and Economic Growth, New York: McGraw Hill Co., 1964

Chapters 1, 2, 3, 7, and 8 are excellent in presenting the case for Education and Manpower as national resources and how upper level countries in economic development have utilized these factors for growth.

8. Henninger, G. Ross, The Technical Institute in America, New York; McGraw-Hill Book Company, 1959; 275 pp.

A report of the National Survey of Technical Institute Education made by the American Society for Engineering Education. Discusses the philosophy and objectives of the technical institute, curriculum patterns, the institute student body, faculty, physical plant, administrative pattern, and financial structure. Appendices include typical occupational opportunities for graduates; typical curriculums in industrial electronics, structural design technology, electrical engineering technology, industrial technology, and machine construction and tool design, together with course descriptions; and data from follow-up studies of graduates.

9. McClure, W. B.,"The Future of Vocational and Technical Education," National Association of Secondary School Principals, February, 1961, pp. 7-12

Technical education in the article is restricted to Occupational Instruction at the post-high school level while vocational refers to formal instruction at the high school level. However, as the author points out, there are many ways in which the two programs are related.

The revolution in the composition of the labor force, the mobility of population, and the increase of the occupational world are all forces which are shaping the future of vocational and technical education. The author maintains that the greatest

gap in American education today is in the field of post-high school technical education. Demands upon high school and post-high school programs are changing. Problems of organization are especially in need of proper conceptions. A totally new organization is needed in many states. Programs must be planned on a state-wide basis, with state and nation-wide opportunities in mind.

10. Roe, Ann, The Psychology of Occupations, New York: John Wiley & Sons, 1962.

    Occupational choice and satisfaction have much greater psychological importance for the well being of people in the labor force than usually considered. Covers the occupational classifications used in determining level and groups.

11. Smith, Leo F., and Lipsett, Laurence, The Technical Institute, New York; McGraw-Hill Book Company, 1956; 319 pp.

    Gives a check list of criteria for identifying technician jobs. Describes the technical institute, compares it with trade schools and with engineering colleges, and outlines the various types of educational organizations which operate technical institute type programs. Discusses the history of cooperative education in technical institutes, provides data on such programs in eight institutes, and gives suggestions on the organization, administration, and evaluation of technical institute programs.

OTHER USEFUL PUBLICATIONS:

Technical Education News: Published four times a year by the Technical and Vocational Education Division of McGraw Hill Book Company, 330 West 42nd St., New York, New York, 10036.

Then, Now, and Tomorrow in Vocational and Occupationally-Related Education, by Floyd T. Christian, State Department of Education, Tallahassee, Florida.

Technical Education in the Junior College by Norman C. Harris, published by the American Assoication of Junior Colleges, 1777 Massachusetts Avenue, N.W.; Washington, D. C. 20036

Journal of Engineering Education, published monthly by the American Society for Engineering Educators, 1346 Connecticut Avenue, N. W., Washington, D. C. 20036

Man, Education and Work by Grant Venn

Thomas A. Strickland
Director of Environmental Health
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NATIONAL SANITATION FOUNDATION

Programs of Training and Education in Environmental Technology

(POTEET)

Publications List

Brochure - "The Environmental Technician."

Colloquium Pack - selected materials from the First NSF Colloquium on the Environmental Technician.

Information Pack - curriculums, descriptions, manpower information, etc.

Speech - "Teachers for the Environmental Technician"
American Public Health Association Convention
November 12, 1969

Speech - "On the Eve of Earth Day . . . "
Meramec Community College
St. Louis, Missouri
April 21, 1970

"Toward Better Environmental Technicians" - position paper, July 15, 1969.

15 May 1970

Paperbacks in Public Health

"Hunter is an international authority on industrial health and Gordon describes the intolerable conditions which pertain in the cities in the United States. Kira's book is a description of the work of the Cornell University Center for Housing and Environmental Studies in modernization of toilet facilities."

Hunter, D. Health in Industry. Harmondsworth, Middlesex: Penguin Books, 1959. 288 pp. $.48. (B)

Ehlers, V. M. Municipal and Rural Sanitation. London: McGraw-Hill. $5.28. (B)

Wright, L. Clean and Decent. The Fascinating History of the Bathroom and Water Closet. London: Routledge and Kegan Paul, 1966. $1.50. (B) Toronto: University of Toronto Press. $2

Battan, L. J. The Unclean Sky. Garden City, N. Y.: Doubleday, 1966. xii, 141 pp. $1.25.

Schubert, J., and Lapp, R. E. Radiation: What It Is and How It Affects You. New York: Viking Press, 1957. $1.65.

Gordon, M. Sick Cities. Baltimore: Penguin Books, 1965. 444 pp. $2.25.

Bunting, B. T. The Geography of Soil. London: Hutchinson Publishing, 1967. $1.46. (B)

Kira, A. The Bathroom, Criteria for Design. New York: Bantam Books, 1967. xiv, 233 pp. $1.45.

(B) = Published in Great Britain

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AIR POLLUTION REFERENCE LIBRARY

An air pollution reference library is being established at the City College of the City University of New York. It will be located in the Technology Library of Steinman Hall, 140th Street and Convent Avenue, Manhattan, and will be available for use by the general public. The library, in microfilm form, was purchased for the College by the Division of Air Resources, New York State Department of Health. It consists of the complete San Francisco Bay Area Microfilm Library, one of the world's most extensive reference sources on the subject of air pollution. The collection, completely indexed, includes more than 13,000 accession cards, 10,000 author cards and 3,000 subject cards. In addition, the Technology Library has acquired by donation a collection of air pollution control material and publications from Sylvan L. Hanauer, P.E., a member of the Technical Advisory Committee of the State Action for Clean Air Committee and of the State Committee, who is a former Deputy Commissioner of the New York City Department of Air Pollution Control....

Quoted from
NEW YORK STATE ACTION
FOR CLEAN AIR COMMITTEE
105 East 22nd Street
New York, New York 10010

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Gleazer, Edmund J., Jr. This is the Community Junior College, New York: Houghton Mifflin Company, 1968

Harris, Norman C., Technical Education in the Junior College: New Programs for New Jobs, Washington: American Association of Junior Colleges, 1964

Medsker, Leland L., The Junior College: Progress and Prospect, New York, McGraw Hill Book Company, 1960

National Academy of Sciences, National Research Council, Educational Needs in Environmental Health, Washington, D. C., 1962

Report of the Task Force on Environmental Health, Changing Environmental Hazards, Public Affairs Press, Washington, D. C. 1967

University of Michigan, School of Public Health, Continuing Education Series No. 128, Environmental Health Planning, Ann Arbor, Michigan, 1965

U. S. Government Printing Office, Public Health Service Publication No. 828, Environmental Health Guide, 1962

Venn, Grant, Man, Education and Work, Washington: American Council on Education, 1964

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Jacksonville, Florida 32202

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BROOME TECHNICAL COMMUNITY COLLEGE
Binghamton, New York

A BIBLIOGRAPHY FOR THE LAYMAN OF SELECTED BOOKS AND PUBLICATIONS DEALING WITH ENVIRONMENTAL POLLUTION

The following is a bibliography of books and government pamphlets dealing with water pollution, air pollution, solid wastes pollution, pesticide pollution, and radiation pollution. It includes no highly technical publications, but consists of materials which will be useful to the layman in becoming acquainted with these environmental issues.

A list of government agencies from which publications may be obtained is also included.

Because the rapidly expanding population of the United States and the world is a major contributing factor to our current environmental problems, a listing of books dealing with population problems has also been included in this bibliography.

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Binghamton, New York 13902
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GENERAL ENVIRONMENTAL POLLUTION

1. RESTORING THE QUALITY OF OUR ENVIRONMENT, President's Science Advisory Committee, 1965, Superintendent of Documents, Washington, D. C.

2. CONTROLLING POLLUTION - THE ECONOMICS OF A CLEANER AMERICA, edited by Marshall I. Goldman, 1967, Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

3. STRATEGY FOR A LIVABLE ENVIRONMENT, Task Force on Environmental Health and Related Problems, 1967, Superintendent of Documents, Washington, D. C.

4. THE DYNAMIC SPECTRUM: MAN, HEALTH AND ENVIRONMENT, 1966, National Sanitation Foundation, Ann Arbor, Michigan.

5. WASTE MANAGEMENT AND CONTROL, Publication 1400, National Academy of Sciences, National Research Council, Washington, D. C.

6. QUALITY OF THE ENVIRONMENT - AN ECONOMIC APPROACH TO SOME PROBLEMS IN USING LAND, WATER AND AIR, Orris Herfindahl and Allen Kreese, John Hopkins Press, Baltimore, Maryland 21218.

7. NOT SO RICH AS YOU THINK, George R. Stewart, 1968, Houghton Mifflin Company, Boston, Massachusetts.

8. THE DIRTY ANIMAL, Henry Still, 1967, Hawthorne Books, Inc., 70 Fifth Avenue, New York, New York 10011.

9. THE QUIET CRISIS, Stewart L. Udall, 1963, Holt, Rinehold and Winston, New York, New York.

10. AN ENVIRONMENT FIT FOR PEOPLE, Raymond Dasmann, Public Affairs Pamphlet No. 421, Public Affairs Pamphlets, 381 Park Avenue South, New York, New York 10016.

11. CRISIS IN OUR CITIES, Lewis Herber, 1965, Prentice-Hall, Inc.

12. MOMENT IN THE SUN, A Report on the Deteriorating Quality of the American Environment, Robert Rienow and Leona Train Rienow, 1967, Ballatine Books.

13. SCIENCE AND SURVIVAL, Dr. Barry Commoner, 1966, Viking Press.

14. OUR POLLUTED WORLD, John Perry, 1967, Franklin Watts, Inc. (Grolier Enterprises), Lexington Avenue, New York, New York.

15. FOR THE BENEFIT OF MAN, Bureau of Mines, Washington, D. C., 1965.

16. ENVIRONMENTAL QUALITY, The Recommendations of the President's Council on Recreation and Natural Beauty, 1968, New York State Natural Beauty Commission, 155 Washington Avenue, Albany, New York.

17. ENVIRONMENTAL PROBLEMS AND ACTION PROGRAMS IN THE STATE OF NEW YORK, 1967, New York State Natural Beauty Commission, Albany, New York.

18. THE STATE'S ROLE IN ENVIRONMENTAL QUALITY, 1969, New York State Office for Local Government, Albany, New York.

19. CLEANING OUR ENVIRONMENT: THE CHEMICAL BASIS FOR ACTION, 1969, American Chemical Society, 1155 16th Street, N.W., Washington, D. C.

AIR POLLUTION

1. AIR POLLUTION PRIMER, 1969, National Tuberculosis and Respiratory Disease Association.

2. AIR CONSERVATION, 1965, American Association for the Advancement of Science, Washington, D. C.

3. THE UNCLEAN SKY, 1966, Louis J. Battan, Anchor Books, Doubleday and Company, Garden City, New York.

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5. AIR POLLUTION, 1960, Power Magazine, McGraw-Hill Publishing Co., New York, N. Y.

6. GUIDE TO THE APPRAISAL AND CONTROL OF AIR POLLUTION, 1969, American Public Health Association, 1740 Broadway, New York, New York 10019.

7. CLEARING THE AIR, United States Department of the Interior, Bureau of Mines, Pittsburgh, Penna.

8. THE FEDERAL AIR POLLUTION PROGRAM, Public Health Service Publication No. 1560, National Center for Air Pollution Control. Public Health Service, Washington, D. C.

9. TROUBLE AIR, Public Health Service Publication No. 977, National Center for Air Pollution Control.

10. AIR POLLUTION - A NATIONAL PROBLEM, Public Health Service Publication No. 975, National Center for Air Pollution Control.

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12. TODAY AND TOMORROW IN AIR POLLUTION, Public Health Service Publication No. 1555, National Center for Air Pollution Control.

13. THE EFFECTS OF AIR POLLUTION, Public Health Service Publication No. 1556, National Center for Air Pollution Control.

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16. NO LAUGHING MATTER -- THE CARTOONIST FOCUSES ON AIR POLLUTION, Public Health Service Publication No. 1561, National Center for Air Pollution Control.

17. A PRIMER ON AIR POLLUTION, Mobile Oil Corporation, 150 East 42nd Street, New York, New York 10017.

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22. AIR POLLUTION AND COMMUNITY HEALTH, Clarence Mills, 1954, the Christopher Publishing House, Boston.

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5. A NEW ERA FOR AMERICA'S WATERS, Federal Water Pollution Control Administration, Superintendent of Documents, Washington, D. C.

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RADIATION POLLUTION

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4. ATOMIC RADIATION, 1957, Radio Corporation of America, Camden, New Jersey.

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8. NUCLEAR REACTORS, United States Atomic Energy Commission, Oak Ridge, Tennessee.

9. ATOMIC POWER SAFETY, United States Atomic Energy Commission, Oak Ridge, Tenn.

10. NUCLEAR POWER PLANTS, United States Atomic Energy Commission, Oak Ridge, Tenn

11. RADIOISOTOPES IN MEDICINE, United States Atomic Energy Commission, Oak Ridge, Tennessee.

12. RADIOISOTOPES IN INDUSTRY, United States Atomic Energy Commission, Oak Ridge, Tennessee.

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19. PERILS OF THE PEACEFUL ATOM, Richard Curtis and Elizabeth Hogan, 1969, Doubleday and Company.

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2. POPULATION, EVOLUTION, AND BIRTH CONTROL - A COLLAGE OF CONTROVERSIAL IDEAS, 2nd Edition, edited by Garrett Hardin, 1969, W. H. Freeman and Co., San Francisco.

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4. POPULATION GROWTH - THREAT TO PEACE, edited by William Moran, Jr., 1965, P. J. Kenedy and Sons.

5. THE POPULATION DILEMMA, edited by Philip Hauser, 1963, Prentice-Hall, Inc.

6. POPULATION IN PROSPECTIVE, edited by Louise Young, 1968, Oxford University Press.

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8. OUR CROWDED PLANET, edited by Fairfield Osborn, 1962, Doubleday and Company.

9. POPULATION AND PEOPLE, Edward Stockwell, 1968, Quadrangel Books.

10. POPULATION AND WORLD POLITICS, Philip Hauser, 1958, Free Press.

11. FAMILY PLANNING IN AN EXPLODING POPULATION, Father John O'Brien, 1968, Hawthorne Books, Inc.

12. FAMILY PLANNING AND POPULATION PROGRAMS - A Review of World Developments, Proceedings of the International Conference on Family Planning Programs, 1968, University of Chicago Press.

13. A NEW LOOK AT OUR CROWDED WORLD, Maxwell Stewart, Public Affairs Pamphlet No. 395.

Government Agencies which publish literature dealing with environmental pollution:

1. Federal government

   a. Federal Water Pollution Control Administration
      Department of Interior
      4676 Columbia Parkway
      Cincinnati, Ohio 45226

   b. National Air Pollution Control Administration
      United States Public Health Service
      Department of Health, Education and Welfare
      801 North Randolph Street
      Arlington, Virginia

   c. Environmental Control Administration
      United States Public Health Service
      Department of Health, Education and Welfare
      P. O. Box 30200
      Cincinnati, Ohio 45230

   d. United States Atomic Energy Commission
      Division of Technical Information
      Washington, D. C. 20545

   e. Bureau of Mines
      Department of the Interior
      4800 Forbes Avenue
      Pittsburgh, Pennsylvania 15213

2. New York State government

   a. Division of Air Resources
      New York State Department of Health
      84 Holland Avenue
      Albany, New York

   b. Division of Pure Waters
      New York State Department of Health
      84 Holland Avenue
      Albany, New York

   c. Division of General Engineering and Radiological Health
      New York State Department of Health
      84 Holland Avenue
      Albany, New York

   d. New York State Conservation Department
      State Office Campus
      Albany, New York

   e. New York State Department of Agriculture and Markets
      State Office Campus
      Albany, New York

BROOME TECHNICAL COMMUNITY COLLEGE
Binghamton, New York

A BIBLIOGRAPHY FOR THE LAYMAN OF SELECTED BOOKS AND PUBLICATIONS DEALING WITH ENVIRONMENTAL POLLUTION

Supplement No. 1

The following books and government publications are in addition to those listed in the original bibliography and include materials published since that bibliography was prepared.

Several fine filmstrips dealing with various aspects of pollution have recently become available. The titles, sources, and prices of these are also listed in this supplement.

Several national magazines are now devoting space to articles about pollution, and several magazines devoted entirely to environmental issues are now being published. A list of these magazines is also included in this supplement.

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AIR POLLUTION

1. AIR POLLUTION: WHERE ARE WE GOING?, Dr. John T. Middletown, National Air Pollution Control Administration, Department of Health, Education and Welfare, Washington, D. C.

2. CLEAN AIR ACT AS AMENDED (HIGHLIGHTS), National Air Pollution Control Administration, Washington, D. C.

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2. SOLID WASTES AND AIR POLLUTION, Richard D. Vaughan, Consumer Protection and Environmental Health Service, Department of Health, Education and Welfare, Washington, D. C.

PESTICIDE POLLUTION

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RADIATION POLLUTION

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3. NUCLEAR REACTORS, 1964, U. S. Atomic Energy Commission, P. O. Box 62, Oak Ridge, Tennessee.

4. ATOMIC POWER SAFETY, 1967, U. S. Atomic Energy Commission, P. O. Box 62, Oak Ridge, Tennessee.

POPULATION

1. PEOPLE - AN INTRODUCTION TO THE STUDY OF POPULATION, Robert Cook and Jane Lecht, Columbia Books, 424 Southern Building N. W., Washington, D. C.

GENERAL ENVIRONMENTAL POLLUTION

1. OUR PRECARIOUS HABITAT, Dr. Melvin Benarde, 1970, W. W. Norton and Company, 55 Fifth Avenue, New York, N. Y.

2. THE ENVIRONMENTAL HANDBOOK, edited by Garrett DeBell, 1970, Ballantine Books, 101 Fifth Avenue, New York, N. Y.

3. CRISIS IN EDEN - A religious Study of Man and Environment, Frederick Elden, 1970, Abingdon Press, Nashville, Tennessee.

4. THE ENVIRONMENTAL CRISIS - Man's Struggle to Live with Himself, edited by Harold Helfrich, Jr., 1970, Yale University Press, New Haven, Connecticut.

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6. ECOTACTICS, The Sierra Club Handbook for Environmental Activists, edited by John G. Mitchell and Constance L. Stalling, 1970, Ballantine Books, 101 Fifth Avenue, New York, N. Y.

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2. CRISIS OF THE ENVIRONMENT, New York Times, Book and Educational Division, 229 West 43rd Street, New York, New York, $97.50.

3. WATER FOR TOMORROW, AIR FOR TOMORROW, LAND FOR TOMORROW, KDI Instructional Systems, Inc., 1810 Mackenzie Drive, Columbus, Ohio 43220, $35.00 each.

MAGAZINES

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2. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, published monthly, American Chemical Society, 1155 Sixteenth Street, N. W., Washington, D. C.

3. AUDUBON, published bimonthly, National Audubon Society, 1130 Fifth Avenue, New York, New York.

4. NATIONAL WILDLIFE, published bimonthly, National Wildlife Federation, 1412 Sixteenth Street, N. W., Washington, D. C.

5. THE CONSERVATIONIST, published bimonthly, New York State Conservation Department, Albany.

6. CATALYST FOR ENVIRONMENTAL QUALITY, published quarterly, Catalyst for Environmental Quality, P. O. Box 4155, New York, N. Y.

7. ECO-ACTION BULLETIN, Environmental Action News, 33 E Minor Street, Emmaus, Penna.

8. ALL CLEAR, published bimonthly, All Clear Publishing, Inc., 299 Forest Avenue, Paramus, New Jersey.

9. C. F. NEWSLETTER, The Conservation Foundation, 1250 Connecticut Avenue, N. W., Washington, D. C.

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BROOME TECHNICAL COMMUNITY COLLEGE
Binghamton, New York

EQUIPMENT AND SUPPLIES USED IN ENVIRONMENTAL HEALTH COURSES

A. EH 103 - Milk Sanitation
   1. Babcock test equipment
      a. Centrifuge
   2. Phosphatase test supplies
      a. Color standards
   3. Milk Sediment Testers
      a. Off-the-bottom sample type
      b. Stirred sample type
   4. Abnormal milk test kits
      a. Modified Whiteside Test
      b. California Mastitis test
      c. Strip cups
   5. Ultraviolet lamps
   6. High-temperature short-time pasteurizer control panel and flow diversion
   7. High-temperature short-time pasteurizer test apparatus for holding time.
   8. Milk sampling supplies
      a. Thieves
      b. Dippers
      c. Stirrers
      d. Sample containers
   9. Thermometers
   10. Lactometers

B. EH 203 - Food Sanitation
   1. Flour slicks
   2. Grain triers
   3. Sieves
   4. Food adulteration test kits
   5. Detergent and sanitizer test kits

C. EH 204 - Water Supply
   1. pH meter
   2. Turbidimeter
   3. Spectrophotometer
   4. Nessler tubes and racks
   5. Disc Comparators
      a. Ph discs
      b. Chlorine discs
      c. Fluorides disc
      d. Iron disc
      e. Color disc
   6. Slide comparators
      a. pH standards
      b. Chlorine standards
   7. Sedgewick-Rafter apparatus
      a. Microscopes

D. EH 205 - Water Pollution control
   1. Muffle furnace
   2. Drying oven
   3. Dessicators
   4. pH meter
   5. BOD incubator
   6. Dissolved oxygen analyzer
   7. Hand levels and leveling rods
      a. Abney levels
      b. Hand sight level
      c. Measuring tape
   8. Soil appraisal supplies
      a. Shovels and post hole diggers
      b. Soil augers
      c. Pails
      d. Measuring tape
      e. Stop watch
   9. Imhoff cones and racks

E. EH 202 - Community Sanitation
   1. Light meters
   2. Electrical testers
   3. Carbon monoxide tester

F. EH 201 - Atmospheric Pollution Control
   1. Durham pollen sampler
   2. Gelman particulate slide set
   3. Weather instruments
      a. Rain guage
      b. Wind speed and direction indicator
      c. Barograph
      d. Thermograph
      e. Psychrometer
      f. Thermometers
   4. Microringlemann charts
   5. Smokescope
   6. Carbon monoxide testers
   7. High-volume air samplers
   8. Dustfall jars
   9. Lead peroxide candles
   10. Materials effects components
   11. Gas sampler
   12. Vacuum pump

G. EH 206 - Radiological Health
   1. Ionization chamber survey meters
   2. Pocket dosimeters and chargers
   3. Phantoms
   4. Glo-bars and glo-cards
   5. X-ray equipment
      a. Medical radiographic unit
      b. Dental radiographic unit
   6. Film processing equipment
      a. Manual processing
      b. Automatic processing

H. BI 106 - Limnology
1. Boat with motor, oars, trailer and crane
2. Kemmerer samplers
3. Ekman dredges
4. Peterson dredge
5. D.O.Samplers
6. Secchi discs
7. Sounding lines
8. Electronic thermometer
9. Wash buckets
10. Stream bottom samplers
11. Plankton net and bucket
12. Battery operated pH meters
13. Reversing thermometers
14. Water analysis field kit

I. Miscellaneous glassware and hardware
1. Waterbath
2. Hotplates
3. Bunsen burners
4. goggles
5. Burettes
6. Burette stands
7. clamps
8. Clamps
9. Flasks
10. Vacuum flasks
11. Graduated cylindars
12. Beakers

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BROOME TECHNICAL COMMUNITY COLLEGE
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TEXTBOOKS AND MAJOR REFERENCE BOOKS USED IN ENVIRONMENTAL HEALTH COURSES

A. EH 101 - Environmental Health I
   1. Public Health - Its Promise for the Future by Smillie
   2. A History of Public Health by Rosen
   3. Charles V. Chapin and the Public Health Movement by Cassedy

B. EH 102 - Environmental Health II
   1. Communicable Disease Control by Anderson, Arnstein, and Lester
   2. Preventive Medicine by Hilleboe & Larimore
   3. Eleven Blue Men by Roueche

C. EH 103 - Milk Sanitation
   1. Grade A Pasteurized Milk Ordinance by the Public Health Service
   2. Municipal and Rural Sanitation by Ehlers and Steel

D. EH 201 - Atmospheric Pollution Control
   1. Air Pollution Control by Faith
   2. Air Pollution by Stern
   3. The Unclean Sky by Battan
   4. Air Pollution by the World Health Organization
   5. Municipal & Rural Sanitation by Ehlers and Steel
   6. Air Conservation by the American Association for the Advancement of Science

E. EH 202 - Community Sanitation
   1. Municipal and Rural Sanitation by Ehlers and Steel
   2. Municipal Refuse Disposal by the American Public Works Association
   3. Mechanical and Electrical Equipment for Buildings by McGuinness, et al.
   4. Basic Principles of Healthful Housing by the American Public Health Association

F. EH 203 - Food Sanitation
   1. Quantity Food Sanitation by Longree
   2. Food Plant Sanitation by Litchfield and Parker
   3. The Technology of Food Preservation by Desrosier
   4. Hygiene in Food Manufacturing & Handling by Graham-Rack & Binsted
   5. Food Service Sanitation Manual by the Public Health Service
   6. Municipal & Rural Sanitation by Ehlers and Steel

G. EH 204 - Water Supply
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   3. Chemistry for Sanitary Engineers by Sawyer and McCarty
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H. Water Pollution Control
   1. Municipal and Rural Sanitation by Ehlers and Steel
   2. Manual of Septic Tank Practice by the Public Health Service
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   2. Radiation and Life by Davis
   3. Fundamentals of X-rayand Radium Physics by Selman

J. EH 207 - Environmental Health Administration
   1. Principles of Public Health Administration by Hanlon
   2. Mustard's Introduction to Public Health by Goerke & Stebbins
   3. Public Health Law Manual by Grad

K. BI 254 - Sanitary Microbiology
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L. BI 106 - Limnology
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M. BI 205 - Parasitology
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Morton D. Schweitzer, Ph.D., Editor

JUNE 1969
VOLUME 1, NUMBER 6

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681

S-28

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WATER SUPPLY

Gastroenteritis following ingestion of sewage-polluted water: an outbreak at a logging camp on the Olympic Peninsula. Werner SB, et al. Amer J Epidem 89:277-85, Mar 69
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(On the chemical composition of urinary calculi of children of preschool age and of the drinking water in the Armenian SSR) Melkumiants IT. Zh Eksp Klin Med 7:59-64, 1967 (Rus)

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AIR AND WATER POLLUTION - VOLUME I

Defense Documentation Center
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October 1968

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Volume I of II Volumes

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U N C L A S S I F I E D - U N L I M I T E D

P R E F A C E

This Unclassified and Unlimited bibliography was assembled to satisfy the needs of the general public. The 294 references are arranged under eleven separate headings and cover the period from 1953 to the present.

The indexes to this volume include some of the references that also appear in the companion volume, Air and Water Pollution (Secret). Only unclassified citations appear in this volume and users are reminded to request only those reports listed in the AD-Numeric Index. Although the limited citations appear in the indexes, they are not available to all requesters.

BY ORDER OF THE DIRECTOR, DEFENSE SUPPLY AGENCY

OFFICIAL

ROBERT B. STEGMAIER, JR.
Administrator
Defense Documentation Center

A B S T R A C T

This bibliography covers the subjects of pollution of air and water, from both natural and man-made sources. The 294 references include the causes of pollution, their detection control and elimination for both air and water environments. Atmospheric pollution is treated as it occurs not only in the ambient air but also in confined environments such as in submarines and space vehicles. References date from 1953 and are unclassified.

TABLE OF CONTENTS

	Page
PREFACE	iii
ABSTRACT	v
AD BIBLIOGRAPHIC REFERENCES	
I. Air Purification	1
II. Biological Pollution other than BW Agents	39
III. BW and CW Agent Pollution	49
IV. Chemical Pollution (Exclusive of Warfare Agents)	57
V. Confined Environment Contamination	117
VI. Detection and Measurement	177
VII. Natural Air Pollution	205
VIII. Radiological Pollution including Radioactive Fallout	225
IX. Rocket Exhaust and Propellant	289
X. Water Pollution	311
XI. Water Purification	343
INDEXES	
Corporate Author/Monitoring Agency	O-1
Subject	D-1
Personal Author	P-1
Contract	C-1
Report Number	R-1
AD-Numeric	A-1

National Sanitation Foundation
Box 1468
Ann Arbor, Michigan 48106

Programs of Training and Education in Environmental Technology
(POTEET)

John Reddington
Director of Education
313/663-8581

INFORMATION PACK

POST-SECONDARY CURRICULUMS IN ENVIRONMENTAL TECHNOLOGY

POST-SECONDARY CURRICULUMS IN ENVIRONMENTAL TECHNOLOGY

CALIFORNIA

Contra Costa College
Attn: John Wixon
San Pablo, California 94806
Sanitation and Water Technology

San Diego Junior Colleges
Office of Vocational Education
Attn: Hal Rand
San Diego, California 92101
Water & Wastewater Technology
(night courses)

COLORADO

Community College of Denver
Attn: Miss Jo Elen Zgut
Denver, Colorado 80216
Environmental Control Technology

FLORIDA

Miami-Dade Junior College
Attn: A.H. Davidson
Miami, Florida 33167
Environmental Engineering Technology
(planned)

Santa Fe Junior College
Attn: John Turner
Gainesville, Florida 32601
Air Pollution Technology

St. Johns River Junior College
Attn: William Buck, Jr.
Palatka, Florida 32077
Civil Engineering Technology

St. Petersburg Junior College
Attn: Marvin Moore
Pinellas Park, Florida 33565
Environmental Technology
(planned)

GEORGIA

Atlanta Area Vocational-Technical School
Attn: R.A. Ferguson
Atlanta, Georgia 30310
Sanitary Engineering Technology

ILLINOIS

Chicago City College Southeast
Attn: Walter Komiak
Chicago, Illinois 60617
Environmental Control Technology

Waubonsee Community College
Attn: Lee Thompson
Sugar Grove, Illinois 60554
Water & Wastewater Technology

INDIANA

Purdue University
School of Technology
Attn: Harvey Wilke
W. Lafayette, Indiana 47907
Pollution Control Technology
(planned)

IOWA

Kirkwood Community College
Attn: Harold Kort
Cedar Rapids, Iowa 52406
Environmental Health Assistant
(one-year certificate program)

MAINE

Southern Maine Vocational Technical Institute
Attn: A.A. Baker
South Portland, Maine 04106
Wastewater Technology

5 May 1970

MARYLAND

Charles County Community College
Attn: Carl Schwing
La Plata, Maryland 20646
Pollution Abatement Technology

MASSACHUSETTS

Holyoke Community College
Attn: Edith Reinisch
Holyoke, Massachusetts 01041
Environmental Technology
(planned)

New England Institute
Attn: Joseph Goldfarb, M.D.
Boston, Massachusetts 02215
Environmental Technology
(planned)

North Shore Community College
Attn: Tracy Flagg
Beverly, Massachusetts 01915

MICHIGAN

Bay de Noc Community College
Attn: Ken Maki
Escanaba, Michigan 49829
Water & Wastewater Technology

Ferris State College
Attn: Jack Fleming
Big Rapids, Michigan 49307
Environmental Sanitarian Assistant

Henry Ford Community College
Attn: Miss Eleanor Tourtillott
Dearborn, Michigan 48128
Environmental Technology
(planned)

Lansing Community College
Attn: Ed Bergmann
Lansing, Michigan 48914
Sanitary Engineering Technology

Monroe County Community College
Attn: Jack MacDonald
Monroe, Michigan 48161
Environmental Control Technology

MISSOURI

Meramec Community College
Attn: David Campbell
St. Louis, Missouri 63122
Pollution Control Technology

NEW YORK

Broome Technical Community College
Attn: Dave Newton
Binghamton, New York 13902
Environmental Health Technology

Hudson Valley Community College
Attn: Fred Zipprich
Troy, New York 12180
Environmental Health Technology

SUNY, Agricultural & Technical College
Attn: Walter Flanders
Morrisville, New York 13403
Water & Wastewater Technology

NORTH CAROLINA

Fayetteville Technical Institute
Attn: Dean Painter
Fayetteville, North Carolina 28303
Environmental Engineering Technology

OHIO

Community and Technical College
University of Toledo
Attn: Gary Bennett
Toledo, Ohio 43606
Water & Wastewater Technology

Muskingum Area Technical Institute
Attn: Sheldon Sproull
Zanesville, Ohio 43701
Water Pollution Control Technology

OREGON

Clackamas Community College
Attn: Deryl Hampton
Oregon City, Oregon 97045
Water Sanitation Technology

5 May 1970

OREGON (continued)

Linn-Benton Community College
Attn: Charles Zickafoose
Albany, Oregon 97601
Water & Wastewater Technology

Oregon Technical Institute
Attn: Roy Fisk
Klamath Falls, Oregon 97601
Water & Wastewater Technology

SOUTH CAROLINA

Sumter Area Technical Education Center
Attn: Val Green
Sumter, South Carolina 29150
Environmental Health Engineering Technology

TEXAS

Texas State Technical Institute
James Connally Campus
Attn: Ken Bird
Waco, Texas 76703
Water & Wastewater Technology

VIRGINIA

Wytheville Community College
Attn: Randall Edwards
Wytheville, Virginia 24382
Environmental Technology

Source:

Programs of Training and Education
in Environmental Technology
(POTEET)
National Sanitation Foundation
Box 1468
Ann Arbor, Michigan 48106

John Reddington
Director of Education

5 May 1970

ENVIRONMENTAL HEALTH CURRICULA IN SIX TWO-YEAR COLLEGES

The semester hours of Hudson Valley, Milwaukee Tech, and Morrisville Ag & Tech are stated in terms of quarter hours to make comparison easy.

	Communication Arts, Humanities, the Social Sciences	PHYSICAL ED., ORIENTATION	PHYSICS	CHEMISTRY	BIOLOGY	MATH	ENGINEERING DRAWING	SURVEYING	CO-OP WORK EXPERIENCE	FOOD & MILK SANITATION	RADIOLOGICAL HEALTH	AIR POLLUTION	WATER & WASTE WATER SANITATION	HYDRAULICS	EPIDEMIOLOGY	INSTRUMENTS & CONTROLS	CODES, SPECS., ESTIMATES, CONTRACTS	ENVIRONMENTAL HEALTH, PUBLIC HEALTH, ETC.	TOTAL
Ag. & Tech College Morrisville, N. Y. Environmental Health Technician	18	3	Electricity 4½	18	Micro-biology 9	9	6					3	9	4½		4½	4½	4½	97½
Broome Technical Community College, Binghamton, N. Y. Environmental Health Technician	21		9	12	Zoology 4, Limnology 4, Micro-biology 9, Parasitology 4	6	1			7	3	5	8					11	104
Fayetteville Technical Institute, North Carolina Sanitary Engineering Technician	18		8	Electricity 4	Sanitary Chemistry Biology 12, 4, Micro-biology 4	15	6	6					19	4		4	3	4	111
Ferris State College, Big Rapids, Mich. Environmental Sanitarian Assistant	28	4		Physical Science 8	Human Physiology 5, 8, Micro-biology 8, Entomology & Parasitology 3	3 OR 4	2		8	6		3						19	105 OR 106
Hudson Valley Community College, Troy, N. Y. Environmental Health Technician	21			Physical Science 15	6, Bacteriology 6	12	3	4½		3		4½	10½			4½	6	6	102
Milwaukee Technical College Sanitation Technician	22½	1½	6	4½	4½, Bacteriology 4½	Biostatistics 4½, 6			6			12	3			3	4½	16½	99
WATER AND WASTE WATER TECHNICIAN												60							
ENVIRONMENTAL SANITATION TECHNICIAN														4½				34½	99

These figures are gross measures only. For serious comparative study, analyze particular course descriptions in the catalogs of the respective colleges.

NATIONAL SANITATION FOUNDATION
Program of Teacher Education for Environmental Technology (POTEET)
May, 1968

VT 013 354
TECHNICIAN DESCRIPTIONS (INFORMATION PACK).
PROGRAMS OF TRAINING AND EDUCATION IN
ENVIRONMENTAL TECHNOLOGY. (POTEET).

NATIONAL SANITATION FOUNDATION, ANN ARBOR,
MICH.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - MAY70 11P.

DESCRIPTORS - *ENVIRONMENTAL TECHNICIANS;
*HEALTH OCCUPATIONS; WORKING WOMEN; *JOB
ANALYSIS; ROLE PERCEPTION; *CAREER LADDERS;
JOB TRAINING; HEALTH OCCUPATIONS EDUCATION;
PUBLIC HEALTH; TECHNOLOGY; SANITATION
IDENTIFIERS - *ENVIRONMENTAL TECHNOLOGY;
PROJECT POTEET

ABSTRACT - THIS DOCUMENT DEFINES A HEALTH
TECHNICIAN AND GENERALLY DESCRIBES HIS DUTIES
AS INTERPRETED BY VARIOUS COMMUNITY COLLEGES
AND HEALTH DEPARTMENTS. SOME TERMS USED TO
DESCRIBE HIS JOB CLASSIFICATION ARE
ENVIRONMENTAL HEALTH TECHNICIAN,
ENVIRONMENTAL HEALTH ASSISTANT I, OR II,
ENVIRONMENTAL SANITARIAN ASSISTANT,
SANITATION TECHNICIAN, PUBLIC HEALTH
TECHNICIAN, SANITARY ENGINEERING TECHNICIAN
AND SANITATION AIDE. SOME QUALIFICATIONS FOR
TECHNICIANS AS ADOPTED FROM THE NEW YORK
STATE CODE ARE PRESENTED AS WELL AS A
POSSIBLE CAREER LADDER STRUCTURE. ALSO, A
FACT SHEET ON CHANGING PATTERNS OF WOMEN'S
LIVES IS INCLUDED. (GEB)

VT 013 354

C1

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Programs of Training and Education in Environmental Technology
(POTEET)

INFORMATION PACK

TECHNICIAN DESCRIPTIONS

VT013354

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John Reddington, Director
313/663-8581

DESCRIPTIONS OF THE TECHNICIAN

The technician referred to in the following descriptions has generally had about two years of college in a public-health-related field or at least a year's work experience in public health. He is variously called an Environmental Health Technician; Environmental Health Assistant I, or II; Environmental Sanitarian Assistant; Sanitation Technician; Public Health Technician; Sanitary Engineering Technician; Sanitation Aide, etc.

Most descriptions refer to duties like sampling, inspecting, the safe and effective operating of certain technical equipment used in promoting environmental health, surveying, the conducting of tests for bacteriological characteristics, and routine recording. Other descriptions speak of rather more extensive recording and reporting, the drafting of educational materials and regulations for carrying out inspection services, assisting with correspondence, the evaluating of health department programs to control potential disease vectors, being able to apply techniques of sterilization and disinfection, selling or servicing technical equipment, and, in rare cases, supervising certain sampling and measuring activities.

18 May 1970

This is what some say the technician is - - -

Fayetteville Technical Institute - North Carolina

The Sanitary Engineering Technician is "utilized for inspection and safe operation of milk production and processing, meat packing, food processing and service, together with housing and allied health problems, and the control of diseases." The technician conducts "tests on liquid and solid wastes, foods, and water to determine bacteriological characteristics, acidity, etc." He makes technical sales and services of equipment and chemicals.

Broome Technical Community College - Binghamton, New York

The Environmental Health Technician "would work directly with the department's sanitarian in the non-engineering aspects of environmental health programs and do survey, sampling and reporting work for the department's engineer."

Hudson Valley Community College - Troy, New York

The Environmental Health Technician "does bacteriological and chemical laboratory work and some field sampling and inspection to assist in the control and prevention of disease from sources such as water and food."

Washington State Health Department

The Sanitary Inspector investigates complaints, makes routine inspections, collects samples, makes routine entries, assists with measurements of air quality, and conducts rodent and vector control procedures.

The Sanitary Aide "performs assigned routine technical work in enforcing sanitary regulations in an assigned area. The Sanitary Aide class is a sub-professional level of work involving a variety of routine inspectional and educational activities involved in the maintenance of environmental health standards. Work is performed under the immediate supervision of a professional sanitarian." He "conducts correspondence, keeps records and makes detailed reports."

Tri-County Associated Health Departments - St. Joseph, Michigan

Environmental Health Assistant I and II. Technician II is of a higher level than Technician I. His duties involve: Inspections, environmental health surveys, assisting in vermin control programs, and conducting sampling programs and nuisance control programs, assisting in evaluation of health-related establishments for licensure when required by law. He encourages and gives advice on construction methods and operation of approved devices for promotion of environmental health in various types of establishments with facilities affecting the public health.

18 May 1970

Community College Health Careers Project (New York)

The Public Health Technician (Environmental Health Technician) assists "sanitary engineers, scientists, physicians and veterinarians in public health services to gather data on, inspect, and evaluate facilities and industries concerned with commodities and services consumed by the public." He assists "professional personnel in all aspects of surveillance over water supply, the food industry (i.e. processing, distribution, and service), sewage disposal facilities and plants, building construction and maintenance (including health aspects of housing), air pollution, and recreational establishments including swimming pools." The technician must have skill in "observing, reporting, and recording; using instruments and equipment relating to data gathering, detection, etc.; sterilization and disinfection techniques; selected chemical and bacterial analyses, preparing and preserving cultures taken from food, water, milk, air, etc.; and maintaining electronic equipment, and simple troubleshooting of same, if necessary."

State of Alabama Department of Public Health

The Sanitation Technician follows "standard but fairly complex procedures in carrying out a variety of field, laboratory and office assignments. Work may involve organizing and directing a few assistants in specific assignments, and duties may include responsibility for the care and servicing of valuable equipment. Routine assignments are received with general instructions while new assignments are closely reviewed by conferences with the Division engineer." The work involves: making inspections and proposing and drafting regulations for carrying out inspectional services, preparation of correspondence on technical inspectional problems for Division Engineer, assisting in the preparation of educational materials, supervision of installation of flow measuring devices and water level recording instruments, supervision of personnel performing stream flow measurements and completion of computations for calculation of flow, supervision of collection of water and waste samples, conducting of routine laboratory determinations relating to sanitary engineering and toxic industrial waste and routine chemical control tests. He serves as liaison between the Vector Control Division and local health departments, evaluates programs for control of potential disease vectors, surveys municipal conditions contributing to vector populations, and makes species identification of insects and rodents of public health importance when necessary.

Alameda County Health Department, California (not a 2-year college level job)

The Sanitation Aide will, "under the direction of the district sanitarian, perform specific activities to promote environmental health programs of the health department." With assistance, he will "help the resident or home-owner create a safe, sanitary and esthetically acceptable neighborhood by controlling environmental conditions." He will perform duties of inspection, preparation of poison bait, sampling, measuring, educating clients, assisting in installations of septic tank systems, and conducting tests (dye, air pollution, etc.).

(The county is initiating a training program aimed at developing health careers in the Alameda County Health Department for low-income adult males. The participants are not required to have a high school education.)

Dr. Charles Spangler, Bureau of Health Manpower

"The environmental technician performs non-professional technical work and supervision of environmental* aides under the general direction and guidance of environmental professionals. In this context, they should be able to carry out surveys, investigations, and evaluations of environmental conditions and determine compliance with or violation of public sanitation laws and regulations. They may operate water and waste water treatment facilities and supervise inspectional and control programs. The environmental technician should have considerable responsibility in regard to the details and procedures followed in carrying out his duties.

The environmental technician preferably should have graduated from a two-year environmental course given in a junior or community college with additional in-service orientation. He may also have attended short courses."

* ("The environmental aide works under the direction or supervision of environmental technicians or professionals. He should be able to make inspections; perform tests on and collect samples of water, food, milk, air; operate sampling equipment; answer complaints; operate simple water and waste water treatment facilities; carry out control activities; and provide technical support and assistance to personnel engaged in professional and scientific work in the field of environmental sanitation. The environmental aide should have a high school background with on-the-job training and may also have attended short courses dealing specifically with the area of his activities."

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State of Oklahoma Department of Health

The Public Health Assistant I, "under the immediate supervision of a local health officer or sanitarian, performs preliminary field investigations not requiring progessional knowledge or judgment in the fields of epidemiology, other public health programs, or nuisances of public health significance performs related duties as assigned." He "gathers data relative to the sources and extent of communicable diseases in the local area; acts as liaison officer between local health authorities, local law enforcement agencies, hospitals, clinics, the armed forces, and other institutions and solicits their cooperation in the proper reporting, quarantine and examination of cases of communicable disease; helps to maintain proper control measures to prevent the spread of known cases; and aids in publicizing programs for their prevention and control; investigates nuisances of minor public health significance; works in rodent and insect control programs; assists in collection of solid waste data; collects data involved in housing code programs; collects routine samples; prepares reports covering inspections and investigations made."

A local health department

The Sanitarian Technician is a senior non-professional staff member who is under the supervision of a Registered Sanitarian and performs a variety of inspectional, investigational, and educational duties in one or more of the following areas: food sanitation, sewage disposal, vector control, solid waste disposal, recreation, water and water supply systems, agriculture, housing, and civil defense and disaster. In addition to routine inspections, investigations, and surveys, some general duties might include: obtaining facts, evidence, and samples; dictating correspondence; preparing reports and recommendations; keeping records; and advising individuals and groups on conditions dangerous to the public health and on the means to overcome them.

QUALIFICATIONS FOR ENVIRONMENTAL HEALTH TECHNICIANS

(adapted from the New York State Sanitary Code, Part II, Section 11.105)

ENVIRONMENTAL HEALTH TECHNICIAN TRAINEE

a. The qualifications for environmental health technician trainees shall be:

(1) An associate degree in applied science; or

(2) Completion of two years of college including twelve semester credit hours in mathematics and natural science.

ENVIRONMENTAL HEALTH TECHNICIAN

b. The qualifications for environmental health technicians shall be:

(1) An associate degree in applied science or completion of two years of college including twelve semester credit hours in mathematics and natural science: plus, in both instances, one year of satisfactory experience as an environmental health technician trainee during which the applicant satisfactorily completed an in-service training program approved by the State Department of Health which includes satisfactory completion of a Public Health Council approved course in environmental health; or

(2) An associate degree in applied science in a course specifically approved by the Public Health Council.

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John Reddington,
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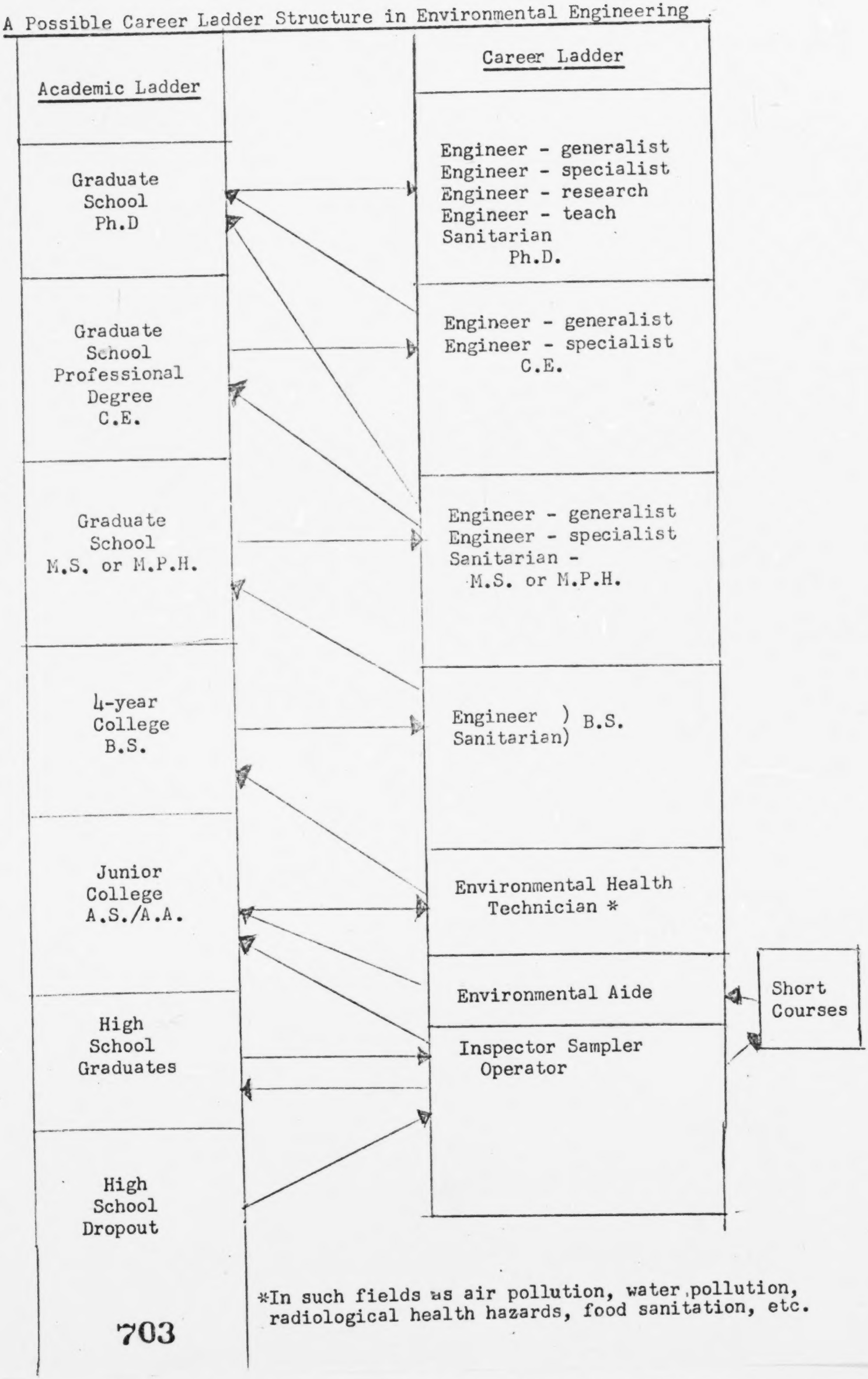
313/663-8581

18 May 1970

A Possible Career Ladder Structure in Environmental Engineering



*In such fields as air pollution, water pollution, radiological health hazards, food sanitation, etc.

PURDUE UNIVERSITY
School of Technology

Office of Manpower Studies

Manpower Information Tid-bit No. 6 10 December, 1968

A FACT SHEET ON CHANGING PATTERNS OF WOMEN'S LIVES*

Introduction: There is an important change occurring in the increasing involvement of women in our labor force at all occupational levels. We should not overlook the need to get word of applicable technology programs (besides Nursing and Dental Health) to girls throughout the state. Some possibilities include Chemical Technology, Computer Technology, Electronics Technology, Food Service Technology, Industrial Illustration, Mechanical Drafting Design Technology, Personnel Major and Pilot (Aviation Technology).

A revolution is occurring today in the life patterns of women and girls. The young girl today can anticipate a very different way of life from that of her grandmother and even her mother. The components of this vast change include:

In 1920 when many mothers of today's teenagers were born, life expectancy was 55 years; in 1965 it was 74 years!

In 1920 only 20 percent of 17-year-old girls graduated from high school; in 1967, 77 percent.

In 1920 only 2 percent of 21-year-old women graduated from college; in 1966, 16 percent.

In 1920 only 23 percent of all women aged 14 years and over were in labor force; in 1967, 40 percent.

In 1920 the average woman worker was single and 28 years of age. Today the average women worker is married and 40 years old.

About half of today's women marry by age 21 and have their last child at about age 30; by the time her youngest child is in school, a mother may have 30 or 35 more years of active life before her.

Today almost 29 million women are in the labor force; by 1980 there will probably be more than 36 million. More than 1 out of every 3 workers is a woman; almost 3 out of 5 working women are married and living with their husbands.

Laborsaving household equipment and prepared foods shorten the time requried for domestic chores.

The need for increased family income to help meet the higher costs of education, health, and the wider variety of goods and services desired, leads more and more women to seek paid employment.

Increasingly women are seeking the right to choose how they will make their contribution to their family and their community.

Girls in their early teens need considerable help to enable them to approach positively the various roles they may play during their lifetimes. Only as new realities are anticipated early and prepared for, will girls be able to realize their fullest potential.

The level of education attained by women has risen steadily since the turn of the century. Education above the elementary level is now available to all. The need for a high school diploma or education above the secondary level also has motivated many young women to stay in school. They seek to qualify not only for entry-level jobs but also for promotional opportunities in this era of technological change.

Increase in educational achievement

The broad upswing in the amount of schooling completed by women since the turn of the century has been striking. High school graduations increased from a ratio of 7 per 100 girls 17 years of age in the population in 1900 to 32 per 100 in 1930, and to 77 per 100 in 1966. College graduations (bachelor's and first professional degrees only) increased from a ratio of less than 1 per 100 women 21 years old in 1900 to 4 per 100 in 1930, and to 16 per 100 in 1966.**

The number of women graduating from high school and the number earning degrees at all three levels increased significantly between 1900 and 1965:

	1900	1930	1966
High school graduates	57,000	366,500	1,330,000
Recipients of Bachelor's or first professional degrees	5,000	48,900	224,500**
Master's degrees	300	6,000	47,600**
Doctor's degrees	23	350	2,100

Women earned 19 percent of all bachelor's or first professional degrees in 1900, 40 percent in 1930, and 40 percent in 1966.** Women received 19 percent of all master's degrees in 1900 and 34 percent in 1966,** after having reached a peak of 40 percent in 1930. Women earned 6 percent of all doctor's degrees in 1900 and 12 percent in 1966, after having achieved a high of 15 percent in 1920 and 1930.

Education and labor force participation

There is a direct relationship between the educational attainment of women and their labor force participation. The more education a woman has received, the greater the likelihood that she will be engaged in paid employment.

In March 1967, 67 percent of all women 18 years of age and over who had completed 5 years or more of college and 54 percent of all women with 4 years of college were in the labor force. In contrast, only 24 percent of all women with less than 8 years of education were employed or seeking work. The chances of being employed were even slimmer (19 percent) among women who had less than 5 years of formal education.

Unusually high rates of labor force participation were shown for both women 45 to 54 years of age with 5 yrs or more of college (81 percent) and women 20 to 24 years of age with 4 years of college training (81 percent).

* U.S. Department of Labor, Women's Bureau, Washington, D. C.
**Not strictly comparable with prior years. In 1966 M.L.S. and M.S.W. degrees, formerly counted as first professional degrees, were included with master's degrees.

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JOBS AND AGRICULTURAL DEVELOPMENT; A STUDY OF THE EFFECTS OF A NEW AGRICULTURAL TECHNOLOGY ON EMPLOYMENT IN POOR NATIONS.

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ABSTRACT - AS A RESULT OF TREMENDOUS PROGRESS IN AGRICULTURAL TECHNOLOGY, ASIA IS EXPERIENCING A "GREEN REVOLUTION" CENTERED AROUND NEW, HIGHLY PRODUCTIVE CEREAL VARIETIES. AT THE SAME TIME, THE HIGH RATE OF POPULATION GROWTH HAS MADE UNEMPLOYMENT A SEVERE PROBLEM IN THE DEVELOPING COUNTRIES. IF THE EMPLOYMENT EFFECTS OF THE NEW GRAINS ARE TO BE MAXIMIZED, IT IS ESSENTIAL TO WORK TO KEEP SUPPLY AND DEMAND RISING IN TANDEM AND AT A RAPID RATE. THIS CAN BE DONE BY: (1) INCREASING THE DEMAND FOR CEREALS, (2) DIVERSIFYING AGRICULTURAL RESOURCES INTO OTHER TYPES OF PRODUCTION TO MEET DEMANDS OF A GROWING URBAN POPULATION AND INCOME, AND (3) EXPORTING. A WELL-CONCEIVED RURAL DEVELOPMENT STRATEGY MUST BE ADOPTED, ENCOMPASSING THE STRATEGIC ELEMENTS OF: (1) DEVISING A NATIONAL MECHANIZATION STRATEGY, (2) INSTITUTING LAND REFORM, (3) EXTENDING THE GREEN REVOLUTION, (4) EXPANDING IRRIGATION SYSTEMS AND IMPROVING CREDIT SYSTEM, (5) INCREASING THE DEMAND FOR FOOD, AND (6) SLOWING THE RATE OF POPULATION GROWTH. THE ATTITUDE AND ASSISTANCE OF THE RICH NATIONS WILL GREATLY AFFECT THE SUCCESS OF POLICIES IN UNDERDEVELOPED NATIONS. (CD)

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jobs and agricultural development

Robert d'A. Shaw

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jobs and agricultural development

Robert d'A. Shaw

a study of the effects of a new agricultural technology on employment in poor nations

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The cities are filling up and urban unemployment steadily grows. Very probably there is an equal measure of worklessness in the countryside. The poorest quarter of the population in developing lands risks being left almost entirely behind in the vast transformation of the modern technological society. The "marginal" men, the wretched strugglers for survival on the fringes of farm and city, may already number more than half a billion. By 1980 they will surpass a billion, by 1990 two billion. Can we imagine any human order surviving with so gross a mass of misery piling up at its base?

Robert S. McNamara
President, World Bank Group
Copenhagen — September 21, 1970

table of contents

		Page
Chapter I	Employment in the Developing Countries	1
	I.1. The Global Employment Problem	1
	I.2. The Agricultural Sector and Employment	4
	I.3. The Impact of a New Agricultural Technology	6
	I.4. An Approach to Rural Employment	8
Chapter II	The New High-Yielding Varieties	11
Chapter III	Direct Employment Effects	15
	III.1. Wheat	15
	III.2. Rice	17
	III.3. Comparison with Rice Production in East Asia	19
	III.4. The Effect of Multiple Cropping	20
	III.5. Employment Effects on Various Social Groupings	22
	III.6. Non-Irrigated Regions	22
	III.7. Intra-Regional Differences	23
	III.8. Large Farmers	24
	III.9. Small Farmers	25
	III.10. Tenant Farmers	27
	III.11. Landless Laborers	28
Chapter IV	The Problem of Mechanization	31
	IV.1. The Mechanization Issue	31
	IV.2. The Effect on Yields	33
	IV.3. Mechanization and Intensity of Cultivation	35
	IV.4. Selective Mechanization	37
	IV.5. The Use of Tractors	37
	IV.6. The Attractions of Tractors	38
Chapter V	Technology and Rural Tensions	41
	V.1. The Politicization of Agricultural Groups	42
	V.2. The Polarization of Agriculture	44
Chapter VI	The Broader Employment Implications	47
	VI.1. The Growth of Demand for Cereals	47
	VI.2. Diversification	49
	VI.3. Trade	50
	VI.4. Indirect Employment Effects	52
Chapter VII	A Rural Employment Strategy	55
	VII.1. Introduction	55
	VII.2. A National Mechanization Strategy	57
	VII.3. Land Reform	60
	VII.4. Extending the Green Revolution	63
	VII.5. Credit and Irrigation	64
	VII.6. Increasing the Demand for Food	65
	VII.7. Slowing Population Growth	66
	VII.8. Implications for Developed Countries	68
	VII.9. Some Concluding Observations	70

preface

This monograph emanated from a series of provocative discussions I had with Lester Brown of the Overseas Development Council while he was writing *Seeds of Change*. James Grant, President of the ODC, has provided much support and encouragement for my work through his interest in the complex problems of employment in the developing world. Several other staff members of the ODC have also been very helpful, most notably Harald Malmgren, Robert Hunter, Joe Kimmins, and Sarah Jackson, all of whom made much-needed professional and editorial suggestions.

The first draft of this monograph was the subject of three seminars chaired by Orville Freeman at the ODC. The participants in these seminars helped to broaden my framework of analysis and to refine many of my ideas. Subsequently, the manuscript was read by David Hopper, President of the Canadian International Development Research Center, and by Manu Shroff, Counselor of the Indian Embassy in Washington; their comments were also of great use. I have profited from many conversations, most particularly with Ronald Ridker and Christina Hussey of the U.S. Agency for International Development, Price Gittinger of the World Bank, and Kusum Nair of the University of Michigan.

I am most grateful for the patience and dedication of the two secretaries, Marilyn Weinstein and Patricia Smith, who typed the several drafts of this manuscript. And Betty Baker provided me with useful editorial advice.

October 19, 1970
Washington, D. C.

Robert d'A. Shaw

CHAPTER I

employment in the developing countries

1

I.1. THE GLOBAL EMPLOYMENT PROBLEM

The world learned many lessons during the United Nations' First Development Decade. One of the most significant, although so far least appreciated, is that there is an impending employment crisis in the developing world in the wake of the more familiar population explosion. Quite simply, development planners and administrators do not yet know how to provide enough productive jobs for growing labor forces in many developing countries where there is already an enormous waste of human resources implied by open unemployment and by people occupying their time in jobs with very small output.[1]

Unemployment rates of 15 to 20 percent are common in the large cities: and they are usually considerably higher for young men in the 15-to-24 year age group.[2] In Latin America, one estimate shows that open unemployment rose from 5.6 percent of the labor force in 1950 to 11.1 percent in 1965. Even more striking, if all the people who cannot find more than part-time jobs as well as those who work at exceptionally low productive levels are added to the ranks of the openly unemployed, at least a quarter of the total amount of available work time in Latin America seems to be completely wasted.[3]

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[1] D. Turnham and I. Jaeger, *The Employment Problem in Less Developed Countries – A Review of the Evidence*, O.E.C.D. Development Center, Paris, June 1970. This is an excellent overview of the existing evidence on the extent of unemployment, together with a judicious discussion of the problems of concepts, measurement, and poor coverage by studies.

[2] *Ibid.*, Ch. III Table 2, pp. 58-60.

[3] Figures quoted in E. Thorbecke, *Unemployment and Underemployment in the Developing World*, paper presented to the Columbia University Conference on International Economic Development, Williamsburg, Va. February 15-21, 1970.

The problem will probably become even more difficult to cope with in the 'seventies. The acceleration in the rate of population growth that occurred in the developing world just after the Second World War is now being reflected in a flood of young entrants into the labor force. In India alone, one estimate has shown that the labor force may increase from 210 million in 1970 to 273 million by the end of the decade. In the first week of the 'seventies, roughly 100,000 more new workers needed jobs than older workers stepped aside to make room for them. In the final week of the decade, this weekly increase will rise to 140,000.[4] In ten years, therefore, India has to provide enough job opportunities for new workers who number as many as the total combined labor forces of Britain, France and West Germany.

Because such vast numbers of people are involved, employment policies are now beginning to be seen as a vital component of development strategies. But precisely why is employment such an important aspect of the development process itself? The reasons can be summarized as follows.

(a) Where social security systems are non-existent or deficient, as is the case in nearly all developing countries, productive employment is the central mechanism for alleviating poverty.

2 (b) At the same time, people who have worthwhile jobs have opportunities to learn work skills and attitudes that are an integral part of the modernization process.

(c) The location of good jobs and incomes determines to a great extent population movements in developing countries.

(d) The lack of employment, especially among young city dwellers, is a major element in an environment of frustration that periodically breaks out into violence.

(e) Finally, a considerable volume of unused labor forms a potentially productive resource for developing countries, if only it can be brought into use.

Taken together, these five reasons argue strongly for paying increased attention to the whole problem of unemployment and its relation to poverty in the developing world.

Concern over employment in the emerging nations is a rather recent phenomenon. It may seem strange that a subject of this magnitude has been so little discussed. The main reason for this is that, in the past, economists and government policy-makers have viewed the creation of jobs as a derivative of the rate of economic growth, and likely to be taken care of naturally as this growth progressed. The manufacturing and service sectors have been considered as the dynamic elements of the economy for employment. As these sectors have grown, they have demanded more workers, who have been supplied from the labor pools of the agricultural sector.

Agriculture has represented a kind of residual storage tank in which the bulk of the labor force could find some sort of subsistence until sufficient economic development has occurred to cause a structural transformation, drawing most of the workers into urban-based industrial and service sectors. The storage tank is vast.

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[4] G. Tobias, *Human Resources Utilization and Development in the Seventies*, The Ford Foundation, New Delhi, May 1970, pp. 3-4.

In developing countries, between 45 and 80 percent of the entire population derives its livelihood directly from the land: in South and Southeast Asia and in Africa, the proportion is consistently in the top half of this range.

But we are now discovering that policies based on this theory have not generally satisfied the need for more jobs and increased income in today's developing world, even though it satisfactorily explains nineteenth-century industrialization and growth. The basic circumstances of the developing countries today are very different from those of the developed countries when the latter embarked on modernization. The difference in population growth rates is the most significant. The rates now average 2.5 percent a year in South and Southeast Asia, as well as in Africa, and nearly three percent a year in Latin America. After the necessary time lag, the labor force will also grow at these rates: it is already growing at a rate of two percent a year throughout the developing world, which is at least double the rate typical of Europe during the Industrial Revolution.

In addition to the increase in the number of people to be employed, modern technology, with its emphasis on intensive use of capital, means fewer jobs per dollar of investment than was the case 20 or 30 years ago. And there are many pressures on developing countries to adopt the most modern technologies available. Among these pressures are the lack of supervisory skills, powerful trade unions demanding higher wages for the workers in the modern sector, the distorted structures of interest and foreign exchange rates in most developing countries, the desire for prestige combined with the need to avoid settling for "second-best", and skillful salesmanship of modern technologies.

The effects of these and other factors are shown in a model designed by Dr. S. K. Singh to estimate the rate of increase in gross domestic product (GDP) required from a country to absorb the *increase* in its labor force in non-agricultural jobs.[5] This growth would not decrease the *absolute* number of people working on the land, nor would it affect the existing backlog of unemployment and underemployment. The estimates are:

	Per Capita Income	Rate of Growth of Population	Required Rate of Growth of GDP
1. Typical Asian Country	$100	2.5%	10.2%
2. Typical Latin American Country	$300	3.1%	9.3%
3. Typical African Country	$100	2.7%	11.0%

In striking contrast to these estimates for developing countries, the United Kingdom reached the point at which the increase in its labor force could be absorbed in non-agricultural jobs with a GDP growth rate of just over two percent annually. The United States reached the same point with a growth rate of three percent a year.

[5]S. K. Singh, *Aggregate Employment Function: Evaluation of Employment Prospects in LDCs*. Mimeo for Basic Research Center, World Bank, December 1969.

Politicians, planners and administrators now realize that they can make no progress in raising the living standards for most of the world's people unless they can create the conditions in which improved incomes can be earned through productive work. They are also learning that income disparities between social classes, between geographical regions, and between town and country have often been widening despite high national growth rates. One of the most effective ways to overcome the phenomenon is to use specific employment policies to raise the productive capacities of the disadvantaged.

Within the past year, several of the most influential national and international organizations devoted to development have made the creation of more and better jobs one of their central tasks. The International Labor Organization has established a World Employment Program to encourage agencies with responsibilities in the fields of social and economic development to take employment objectives into account when formulating and implementing their own policies and programs. The World Bank has acknowledged the importance of the employment problem. The Development Center of the Organization for Economic Cooperation and Development is mounting a major research project on the subject. And several universities, including Yale and Cornell, are becoming involved in research. Lester Brown, of the Overseas Development Council, has called for a redefinition of the population problem: "The food-population problem of the 'sixties is becoming the employment-population problem of the 'seventies. Feeding the increased numbers of people will not be easy, but it is likely to prove much more manageable than providing jobs."[6]

I.2. THE AGRICULTURAL SECTOR AND EMPLOYMENT

It is a truism to state that the overall answers to these colossal demands for employment in developing countries must be sought in their economies at large. Economic growth rates must be accelerated and more attention paid to the sectoral nature of that economic growth.[7] But as we look more closely at the various sectors where jobs must be created, the most striking fact is the size of the agricultural sector. Indeed, whatever is done in the non-agricultural sectors, it is certain that the absolute numbers of people in the rural areas of the developing countries are going to grow over the medium term. So the need for jobs in the agricultural sector will also continue to rise.

Some statistics will illustrate this point: U.N. figures show that 97 percent of the projected world increases in rural and small town population from 1960 to 1980 will occur in the developing countries. This means an increase of 645 million people in two decades.[8] Of the 63 million new workers predicted to enter the labor force in the next decade in India, some 47 million are

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[6] L. R. Brown, *Seeds of Change*, Praeger, New York, 1970, p. 122.

[7] A comprehensive attempt to plot an employment strategy for Colombia is the subject of an International Labor Office report entitled *Towards Full Employment*, ILO Geneva, 1970.

[8] United Nations, International Social Development Review No. 1. *Urbanization: Development Policies and Planning*, New York, 1968, p. 19.

expected to need jobs in the rural areas. And in Latin America, if present trends continue,

> About one third of the net increase in the population will have to remain in agriculture during the coming decade or two. This means that the farm work force that has been increasing since 1950 at an average of about 500,000 per year can be expected to grow during the next fifteen years at an average of close to one million workers annually. This is occurring in spite of the fact that agricultural employment has fallen from 54 percent of the total work force in 1950 to an estimated 45 percent in 1968 and is expected to drop to about 40 percent by 1980.[9]

West Pakistan has a much higher percentage of its labor force in agriculture than Latin America, and is therefore more typical of the developing world. The country underwent a phenomenal expansion in non-agricultural investment and output between 1951 and 1961 which was associated with a growth rate of about 4.3 percent annually in non-farm employment: this rate appears to have been exceeded only by Taiwan in the post-World War II period. Assuming that the total labor force is growing at an average annual rate of three percent (which was approximately the rate of population growth during the 'sixties) and assuming that non-agricultural employment continues to grow at the rate of the 'fifties,[10] projections for the agricultural labor force in West Pakistan are as follows:[11]

1961	7.48 million
1975	10.12 million
1985	11.85 million
2000	13.65 million

The continued growth of the number of people dependent on agriculture for their livelihood is the result of three factors: the initial large size of the agricultural sector, the high overall rate of population growth, and the relatively small capacity of non-farm sectors to expand employment.[12] In this connection, it is perhaps worth remembering that even in the United States the farm population did not begin to decline until 1934. If policies in the developing countries are to be directed towards better employment

---

[9]S. Barraclough, "Employment Problems Affecting Latin American Agricultural Development", *Monthly Bulletin of Agricultural Economics and Statistics*, p. 1, Vol. 18, Nos. 7/8, July/August 1969.

[10]This may be optimistic since the marginal capital labor ratio rose from an estimated Rs 3,650 in the early 'fifties to about Rs 5,250 in the Second Plan period and is anticipated to rise further.

[11]H. Kaneda, *Economic Implications of the Green Revolution and the Strategy of Agricultural Development in West Pakistan*, Pakistan Institute of Development Economics Research Report No. 78, Karachi, January 1969, p. 7.

[12]Some interesting models based on hypothetical assumptions to illustrate the time periods before the agricultural population begins to decline are given in: B. F. Johnston, *Agricultural and Economic Development: The Relevance of the Japanese Experience*, Food Research Institute Studies Vol. VI No. 3, 1966, p. 267-270.

opportunities, the agricultural sector is far too important to be neglected.

There is another reason for stressing agricultural employment opportunities. At the same time that developing countries are realizing the size of the job problem, they are learning that the agricultural sector is less effective now in retaining those who cannot find jobs in the cities. Under the pressures of improved communications and new aspirations, rural peasants are migrating to the cities much faster than the number of industrial job opportunities increases.

The President of the World Bank noted in a recent speech:

> Unemployment . . . is not only endemic throughout the emerging world, but is growing worse, especially in urban areas. Though the urban population in the developing countries has been increasing at an average annual rate of over five percent, industrial employment has risen much more slowly. In Latin America, the situation is particularly serious. There the urban population has grown twice as fast as the number of jobs.[13]

The motives for this migration are a complex mixture of urban "pull", the attraction of higher wages, social, cultural and educational activities and the glamour of the towns; and rural "push", the desire to escape from a stagnation that offers only heavy unrewarding jobs in an atmosphere of little hope. Such problems as mushrooming slums, the dangers of massive urban unemployment, and the drain of talented and ambitious people from the countryside can only be resolved with programs that include a process of rural regeneration. Without this element, modern urban centers in the developing countries will be asphyxiated in their cradle. Rural regeneration, in turn, centers on providing more and better jobs in the countryside and, above all, on farms. A government that succeeds in providing more urban jobs but does nothing to improve rural living standards and employment opportunities is likely to discover that employment and unemployment in the town go hand in hand: every new job created in the city may attract two or more migrant families from the countryside.

Thus, population growth and sluggish agricultural sectors have driven millions of peasants to migrate to the cities. Many of them have found no jobs at all or only jobs with very low productivity. Yet rural populations continue to increase. The number of people living on the margin of existence is rising. They are not integrated into the mainstream of national life; they barely participate in the market economy; they have little hope for the future. These are the "marginal men" to whom Robert McNamara so graphically referred in his 1970 Copenhagen speech.

I.3. THE IMPACT OF A NEW AGRICULTURAL TECHNOLOGY

The employment opportunities that can be generated in agriculture are of crucial importance to future living standards in the poor countries. Technological advances are beginning to revolutionize the agricultural sector. Of these advances, one stands out

[13] R. McNamara, Address to the Board of Governors, World Bank Group, September 29, 1969, Washington, D.C., p. 13.

because of the widespread nature of its impact: it is the development of new high-yielding cereals that are particularly suitable for tropical and subtropical regions.

In October 1970, the Nobel Peace Prize was awarded to the American scientist, Dr. Norman Borlaug, for his pioneering work in the development of the new wheats in Mexico. The Nobel Committee noted that Borlaug "has made it possible for the developing countries to break away from hunger and poverty."

Cereals, and particularly wheat and rice, form the staple diets of nearly all the people in developing countries; in Asia they contribute perhaps 70 percent of the total calories consumed. And cereals are grown by hundreds of millions of peasant farmers. Therefore, the central purpose of this monograph is to examine the likely effects of this dramatic and far-reaching technological change on employment and to suggest, as far as is possible with today's knowledge, some possible courses of action for governments to use the new technologies to help cope with their employment problems.

Over the past few years, new dwarf wheat and rice varieties have spread to many parts of Asia. Their yields are at least double those of traditional varieties, and if used wisely, they can raise the income of farmers very considerably as well as promote growth elsewhere in the economy. Indeed, these varieties could stimulate the rural regeneration that is so essential to overall development. At the same time, the new cereal varieties require much more careful cultivation – better water control, more fertilizer, and more weeding – if they are to fulfill their promise. The combination of higher yields and improved cultivation means that more labor may be required for the new seeds, and that the returns to that labor can be higher.

The possibilities for creating more and better jobs that are inherent in the new varieties have excited many of those concerned with the employment problems in the developing countries. The Report of the Pearson Commission on International Development says:

> The main burden of absorbing the increase in the labor force falls inevitably on agriculture . . . Only a fraction of the new workers can find employment in non-agricultural sectors even if these expand very rapidly. A strategy for agricultural development which increases employment opportunities rapidly without depressing incomes must focus on labor-using and capital-saving ways of improving agricultural productivity. Much pessimism has been voiced about the possibility of significant change in this direction. An encouraging aspect of agricultural development in the last few years, however, is that the major increases in yields resulting from the new varieties and intensified irrigation are not dependent on large-scale substitution of capital for labor.[14]

As promising as this use of the new varieties may seem at first look, however, more jobs and a higher living standard for rural families do not follow directly from the technological requirements of the new seed varieties. A wide range of other factors

[14] Report of the Commission on International Development, *Partners in Development*, Praeger, New York, 1969, pp. 59-60.

intervene, including economic, institutional, political and managerial considerations. The ability of individuals and groups to produce material output lies at the heart of the nexus of relationships that make up a society. In particular, more jobs and the resulting increases in income will affect the social structure and the nature of the links between groups of people. Therefore, this paper will also concentrate on identifying some of the factors involved in translating the new agricultural technologies into jobs and income and to show how they are related in a given social situation. The material from which the conclusions are drawn comes from a variety of studies, both statistical and impressionistic, that have been made of these new cereal varieties, principally in South and Southeast Asia.

Unfortunately, very few of the studies focus specifically on the employment aspects of the new varieties, but they do enable the formation of preliminary hypotheses. Hopefully, this may encourage others to explore the complexities of employment in a rapidly changing agricultural context.

I.4. AN APPROACH TO RURAL EMPLOYMENT

In approaching this subject we must bear in mind that conceptual problems of formidable dimensions arise in defining the labor force and the levels of employment and unemployment in an underdeveloped economy. For example, a very high percentage of the men, women and children in a developing country do some productive work at some time in the course of a year, but very few of them earn wages for their work. Again, the great majority of people work for themselves and their families. Within the traditional sector, most people do sufficient work to attain a subsistence level – to satisfy their physiological needs and to meet certain other requirements defined by their culture. And in most areas, there is considerable variation in the amount of time people work on farms from month to month, as a result of the demands of the agricultural calendar. In such situations, the concepts of employment that are used in industrialized societies are inapplicable.

Despite the difficulties in determining the true extent of unemployment in the developing world, it is still possible to state categorically that there is an enormous problem of rural poverty there. And it is also clear that the poverty is largely the result of low average levels of productivity. The reasons for these low levels are a complex mixture of traditional methods, lack of incentives and opportunities, cultural values, and physical barriers such as malnutrition and disease. Despite the complexity of these barriers to development, there are many examples of peasants who have been willing to raise their productivity and output if they have the opportunity to do so and if they consider the rewards worthwhile, in terms of a better life for themselves and their families.

The dynamic element of demographic change is imposed on this state of rural poverty. We have seen that populations are increasing at an unprecedented rate in historical terms, and that the numbers of people who must derive their living from the land will continue to rise. This leads to the following, rather simple approach towards employment which is used in this monograph: if rural living stan-

dards are to rise, governments and planners must find ways to increase the productivity of those presently working on the land; they must also create additional employment opportunities for the growing rural labor forces. Thus, the number of employment opportunities in terms of units of time, and the return to those opportunities, are key variables. The relevant questions then become:

(a) Can the new agricultural technologies be used to provide more rural employment opportunities?

and

(b) How can developing countries design agrarian systems incorporating the new technologies to combine the goals of maximizing food output and productively employing the rural population?

There is also a third question that needs to be discussed, although it is given less attention here, because it essentially belongs in a more broadly focused study. It is:

(c) How can the developing countries best use the increases in cereal production to accelerate the growth in output and employment in the rest of the economy?

This study concentrates on Asia because that part of the world has had the most experience with the new cereal varieties. Nevertheless, it is hoped that countries in other parts of the world on the threshold of a similar breakthrough in cereal production may find useful lessons in these recent Asian experiences.

As we consider Asia, there are some important statistics about the size of the agricultural labor force, and about its density and productivity on the land, that must be introduced at the outset. The table below lists estimates for 1965 of the economically active populations and the number of people economically active in agriculture, forestry, hunting and fishing.[15]

Table 1

Persons in total labor force, and in agricultural labor force

1965

Country	Total (in 1000's)	Agriculture (in 1000's)	Percentage of Agr./Total
Ceylon	4,165	2,250	54%
Taiwan	3,755	2,017	54
India	207,665	145,365	70
Korea	6,295	4,406	70
Nepal	4,950	4,555	92
Pakistan	38,455	28,455	74
Philippines	10,101	5,725	57
Thailand	15,612	12,759	80

[15] Asian Productivity Organization (APO), *Report of the Expert Group Meeting on Agricultural Mechanization*, Tokyo, 1968, Vol. II, Table 10, p. 20.

We can see from this table that, in these eight Asian countries alone, there are over 200 million people directly working in agriculture, and that this represents more than 70 percent of the total labor force. A further set of statistics shows that in comparison with the East Asian countries of Japan, Korea, and Taiwan, most South and Southeast Asian countries still have relatively light pressure on their land, although there are considerable differences in land quality, climate, and other factors. The table[16] below shows the average density of the working population and the output per hectare for nine Asian countries:

Table 2

Country	Agricultural Working Population/100 hectares	Net Agricultural Production/hectare (in U.S. $)
Ceylon	120	352
India	90	133
Japan	216	1,350
Korea	196	477
Nepal	249	236
Pakistan	109	169
Philippines	71	186
Taiwan	195	696
Thailand	110	112

This table appears to show a positive relationship between density of people on the land and agricultural output. These figures are not conclusive, but they do suggest that more people could be absorbed productively in the rural areas of most South and Southeast Asian countries, given appropriate technologies and significant changes in the social and institutional structures. The patterns of population growth show that more people are going to *have* to be absorbed in jobs in the rural areas over the next generation. The question then is, "How can the new cereal varieties help to create the needed employment opportunities in the countryside?"

[16] *Ibid.*, Table 13b, p. 23, and Table 14, p. 24.

CHAPTER II

the new high-yielding varieties

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New high-yielding cereal varieties of wheat, rice, corn, and other coarse grains have spread to many areas of Asia since 1965 with a speed that justifies the name "Green Revolution". These new varieties are now being introduced in Latin American and African countries as well. Their rather amazing expansion in Asia is indicated in the table below.[1]

Crop Year	Acreage Under High-Yielding Varieties
1964-65	200 acres
1965-66	37,000 acres
1966-67	4,800,000 acres
1967-68	20,000,000 acres
1968-69	34,000,000 acres
1969-70 (estimate)	40,000,000 acres

This paper will concentrate on the new high-yielding dwarf wheat and rice varieties. These two food grains comprise the great bulk of acreage under high-yielding varieties. They are also the crops with which scientists have achieved the most significant breakthroughs, both in terms of new plant breeding techniques and in terms of higher yields. The first high-yielding dwarf wheat suitable for tropical and subtropical regions were developed in the 'forties at the Office of Special Studies in Mexico sponsored by the Rockefeller Foundation. In 1962, the International Rice Research Institute (IRRI) was established at Los Banos in the Philippines. There, scientists developed within three

[1] From data assembled from numerous U. S. Department of Agriculture (USDA) publications for inclusion in L. R. Brown, *op. cit.*, p. 21.

years the so-called "miracle rice", designated IR-8, using the techniques evolved in Mexico of crossing varieties of widely differing backgrounds. Other, similar high-yielding rice varieties followed IR-8 at Los Banos. Both the Mexican wheats and the IRRI rices are capable of giving yields two or even three times higher than those of traditional varieties. Research centers in a number of tropical and subtropical countries have adapted these basic high-yielding varieties to suit varying local conditions.

The main characteristics of the new varieties that make them such powerful catalysts for agricultural development can be summarized as follows:

1. They are highly responsive to the application of fertilizer. Both the new wheats and rices respond effectively to fertilizer up to dosages of 100 to 120 pounds per acre, whereas traditional varieties can only absorb about 40 pounds per acre. And the new varieties are more efficient in their use of the fertilizer, generally producing at least 50 percent more grain for each pound of fertilizer used.

2. The new varieties require just the right amount of water at the right time. In most of Asia this implies the need for a controlled water supply. Without irrigation, the high-yielding varieties (especially the rices) tend to do no better than traditional varieties, but they use adequately managed water supplies much more effectively. One exception to this is the adoption of Mexican wheats in Turkey, where the amount of rainfall and its winter pattern have resulted in relatively high yields without irrigation in the Mediterranean and Aegean regions.

3. The new varieties are less sensitive than traditional varieties to the length of the daylight hours. As a consequence they can be planted at any time of the year in the tropical and subtropical regions of the world, providing that there is enough water for them to mature. The significance of this characteristic is that where irrigation exists, the new varieties can produce two or even three crops, growing in both the wet and the dry seasons. In the case of rice, this possibility is augmented by the fact that the new varieties mature more quickly than traditional ones, which usually take from 150 to 180 days. IR-8, on the other hand, matures in 115 to 130 days, depending on where it is planted. And some of the new rices in India and Ceylon mature in 90 to 100 days.

4. Improved cultivation practices also enhance the yields of the new varieties. And, with higher yields attainable, these improved practices become much more worthwhile to the farmer. He is much more likely to prepare his seedbed properly, space his plants, apply fertilizer and pesticides correctly, and weed his crop, if it means greatly increased income through making full use of the genetic potential of the new seeds. Then, too, these modern farming methods protect the farmer's investment in the new seeds, in irrigation, and in fertilizers.

These four characteristics give the new varieties the potential for major increases in yields over traditional varieties. They also allow a greater intensification of farming. For both these reasons, more labor is required, all other things being equal. The new varieties also increase the effectiveness of that labor, enabling wages to rise. But increased yields can only be achieved with sub-

stantial investment in such necessary inputs as water control, fertilizer, and labor. This means that the costs of a crop failure with the new varieties are much higher than with traditional breeds.

The overall gain in food production in Asia averaged five percent in both 1968 and 1969. Considerably greater increases have occurred for particular crops in some areas, most notably for wheat in West Pakistan and Northern India. Improved farming methods and greater efficiency of the inputs associated with the new cereal varieties are largely responsible for these gains. Despite the remarkable spread of the high-yielding cereals, they still cover only a relatively small proportion of the total acreage in Asia (excluding China for which no data is available). Recent U. S. Department of Agriculture data show that about 20 percent of the wheat acreage and seven percent of the rice acreage in Asia are now planted to high-yielding varieties.[2]

Five years ago, famine threatened many parts of Asia. Governments placed the highest priority on growing more food to remove this threat and to reduce the drain on foreign exchange caused by grain imports. Resulting agricultural strategies relied heavily on use of the new cereal varieties. But discussions of how countries can sustain the recent performance have tended to neglect the relationships between land and capital, on the one hand, and employment of the available labor, on the other hand. The new varieties are potential seeds of the rural regeneration that is so essential to the development of the poor countries. They can raise output and incomes for many millions of peasant farmers. The real question is to what extent the new technologies will benefit the great mass of peasants. Or will the gains be gathered up by a relatively small number of commercial farmers?

[2]D. G. Dalrymple, *Imports and Plantings of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations*. Foreign Agriculture Service, USDA, November 1969.

CHAPTER III

direct employment effects

Having considered the characteristics of the new varieties, we can now explore their effects on farm employment. Very little research has been done on this subject. Given the heterogeneity of agriculture in Asia, it is extremely important that many more farm level studies be performed in order to find out what is happening in particular situations, and in order to make proper policy recommendations. It is nevertheless possible to suggest some important trends. In these trends, distinctions should be made between the major categories of farmers: those growing wheat and rice; those with and without irrigation; and the major agrarian groups in a community.

As we have seen, the higher yields and the greater intensity of farming made possible by the new varieties should have a considerable effect in raising the amount of labor required per acre for their cultivation. At the same time, however, the efficiency of the complementary inputs, and particularly of fertilizer and water, is improved by use of the new varieties. As a result, the required labor for each unit of output is likely to decline. Thus, while yields may double, the increase in labor requirements per acre is not likely to increase by as large a proportion. This divergence is extremely important in any discussion of the overall employment effects of the Green Revolution.

III.1. WHEAT

The most spectacular increases in yields and output have been achieved with the Mexican wheats in some areas of West Pakistan and India. Where these wheats have been used, the sparse data on resulting employment effects support the reasoning that more labor is needed for their cultivation per acre though less is needed per ton of grain.

A survey of a wheat-producing district of Delhi State in 1967-68 showed that use of the Mexican varieties involved a

doubling of the amount of hired labor.[1] The gross return on these farms per acre nearly tripled. Again, a report on the Indian Intensive Agricultural District Programme showed that Ludhiana District in the Punjab (which appears to have achieved the highest average yields of any district using the new wheats) had increased its number of agricultural jobs faster than the rate of growth of rural population, and that the real wage rate had increased by 16 percent from 1962-63 to 1967-68.[2] What has happened in this district is described as follows:

> Compared to a few years earlier, when a laborer remained idle for three or four months a year, he now found employment all year round. This was due mainly to more intensive cropping with the large increase in irrigation facilities; more labor intensive farm practices per crop; and diversification of the cropping pattern . . .[3]

Data from the Programme Evaluation Organization of the Indian Planning Commission shows that the participants in the high-yielding varieties programs for wheat have much larger expenditures for hired labor than do non-participants. An average for the samples taken shows that participants on large farms spent about four times as much as non-participants, and that those on small farms spent about ten times as much.[4] It is not clear, however, how much of the increase represented higher wages at peak labor seasons (and in particular at harvest time), and how much reflected the additional hours of work required by the new varieties.

An ambitious attempt has been made to estimate the extent to which the availability of human and bullock labor is a constraint on the spread of the Green Revolution in the Indian Punjab.[5] The authors assume that the greatest effect of the new seeds on labor is associated with the additional yields, so that extra labor will be required during the periods of harvesting and threshing. The authors state that the new varieties ought not to require a great deal more energy for planting, irrigation, and weeding than the varieties they replace. They predict that by 1984, all the irrigated land in the state will be planted with the high-yielding varieties.

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[1] Indian Agricultural Research Institute, *Five Years of Research on Dwarf Wheats*, New Delhi, 1968, Table 18, p. 45.

[2] S. R. Sen (Chairman), *Modernizing Indian Agriculture*, Report on the Intensive Agricultural District Program (1960-68); Vol. I, Expert Committee on Assessment and Evaluation; Ministry of Food, Agriculture, Community Development and Cooperatives; New Delhi, 1969.

[3] F. Frankel, *Agricultural Modernization and Social Change: A Case Study of Five I.A.D.P. Districts*, USAID India Country Field Submission FY 1971 Annex P, September 1969, p. P-27.

[4] J. W. Mellor, *Report on Technological Advance in Indian Agriculture as It Relates to the Distribution of Income*, mimeo for World Bank, December 1969, p. 21.

[5] M. H. Billings and A. Singh, *Conventional Energy as a Constraint to the Green Revolution 1964-84: The Punjab Case*, mimeo for USAID, New Delhi, April 1969.

But this spread in itself will result in no more than a six percent increase in the demand for human energy.

There are some indications that considerably more labor than is indicated in this model may be necessary to realize the full potential of the new varieties. For example, an examination of the yields achieved with the new varieties shows that they are still low compared to what can be achieved. The average yield for the new varieties in India in the 1967-68 crop year was only 2,365 pounds per acre, though the range went all the way from below 2,000 pounds to over 6,000 pounds per acre. In West Pakistan the yields of the new varieties have averaged only about 1,600 pounds per acre. Both the actual range of yields and the results on demonstration plots show that there can be substantial improvements in the average yields. This may require more labor in cultivation, more careful preparation of the land, proper spacing of plants, higher quality of weeding, and so on. The need for research in this area is shown by a study conducted in India.[6] It indicates little or no relationship between the fertility level, seeding dates, and the number of irrigational applications on the one hand, and yields on the other. This does not imply that these factors are unimportant in determining wheat yields but that other, less easily identified factors are also extremely important. The skill and energy of the farmer are probably high on the list of these other factors. For example, other studies have shown that, where weeds are a problem and not controlled properly, the more fertilizer that is applied the lower is the yield of grain.

In summary, the adoption of Mexican wheats does appear to increase the amount of labor used in cultivation by a considerable amount, and also to increase the returns to that labor. But two qualifications should be made. Firstly, the use of labor-saving machinery may radically change this situation; this is discussed in detail in the next chapter. Secondly, there is some evidence that yields and the amount of labor required could both be increased by more careful cultivation.

III.2. RICE

Turning to rice, the available information is rather more conclusive, although there has still been no comprehensive survey. With the exception of one study of the rice variety ADT-27 in Thanjavur District, Madras State (where most farmers used tractors for land preparation), the consensus of the material is that introduction of the new rice varieties does require the use of considerably more labor. In the Philippines, the most likely approximation of additional requirements is of the order of 30-50 percent.

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[6]Quoted in *New Cereal Varieties: Rice and Wheat in India*, paper for USAID Spring Review, March 13-15, 1969, p. 8 (wheat).

Table 3

Contrasting the high-yielding varieties (HYV) with local varieties for the Philippines[7]

	Labor Input Man-days/Hectare	Labor Input Man-days/Ton
1966 Dry Season		
Laguna Province		
Local	53	22.5
1967 Dry Season		
Pampanga/Bataan Provinces		
IR-8, owner operated farm (HYV)	86.7	18.9
IR-8, tenant farm (HYV)	74.6	17.5
BPI-76, owner operated farm (HYV)	90.1	24.1
BPI-76, tenant farm (HYV)	78.3	25.4
1967 Wet Season		
IR-8 (HYV)	79	16.5
Local	51	20.4
1968 Wet Season		
Laguna Province		
IR-8 (HYV)	69	18.7
Malagkit-local high quality variety	58	20.6

All of these figures *exclude* time taken in harvesting and threshing the crop, which can be estimated as adding another 20-30 days to the total per hectare.

In India, the ratio of labor costs per acre for the high-yielding varieties and local strains varies considerably, from 1:1 in the case of Thanjavur all the way to 2.9:1 in West Bengal. The average is about 2:1, though it is not possible from the data to translate this directly into man-days/hectare.[8] Nor is it possible to estimate the degree to which these ratios reflect differences in the costs of labor and the influence of multiple cropping.

Rice is by far the most important crop in Asia, in terms both of its contribution to the diets of the people of that continent and of the number of farmers who depend wholly or in part on growing it. An increase in the labor requirements of this one crop has extremely important implications for the whole region. But it is evident that overall labor requirements for rice can rise only if the demand for the commodity grows fast, because of the increase in the productivity of labor. This is discussed further in Chapter 6.

As an example of the importance of demand, data from rice farms in Comilla, East Pakistan, estimate that an increase in rice

[7] Data assembled by the author from several International Rice Research Institute Publications.

[8] *Indian Programme Evaluation Organization Survey (PEO) of 1967-68 Kharif Crop*, quoted in USAID Spring Review Paper on India, *op. cit.*, Table 19, p. 46 (rice).

yield of one maund (82 lbs.) requires about 0.9 additional days work by one man.[9] Assuming a rapid spread of the use of the new varieties during two crop seasons over the next five years, it has been calculated that additional employment could be created for about one-third of the net increase to the labor force by 1975. The increase in yields and area under the new varieties would add 6.4 million tons of rice to the East Pakistan crop. But the expected increase in demand due to a growing population and rising incomes is only about 3.8 million tons. So, unless export markets can be found, prices will fall, and the possible additional number of jobs will not materialize.[10]

III.3. COMPARISONS WITH RICE PRODUCTION IN EAST ASIA

The new rices do not at present appear to use the same degree of intensity of labor as is practiced in East Asia, and especially in Japan. The improved rice varieties used in Japan and Taiwan differ genetically from those being developed in South and Southeast Asia. But they have similar characteristics of fertilizer responsiveness, requirements for water control and careful cultivation. While reliability of Japanese statistics before 1933 is doubtful, it is believed that the labor input for rice cultivation was as high as 370 man-days per hectare during the period 1910-1925, when the high-yielding rice varieties developed there were diffused nationally. Subsequently, with the use of better agricultural implements, and as irrigation pumps became more popular, the labor input went down to 314 man-days in 1933-35.[11] In the post-war years, manpower in Japan was in short supply, and agricultural labor was supplemented by machinery and power. Since 1955, the power tiller has become a major factor of Japanese agriculture, and is now in operation on more than half of the farms in the country. Despite this spread, cultivation still uses labor intensively. The official estimate for 1965 shows that, even in that year, the cultivation of one crop of rice took an average of about 180 man-days per hectare. This compares with the average of 100 to 110 man-days per hectare for the high-yielding rices in the Philippines, and a range of 60 to 120 man-days per hectare for traditional varieties in most of South and Southeast Asia.[12] And in Taiwan, the National University has estimated that the labor requirement for rice is 150 to 160 man-days per hectare.[13]

A major study by the Asian Productivity Organization (A.P.O.) has shown that each of the phases of the cultivation cycle, with the exception of harvesting, requires more labor per acre in East Asia than in South and Southeast Asia.[14] Of special importance is

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[9]Technical Bulletin No. 19, *Costs and Returns*, Pakistan Academy for Rural Development, Comilla, East Pakistan.

[10]Memo by R. Isler, *Increased Rural Employment Via Increased Rice Production through Improved Farming Practices*, USAID, Lahore, 1970.

[11]S. Ishikawa, *Direction of Technological Change in Agricultural Production in the ECAFE Region during the 1970s*, paper ISOP .5/A/H.Y Bangkok, September 15-26, 1969, p. 17.

[12]APO, *op. cit.* Table 31, p. 50.

[13]*Ibid.*, Table 30, p. 50.

[14]*Ibid.*, pp. 48-51.

the extra time spent in seedbed preparation, transplanting and water control. At least some of the variation in labor force requirements might be attributed to the genetic differences between the rices used in East Asia and the new high-yielding varieties being introduced in the more southerly parts of the region. But greater care in cultivation is also a major contributor to yields. The average yields of the new rices in South and Southeast Asia in 1967-68 were still relatively low compared to the potential demonstrated in experimental stations. The average yields for milled rice are as follows:[15]

Philippines	2,591 lbs./acre
India	2,400 lbs./acre
E. Pakistan	2,746 lbs./acre
W. Pakistan	2,472 lbs./acre

These are the yields for the farmers who initially adopted the innovations. They have generally benefited from the most favorable environments in terms of land size and quality, availability of inputs, and the willingness of the farmers to follow directions. As the new varieties have spread, their average yield has tended to fall. In comparison, demonstration plots at IRRI have yielded about two and one half times the output per acre obtained by farmers.

III.4. THE EFFECT OF MULTIPLE CROPPING

Switching to the new varieties from traditional ones requires more labor. But an even more significant increase in the demand for labor occurs if a farmer can shift from growing one crop a year to growing two or more (multiple cropping). Each crop requires that the land be prepared, the seed sown, the plants weeded, and the grain harvested and threshed. The potential for multiple cropping is enhanced by the shorter maturation period of the new rice varieties. At the same time, the additional yields and profits from the new varieties make it worthwhile for farmers to invest in water control facilities, which are essential for cultivation in the dry season.

In those areas where multiple cropping is made possible, the increase in employment seems to be roughly equivalent to the rise in the intensity of cropping. A study of some large farms in the Pakistani Punjab showed that because of the longer working hours per man per day, and also because of the increased numbers of workers (both family labor and more especially hired hands), the input of labor per acre on farms irrigated by tubewells averaged 57 percent higher than that on the farms without irrigation.[16] This corresponded quite closely with the expansion of cropping intensity due to the tubewells.

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[15] F. L. Corty, *Global Crop Paper – Rice*, for USAID Spring Review May 13-15, 1969, Table 4, p. 13-A.

[16] H. Kaneda, and M. Ghaffar, *Output Effects of Tubewells on the Agriculture of the Punjab: Some Empirical Results*, Research Report No. 80, Pakistan Institute of Development Economics, Karachi, March 1969.

The situation in Taiwan is perhaps even more revealing. Between 1915 and 1965, the multiple cropping ratio on the island (that is, the ratio of the total area planted to the area of cultivated land) rose from 1.32 to 1.98. During that time, the total amount of time worked doubled, as the number of agricultural workers grew by 50 percent, and the number of days worked by each person increased about one-third. The agricultural output per worker also rose by 250 percent during this period, so that the productivity and incomes of the larger labor force also grew.[17] In a typical Taiwanese community with two crops of rice annually, each crop requires about the same amount of labor.[18] The man-days spent on all farm operations on an average holding had reached 502 per hectare in 1962.[19]

The extent to which multiple cropping has spread with the introduction of the new high-yielding varieties is not clear. It does appear, though, that the potential for future growth in South and Southeast Asia is rather limited. According to a survey by the Asian Development Bank, the suitable land for the double-cropping of rice under existing irrigation is less than 10 percent of the total rice area of the region.[20] The present double-cropped area is only about half of that. The principal reason for this limitation is the quality of the water control. In particular, the terminal water distribution and drainage facilities of many irrigation systems are inadequate for growing two or more crops. And a large number of systems are not large enough to provide sufficient water for the dry season crop. One must conclude, therefore, that the opportunities for multiple cropping will have important effects on employment in only relatively small parts of Asia in the near future. Among these are Malaysia, which is relying on the expansion of its area under two or more crops to achieve self-sufficiency in rice, and those large portions of India and Pakistan where relatively cheap private tubewells and low lift pumps are both feasible and profitable.

In summary, the pattern indicates that the introduction of the new cereal varieties by itself does increase the demand for labor. It is impossible at this stage to obtain an estimate of this increase, though an overall range of 20-50 percent seems to have been experienced. This is increased when one or more additional crops can be grown. It is important to note that the variations both between and within regions have been considerable, and that no areas in South and Southeast Asia appear yet to have attained the degree of labor-intensity of Japanese and Taiwanese farms.

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[17] R. P. Christensen, *Taiwan's Agricultural Development: Its Relevance for Developing Countries Today*, Foreign Agricultural Economic Report No. 39, U. S. Department of Agriculture, April 1968.

[18] APO, *op. cit.*, Table 30, p. 50.

[19] Government of Taiwan, *Report of Record Keeping Families in Taiwan*, 1963.

[20] Asian Development Bank, *Asian Agricultural Survey*, Vol. II, Sectional Reports, Manila, March 1968, p. 65.

III.5. EMPLOYMENT EFFECTS ON VARIOUS SOCIAL GROUPINGS

The direct effects of the new varieties on employment are not spread equally among the cereal farmers of Asia. This is partly because the new varieties are only suited to certain environments. But it is also because the agrarian institutions and social organizations in most of rural Asia tend to make it easier for large farmers rather than other social groups to benefit from the Green Revolution. It is important to understand these differences if the creation of productive job opportunities on the farms is to be a goal to which national policies are directed.

The primary dichotomy is a technical one – between those areas for which the new varieties are suitable, and the rest of the region. The most important feature distinguishing the two types of area is adequate water supply and control. The irrigated areas in some Asian countries are being expanded rapidly. For example, in Ludhiana, the prime wheat-growing district of the Indian Punjab, the area under irrigation rose from 45 percent in 1960-61 to 70 percent in 1967-68, mainly as a result of the rapid installation of tubewells. A similar phenomenon has occurred in the Pakistani wheat-growing areas. Nevertheless, the proportion of the total cropped area that is irrigated and suitable for the new varieties is small, relative to the totality of Asian agriculture.

III.6. NON-IRRIGATED REGIONS

In those areas where irrigation facilities exist or can be constructed, and where their quality is sufficient to match the technological requirements of the new varieties, it is reasonable to expect that the Green Revolution will take hold in due course. It will, of course, be essential to develop suitably adapted varieties, to ensure the provision of the necessary inputs, and to build up the rural infrastructure of extension services, transport, marketing and so on. But the superiority of the new varieties in terms of their ability to reduce the costs per unit of output will determine their broader use in suitable areas.

This superiority, however, will work to the disadvantage of the rest of the region, where farmers must rely on rainfed agriculture. If some areas can produce much more cereal at less cost with the new varieties, overall grain prices will decline; but those farmers who cannot make use of the cost-reducing technologies will find their profit margins cut. For many small farmers, this may mean that they must consider eliminating production of wheat and rice for the market and concentrating on subsistence production for themselves and their families, or else consider diversifying into other crops. For the bigger farmers, there may be some opportunities for extensive farming on a large scale, making use of modern dry-land farming techniques and machinery. In both cases the number of employment possibilities is likely to decrease; the extent of under-employment on small farms is likely to increase.

Research into cereal varieties suitable for the drier areas will partially offset these effects. And diversification into cereals like sorghum and millet, which are less dependent on large amounts of controlled water, may also offer some hope. There are also possibilities for livestock and dairy production. But, in general, the prospect is for a relative and in some cases for an absolute decline

in the level of rural development in these areas. It is not possible at this stage even to hazard a guess about the magnitude of these effects. However, as the levels of political organization and awareness increase, it seems probable that the widening differential between irrigated and non-irrigated areas will occupy a central position in the futures of the Asian nations.

Government policies can do much to alleviate these inequities. The search for new cereals and other crops that can be grown efficiently in areas where rainfall is inadequate must be pushed forward. General tax and subsidy schemes may also have a role to play in supporting the depressed regions in the short term, though the financial, administrative and political limits on their use should be recognized. But, in the long term, the alleviation of poverty in these areas depends on the transfer of significant numbers of people into environments where they can play a more productive role.

III.7. INTRA-REGIONAL DIFFERENCES

For the purposes of analysis, there are four main social groups within the areas suitable for the new seeds for which the benefits of the new technologies may be very different. These groups are:

(a) Large owner farmers
(b) Small owner farmers
(c) Tenant farmers
(d) Laborers

To some extent the distinctions between these groups are arbitrary. The definition of a large farm will vary from one area to another and will depend closely on the availability of irrigation and the quality of the land as well as a number of other factors. It is perhaps convenient to think of large farmers as producing cereals primarily for the market, whereas small farmers grow grain principally for their families, selling the surplus. Similarly, the category of small farmers often overlaps with the last two categories, since many small farmers lease in land or supplement their incomes by working on the farms of their neighbors. The precise definition of the boundaries is unimportant to this analysis of general trends.

In many respects the new varieties appear equally effective on any size of farm; that is to say they are neutral to scale. For the seeds themselves, for the fertilizer that is an essential component of their higher yields, and for other agricultural chemicals, all of which are divisible into very small units, this seems to be true. But some other features of the new technologies offer returns to scale unless their effects can be neutralized. Principal among these features that offer advantages to large farms are mechanization, irrigation, credit, and management.

Under present price structures in most of Asia, there may be significant cost reductions to be obtained from mechanization, particularly from the use of tractors. The cost savings appear to be related to the size of the tractor. But each tractor size is associated with an operating area below which it becomes uneconomical. Thus large farms are in a position to make the best use of the advantages of mechanization.

For irrigation, many of the old large-scale systems supply water regardless of the size of the farm. But for the most efficient units, the private tubewells, there is a minimum command area below which the costs of water rise sharply. The size of the minimum command area varies from 25-50 acres. Large farmers can sink a well of their own and use the water effectively; farmers who own less than the minimum command area have to depend on cooperation with others if they want to take full advantage of cheap water.

The costs of credit are usually higher for small farmers than for large, both because the risks are greater and because the same amount of administration must support a smaller loan. This is aggravated in some areas by the reluctance of cooperatives and banks to loan to small farmers at all. Credit is essential to most farmers to make the necessary fixed capital investments in irrigation and equipment to utilize the potential of the new varieties. And it is also essential to finance working capital, the purchase of the seeds, fertilizer, and other chemicals.

Very little work has been done on the managerial component of the new varieties. In general, though, as the complexity of farming increases with multiple cropping, new purchased inputs, and higher risks, the required level of managerial skill rises. Large, commercialized farmers have sufficient resources in some cases to employ professional managerial and agronomic skills. In the Philippines, for example, some farmers with more than 250 acres are finding it worthwhile to employ professionals to do their planning and management. And a new form of management company is emerging to perform a similar function for groups of somewhat smaller landlords with contiguous lands.

III.8. LARGE FARMERS

Large farmers, then, have certain advantages over the rest of the agricultural community in the initial adoption of the new varieties. These have been exaggerated by the tendency for agricultural development programs to concentrate their resources on the larger and more progressive farmers. It is hardly surprising, then, that in the first years of the spread of the Green Revolution, the larger farmers were more heavily involved than were small cultivators. In terms of national aggregate production this was very important, especially for countries like India and Pakistan which were struggling to overcome massive national grain deficits. In India, for example, a recent survey showed that the average size of a farm was about five and a half acres. Only about 28 percent of the holdings were above this average size, but they covered 83 percent of the total area farmed. Thus, if government programs were concentrated on a relatively small number of larger farms, it would have a very significant effect on overall output.

This approach can bring a number of employment problems in its train. As the large farmers adopt the new varieties, they can reduce costs and increase output, generating additional profits for themselves. There have been tendencies in many parts of Asia for the larger farmers to use these profits both to buy machinery that can displace labor, and to purchase more land. In the Indian Punjab, for example, the amount of land owned by farmers with

more than 20 acres increased by about 10 percent between 1955-56 and 1967-68. The acreage covered by farms in the size group of 20-25 acres grew by only 4 percent, whereas those in the size group 100-150 acres increased by 40 percent.[21] This trend increases the income base for those who are already well off. Another tendency noted in India, West Pakistan, and the Philippines has been the emergence of a small but growing group of new, commercial farmers. These men, who were not previously engaged in agriculture, are buying up farms and making a profitable occupation out of cultivating the new varieties.

III.9. SMALL FARMERS

Small farmers need much more help than large farmers if they are to make full use of the new technologies. Above all, they require credit and irrigation facilities suitable for their own sizes of farms. If they have access to these facilities, small farmers seem to make considerable use of the high-yielding varieties, once their profitability has been demonstrated. A pattern of adoption that is typical though not universal is the one observed in West Pakistan, where:

> The Mexican wheats were first adopted by a higher percentage of large farmers than of small farmers, but in absolute numbers there are many more farmers producing HYV (high-yielding varieties) wheats than large farmers. The percentage of large farmers directly farming their own land is very small. Large farms operated by tenants tended to have a lower percentage of HYV than small owner-operated farms.[22]

In India there have been considerable variations in the record of adoption of the new varieties by small farmers. For rice, the proportion of small farmers among participants in the high-yielding varieties programs varies from 13 to 70 percent.[23] It is not clear, however, how much these variations reflect differential access to irrigation.

For wheat in India, the PEO survey of the 1967-68 crop showed a strong correlation between farm size and the proportion of cultivators participating in the high-yielding varieties programs.[24]

Most studies show that the cash expenditures incurred per acre by small farmers are less than those of large farmers. This is primarily accounted for by lower use of fertilizer. To some extent this has been offset by the fact that small farms have greater livestock densities, and so have more manure available per acre. At the same time, however, the proportion of expenditures borrowed by small farmers appears to be larger than the average.

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[21] A. Rudra, A. Majid, and B. D. Talib, "Big Farmers of Punjab: Some Preliminary Findings of a Sample Survey". *Economic and Political Weekly, Review of Agriculture*, Vol. IV, No. 39, September 27, 1969.

[22] USAID, *New Cereal Varieties: Rice and Wheat in Pakistan*, Spring Review Paper, p. 13 (East Pakistan rice).

[23] USAID, *New Cereal Varieties: Rice and Wheat in India*, Spring Review Paper, Table 34, p. 135 (rice).

[24] Indian Programme Evaluation Organization, *Report for the Rabi 1967-68: Wheat*, Government of India, October 1968, Table 3.1, p. 78.

Where small farmers do adopt the new varieties, it is reasonable to expect that there will be significantly greater employment of family labor, and an increase in the demand for hired labor at peak periods of the year. Most small farmers are unlikely to mechanize their farming operations, so that the full possibilities of the high-yielding cereals for creating employment should be realized in these cases.

There are two sets of problems associated with the adoption of the new varieties by small farmers. The first set of problems is to design technological and organizational systems of suitable scale to enable the small farmer to participate in the Green Revolution, to make sure he can buy the seed, fertilizer and pesticides at the right time, to provide him with water control, and to give him a marketing system so that he can sell his grain and buy other goods. Only as these problems are solved will the employment-generating effects of the new varieties spread further among small farmers.

The second set of problems is more general: it applies both to those small farmers who have adopted the new cereals and to those who have yet to do so. It concerns the maintenance of sufficient incentives and incomes for small farmers as the Green Revolution is extended. Under present trends, cereal production in South and Southeast Asia may rise faster than demand, putting pressure on prices. And as prices fall, small farmers will suffer most. With smaller resource bases, and less access to credit and cost-reducing machinery, many will find their capacity to save and invest cut. As this happens, the new technologies with their increased input requirements will seem less attractive. There is some possibility of a reversion to traditional varieties and subsistence farming through this mechanism. Indeed, there have been reports of this occurring in both the Philippines and West Pakistan.

For those small farmers who are unable to make the transition to the new technologies, the prospects are bleak. They have to compete with a growing volume of cheap grain from the new varieties. Many of them will be unable to market economically what surplus they produce. These farmers are faced with three alternatives: they may retreat into a purely subsistence style of farming; they may take advantage of rising land values to sell out in order to clear their debts and to attempt a new start in life, most likely adding to the trek to the cities; or they can attempt to diversify into other agricultural production (which may be difficult since they lack either the environment or the institutional setting for adoption of the new cereal varieties). The situation is particularly acute for those farmers whose farms are so small that they cannot provide even a subsistence livelihood for the cultivator and his family. A very large number of people in this category earn part of their incomes by leasing in some land or by working as laborers. One survey gives the following figures for the percentage of part-owners, part-tenants in some countries in Asia.[25]

[25] APO, *op. cit.*, Table 18, p. 27.

Country	Year	Percentage of Part-Owners, Part-Tenants in Agriculture
India	1960	22.9%
Pakistan	1960	25.9%
Philippines	1960	14.4%
Thailand	1963	14.0%

In some areas, the figures are very much higher. In Ludhiana District, for example, only 4 percent of agricultural households are pure tenants, but 46 percent fall into the category of part-tenants and part-owners.[26] These small farmers will share the employment problems that are associated with the introduction of the new technologies into tenant and laboring groups.

III.10. TENANT FARMERS

The prospects for adoption of the new seeds by tenant farmers depend heavily on the prevailing patterns of land tenure in a particular area. As with small farmers, tenants and part-tenants face problems of scale in situations where they lack irrigation and credit. But their difficulties are compounded by the rise in the value of land associated with use of the new varieties. Because of higher yields per acre, the demand for land has risen. Tenants want to lease in more land, while land owners are recognizing the gains to be achieved by direct management of their farms. An additional problem that tenants often face is an inability to raise credit because they can offer no collateral.

The ways in which these tensions work themselves out depend in part on the existing relationships between landlords and their tenants. In much of the Philippines, for example, it is customary for the landlord to share the costs of the inputs with his tenants and to help make managerial decisions. They also share the output. The landlord, therefore, gains from encouraging his tenants to invest in the new varieties. This is particularly true for absentee landlords who do not want to return to their land to cultivate it themselves. Elsewhere in the Philippines other types of landlord-tenant relationships exist. And there has been a tendency for some landlords to take over land. In a survey of Mayantoc municipality, for instance, between 1965 and 1967, the number of tenant farms decreased 6 percent.[27]

Superimposed on this nexus of relationships is the imminence of land reform. All the Asian nations have land reform laws enacted, but they have not been vigorously enforced. Now that land is more valuable, landlords are very reluctant to get into a position where their tenants might be given title to the land. Numerous evasive tactics have been reported in West Pakistan, in India, and in the Philippines. Some landlords have in fact evicted those tenants who depended on oral agreements. A recent report stated:

> (In 1969), landlords brought more than 40,000 eviction suits against sharecroppers in the State of Bihar alone, and in

[26] Frankel, *op. cit.*, p. P-14.

[27] H. Voelkner, *The Philippine Rice Revolution: A Case Study of Title IX Implementation*, Mimeo, December 1969, p. 66.

Mysore more than 80,000 such cases were now pending before the courts.[28]

Others have prevented their tenants from establishing the security of tenure which they would gain if allowed to cultivate the same plot for a number of years. In Tanjore, Madras, for example, the bulk of the sharecroppers are shifted from one plot to another each year in order to avoid the provisions for security of tenure under state tenancy legislation.[29] The ways in which these evasions are expressed vary according to the local land legislation.

The differences in legislation and in custom help to explain the widespread variations in the responses of tenant farmers to the new varieties. In parts of the Philippines, tenant farmers seem to have been almost as ready as were owner-operators to adopt the new rices, as a result of the processes described above. In contrast, in the Kosi area of Bihar, barely five percent of the sharecroppers have used high-yielding varieties of seeds, fertilizers and insecticides.[30]

The tenant farmers of Asia are squeezed by growing costs, rising land values, and increasing returns to owner management, combined with the threat of land reform. Unless these difficulties can be overcome, the number of tenant farmers will decline. There are many ways in which the problems can be tackled, but the essential principle should be to give tenants security of tenure without exorbitant rents. If that principle were adopted, tenant farmers would assume roughly the role of small owner farmers, and would be amenable to similar types of assistance. But in the absence of such reform, the prospect is for large numbers of tenant farmers to be forced from the land by economic and legal pressures and to join the ranks of the landless laborers. Many of these are likely to join the migration to the cities, adding to the problems there.

III.11. LANDLESS LABORERS

In the short run, the position of the landless laborer in Asian agriculture may benefit more from the Green Revolution than that of the small farmer and tenant. There have been several references already in this monograph to increased expenditures on labor as a direct result of the introduction of the new technologies. These have generally reflected increases both in wages and in work opportunities for landless laborers. Yet a pattern of developments is also occurring that threatens to negate the gains that laborers have made. As their numbers rise through natural increases and the addition of displaced tenants and small farmers, the position of the landless laborers in rural areas may be expected to become more precarious. The growth of mechanization is also threatening the job possibilities for this group. These pressures have led to signs of a marked deterioration in the relationships

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[28] *Newsweek*, August 3, 1970, p. 31.

[29] Frankel, *op. cit.*, Tanjore Section, p. 98 of draft.

[30] W. Ladejinsky, "Green Revolution in Bihar, The Kosi Area: A Field Trip", *Economic and Political Weekly, Review of Agriculture*, September 1969, p. A-158.

between farmers and the laborers they employ. And this, in turn, has aggravated the tensions between the groups.

In areas where the Green Revolution has made a strong impression, and where the number of agricultural laborers is relatively small, their conditions have improved markedly. Landless laborers in Ludhiana District account for only 18 percent of all rural families. They are able to find employment all year round by combining work in cultivation with some off-season work on the installation of tubewells, land leveling, and the construction of roads and houses. Cash wages per day have doubled over the last few years from about Rs 2.5 (33 cents) to Rs 5 plus tea, though rises in prices have taken up a considerable part of the increase. In areas where local labor was particularly scarce, rates went as high as Rs 6. During the peak harvest season, they have been reported as high as Rs 8-12 per day plus food.[31]

Palghat District, a major rice-growing area in Kerala State, represents a more ominous situation. Fifty-five percent of the agricultural households consist of farm laborers, each of whom works for an average of only 180-200 days. Nearly all the rice land is double cropped, but lack of suitable water control has limited the spread of the new varieties to about 10 percent of the cropped area. Agricultural laborers earn on the average about Rs 600-700 ($80-93) per annum, and have seen little, if any, improvement in their living standards over the past few years. Workers who are permanently attached to individual farmers are very reluctant to jeopardize this security for higher wages.[32]

Under the pressure of a growing supply of labor, and without a spur to demand, the real wages of agricultural laborers in Asia have probably not increased, and may well have declined in recent years.[33] The Green Revolution does offer possibilities for alleviating this misery, because of its effect on the demand for labor, especially where multiple cropping becomes possible. But the twin dangers of a breakdown in the relationships between farmers and laborers, and of the replacement of men by machines threaten these possibilities for the landless. These dangers are examined in the next two chapters. Unless policy measures can be undertaken to stall these threats, the opportunities for improvement of the lot of the landless laborer will evaporate.

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[31] Frankel, *op. cit.*, p. P-27.
[32] *Ibid.*, pp. P-61-2.
[33] Mellor, *op. cit.*, pp. 21-22.

CHAPTER IV

the problem of mechanization

IV.1. THE MECHANIZATION ISSUE

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The Green Revolution has been accompanied by a steep rise in the demand for the mechanization of farm operations. This subject has aroused great passion, but little agreement. The section that follows attempts to summarize the principal issues involved.

The basic arguments mounted in favor of mechanization are:

(a) Power and equipment facilitate an increase in yields through more timely and effective farm operations. Optimum yields of the new high-yielding varieties depend on correct seedbed preparation, proper seeding dates, precise fertilizer placement, and the uniform and timely distribution of water and chemicals. All of these can be better provided through mechanization.

(b) The possibilities for multiple cropping put a premium on speedy harvesting and land preparation so that the next crop may be planted. This gives rise to peak season labor shortages when the demand for human labor exceeds the supply. Mechanization helps output by supplementing labor during the peak periods and so getting the next crop planted more quickly.

(c) Mechanization reduces the dependence on draft animals, which have low productivity and high costs. These animals also consume food sources of energy, and so utilize land that would otherwise be available for growing food for human consumption.

(d) Mechanization increases the appallingly low productivity of labor in the agricultural sectors of the economy. If standards of living are to rise, this must be the ultimate concern of developing countries.

(e) Mechanization lowers the costs of production. This is important in terms of the overall growth of the economy because it permits the generation of savings for investment. It is also important for those countries hoping to lower costs in order to export cereals into the world markets.

On the other side, the following arguments are generally put forward:

(a) The evidence of the effects of mechanization on yields is inconclusive.

(b) In countries where labor is plentiful, but both capital and land are in short supply, the most efficient mode of operation is to utilize the abundant resource while conserving capital and land. Unfortunately, because of the prices attached to these factors in a developing country, the most efficient technology in terms of the overall society does not coincide with that for the individual farmer.

(c) In countries where capital is in short supply, it should not be diverted into agriculture where labor-intensive alternatives are available. The same argument holds for the use of foreign exchange, which has an even higher opportunity cost.

(d) Mechanization displaces labor. Since no other sector of the economy can readily absorb this labor, substantial social and economic dislocations will occur.

(e) Mechanization can accentuate the disparity in incomes between the large landowners and other farmers by enabling the former to lower their costs. This can encourage the concentration of land and other resources.

In this chapter, we make an attempt to sort out these various arguments and to suggest what forms of mechanization may be appropriate in the context of the Green Revolution in South and Southeast Asia. In the long run, of course, if the farmers of Asia are to approach the standard of living of their present-day Western counterparts, they will need to mechanize heavily. And by that stage, there will have to be far fewer farmers each with a bigger plot. But, in the shorter term, the rural population will grow considerably. It is, therefore, worth considering what effect mechanization is likely to have on the job and income opportunities of the present and foreseeable numbers of peasant farmers.

We face an immediate problem of definition when talking about mechanization. Many of the arguments on the issue have been posed in terms of polar opposites; contrasting fully mechanized agriculture, with large tractors, combines and a host of additional equipment; and "traditional" cultivation, characterized as a farmer with a hoe, or with a draft animal and wooden plow. In reality there is a range of intermediate steps between these two poles. These steps include the use of improved animal-drawn implements, such as mouldboard plows and seed drills, the use of stationary power equipment for certain aspects of the cultivation process, such as irrigation and threshing, and the use of small walking tractors as are common in Japan and becoming so in Taiwan and South Korea.

In looking at the needs and possibilities for mechanization in the Green Revolution, we should note that, whereas all the major farm operations of wheat cultivation can be mechanized, this does not at present apply to important segments of rice culture (especially transplanting and harvesting) as practiced in most of Asia. Again, the new varieties of rice and wheat are grown almost exclusively on irrigated lands on which the needs for large amounts of power for seedbed preparation are not acute. This is a different situation from much dryland farming. And timeliness is not as important in seedbed preparation where a dependable source of

irrigation water is available, because a farmer can extend the time to prepare a good bed with little, if any, loss of yield.

IV.2. THE EFFECT ON YIELDS

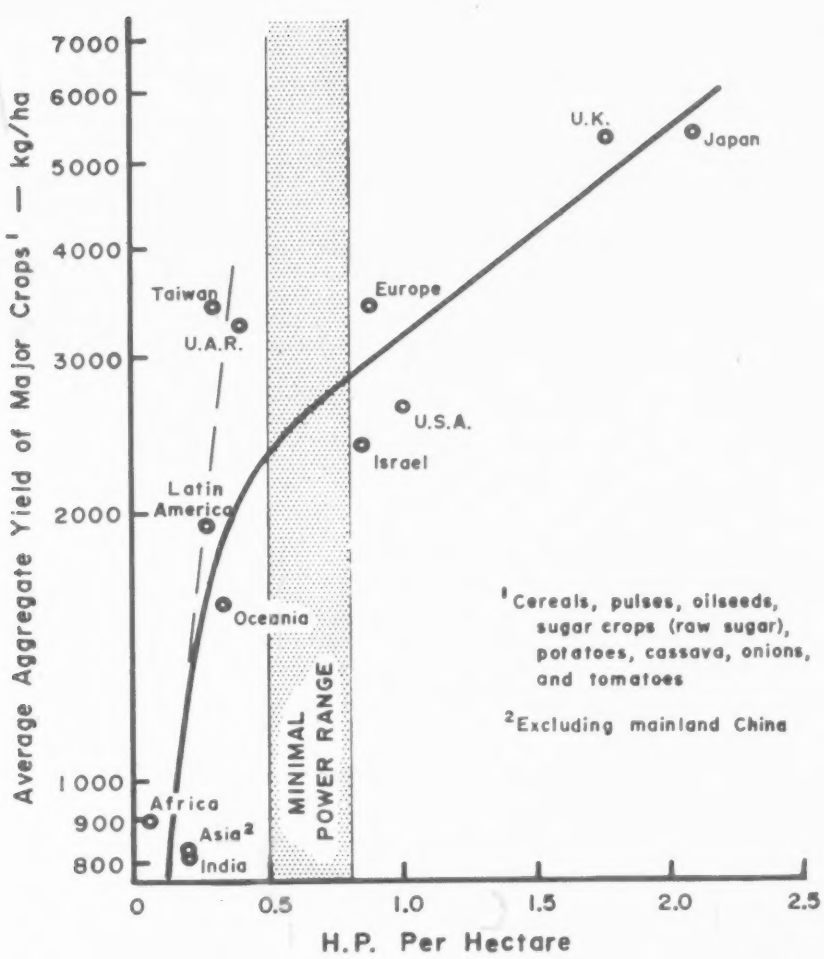
It is rather obvious that most developed countries have much higher yields for cereals than most developing countries, and that they also use much more power per farm acre. In terms of policy, this has often been translated into a demand for rapid tractor mechanization by those countries concerned in order to increase their grain production urgently. But there is other evidence to show that it is by no means clear that tractor mechanization is essential to better yields, and that from the point of view of society the capital used in tractor mechanization might be better used elsewhere.

One article that is often used to justify tractor mechanization was written by G. W. Giles.[1] In an attempt to assess the minimum amount of power necessary to optimize yields, he devised the following chart:[2]

Figure 2

RELATIONSHIP BETWEEN YIELDS IN KG/HECTARE AND POWER IN HORSEPOWER PER HECTARE

Major Food Crops



[1] G. W. Giles, "Agricultural Power and Equipment", in *The World Food Problem*, A Report of the President's Science Advisory Committee, Washington, September 1967, Vol. III, pp. 175-216.

[2] *Ibid.*, p. 180.

The validity of the notion of the minimal power range hardly seems to be demonstrated by Giles' work. Even the diagram indicates that Africa and Asia might be able to increase their yields by about 400 percent (to the level of Taiwan) with almost no increase in the use of horsepower per hectare. And the diagram does not necessarily indicate that the additional use of power caused the increase in yields. Giles, however, goes on to try to show causation by quoting a number of research studies that have been made on the subject. Most of the studies refer either to unirrigated paddy land or to upland paddy cultivation, areas which are not suitable for the high-yielding varieties. The other studies mentioned concern the increased yields obtained by the use of implements such as seed drills and one-row planters that are capable of placing fertilizer effectively. These implements can be adapted to be drawn by animal power; they do not require the use of tractors and large quantities of horsepower per hectare.

Other evidence on the effect of mechanization on yields is mixed. One series of experiments was undertaken in Pakistan.[3] Four different mechanized farming systems were tried, and showed about a 30 percent average increase in yields for corn and wheat over traditional farming with bullocks. The authors conclude however, that similar increases could be achieved through the use of improvements in the traditional cultivation methods.[4]

Data from IRRI show no consistent or significant difference in yields on those farms using tractor power and on those using a "carabao" (buffalo).[5] The yields reported in Japan in 1960 for "highly mechanized" farming are not higher than those reported for land farmed by a hoe.[6] In Japan, there is now a wide range of farm mechanization. But this has only occurred since the mid-fifties when agricultural labor was in short supply. Kaneda writes that:

> The essence of mechanization in the agriculture of Japan is that the acreage worked by a farmer was expanded by the adoption of labor-saving equipment only after the growth in output per acre had become slow and extremely costly.[7]

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[3]M. S. Gill, *Fifty Years' Research in Agronomy, Dairy, Poultry Farming, Water Requirements of Crops, Mechanical Farming and Agricultural Extension*, Department of Agriculture, West Pakistan, 1960, pp. 225-230.

[4]S. R. Bose, and E. H. Clark, "Some Basic Considerations on Agricultural Mechanization in West Pakistan", *Pakistan Development Review*, Vol. IX, No. 3, Autumn 1969, pp. 273-308.

The authors note than an improved bullock yoke increases power output by 60 percent. Similarly, experiments in India have shown that a man with a pair of bullocks takes 18 hours per acre to prepare a seedbed well using a mouldboard plow, disc harrow, and spike-tooth harrow. In contrast, the traditional plow and plank method takes 94 hours per acre.

[5]R. Barker, S. S. Johnson, N. Alviar, N. Orcino, *Comparative Economic Analysis of Farm Data on the Use of Carabao and Tractors in Lowland Rice Farming*, Paper prepared for The Farm Management Seminar with Focus on Mechanization, Institute of Small Scale Industries, Manila, February 24 to March 1, 1969.

[6]W. F. Buchele, *The Use of Energy for Food Production*, mimeo, April 1968, Table 2.

[7]Kaneda, *op. cit.*, p. 21.

Until that point the remarkable rise in yields in Japan had been achieved primarily by the diffusion of improved varieties, cultural practices, and fertilizer; assisted by irrigation pumps, better animal-drawn plows and harrows, revolving weeders, and pedal threshers.

In summary, then, the relationship between mechanization and yields is complex. It is evident that the productivity of the small farms of Asia can be raised without tractor mechanization, at least to a point considerably above their present levels. But some intermediate forms of mechanical advances are probably required in conjunction with the new cereal varieties. What these forms are in any particular situation is an important question and deserves a great deal of attention at the farm level.

A final distinction should be made between small and large farms. Japan and Taiwan are examples of countries in which high yields on small farms have been attained through labor-intensive use of biological and chemical technology. This option is not so readily available on a 100-acre irrigated wheat farm in the Punjab or on an equivalent size of rice farm in the Philippines. The problems of organization and management of large numbers of laborers on farms of this scale are enormous. And the benefits of mechanization to the individual large farmer are equally large. But, looked at from the point of view of a society that must provide a livelihood for a vast and growing labor force, this can present a strong argument for the redistribution of large irrigated farms into smaller plots, where labor can be used more intensively in conjunction with the new seeds and fertilizer, if this latter form of organization can provide the same amount of output.

IV.3. MECHANIZATION AND INTENSITY OF CULTIVATION

It may not be clear that there is a need for mechanization to increase yields per acre, but the possibilities for multiple cropping present somewhat different issues. As noted before, cultivation is possible throughout the year with well-controlled supplies of water; and two or three crops of rice, or of rice combined with some other cereal, are feasible in a twelve-month period. In this situation, pressures mount to reduce the time between the ripening of one crop and the planting of the next. Farmers can no longer afford to leave land idle. Indeed, a rice farmer in Asia who uses the new varieties may face a loss of 30 pounds of rice per acre for every day that his land lies idle between crops.[8] That is enough grain to feed a man for a month.

The existence of peak labor shortages during these crucial seasons as farmers try to harvest and replant in the shortest possible time has given rise to arguments for mechanization. Several studies have been done to analyze the demand for labor during the peak periods, and to compare it with the supply. As an example on the aggregate level, the Billings and Singh study of the Indian Punjab shows that the combination of more intensive cropping and the use of the high-yielding varieties will over the next fifteen years result in two periods of the year when labor is in short

[8] L. Schertz, quoted in Brown, *op. cit.* p. 106.

supply, the months of October-November and April.[9] They suggest that this constraint can only be overcome by the use of tractors for plowing and harvesting.

A study of the relatively large farms on the Central Plain of Thailand has shown that tractors can increase the amount of labor used in rice cultivation.[10] Whereas the direct use of tractors in plowing reduces the labor required per crop, land utilization patterns can be improved. In particular, tractors reduce the peak labor shortages and so enable the labor use to spread out over a longer time period. They also allow plowing to be done at a time that permits farmers to change from broadcasting rice to the more labor-intensive transplanting method. The use of tractors is also associated with a significant rise in yields per acre. The Thai farms in the study are not typical of the rest of the continent, since they are relatively large-scale. They also have peculiar soil conditions that make it impossible for buffalos to plow before the monsoon rains. Finally, tractors on the farms were used only for plowing. Thus, it is by no means certain that the employment experiences in this study will be duplicated elsewhere in Asia.

The rise in wages observed in many countries at harvest times is also taken as an indication of labor shortage. It is, however, important to study the dynamics of the labor supply at these times in the fields. Ladejinsky maintains that a labor shortage exists in the Indian Punjab during the peak season only in the sense of enhanced wages.[11] He writes:

> In the 1969 peak season the competition for labor was particularly keen on account of the untimely rains. But even so, there was no absolute shortage of labor. Hardly any labor moved from district to district; none was imported from other states, and no acre remained unharvested, or mound of grain unthrashed, except for an occasional delay caused by abnormal weather conditions.

It is likely then that higher wages attract more people, especially women and children, into the labor force. And in response to the higher wages, considerable migration of farm laborers has been noted in much of Asia. More analysis needs to be done to discover the true extent of labor shortages, and the extent to which multiple cropping is slowed down or prevented by lack of labor. It is also essential to find out whether the families of laborers can earn enough income to survive throughout the year if they are denied the opportunities for higher wages during the peak seasons. In situations of real labor shortage, i.e. where production is held down because even a rise in wages does not call forth sufficient labor to handle the work, planners and administrators will require ingenuity to devise the most appropriate mechanical methods to increase output without decreasing the number of jobs.

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[9] Billings and Singh, *op. cit.*

[10] Inukai I. "Farm Mechanization, Output and Labor Input: A Case Study in Thailand" in *International Labor Review*, Vol. 101, No. 5, May 1970.

[11] Ladejinsky, W. "The Green Revolution in Punjab: A Field Trip", *Economic and Political Weekly*, Review of Agriculture, January 1969, p. A-78.

IV.4. SELECTIVE MECHANIZATION

The need to facilitate multiple cropping and to overcome labor shortages has given rise to the notion of selective mechanization. Agriculture consists of a whole series of farm operations. The time and energy required for some of these operations places distinct limits on the expansion of the entire agricultural cycle. If some forms of mechanization can be selected for these specific operations, the blockages can be overcome, increasing agricultural output and the overall demand for labor as well.

Of all the farm operations that may present labor problems, threshing is often the most critical. In India, today, a typical farmer takes one month to thresh his wheat with bullocks. With increased yields from the high-yielding varieties, two or even three times as much grain must be handled.[12] If multiple cropping is to spread, the power of the bullocks cannot be tied up for this length of time on threshing. Mechanical threshing provides a solution. This can be done either by providing small threshers to individual farmers or by using larger machines for a group of farmers. Suitable simple threshers have been designed at IRRI and elsewhere. These have the advantage that they can be made by local industries and so can spur employment. It is essential also to provide facilities for chopping the straw that is used for feed for animals.

Another operation that may need to be speeded up in many circumstances is that of seedbed preparation. One possibility is to use tractors for this. But if a large amount of capital is invested in a tractor, it must be used for other operations besides this one. That may lead to the sort of overall displacement of labor discussed in the next section. There are, however, other ways in which the preparation of the seedbed can be hastened. These include a range of improved animal-drawn implements and small walking tractors designed specifically for the task in hand.

A major challenge for agricultural engineers, economists, and administrators lies in the need to identify specific types of mechanization that can in a given situation increase the amount of labor needed for the new cereal varieties, while at the same time raising the productivity of that labor. From the evidence available, there seem to be no agronomic reasons why the smaller farms in areas suitable for high-yielding varieties cannot produce optimum yields with a combination of selective mechanization of irrigation and threshing, and the use of improved animal-drawn implements. The effectiveness of this combination has been well demonstrated in Taiwan.

IV.5. THE USE OF TRACTORS

It is the growing use of large tractors to mechanize a wide range of farm operations that is causing most concern for the employment prospects in the developing countries. The number of tractors in India was estimated at about 90,000 in 1969, as against 31,000 in 1961. The largest concentrations are in areas where the Green Revolution has taken root and where farm holdings are large. The demand for new tractors is currently estimated at 60-70,000 units

[12] USAID, India Wheat Paper, *op. cit.*, p. 23.

annually and may be expected to grow.[13] This demand is not being met by supply and is giving rise to a black market in tractors. Similar conditions exist elsewhere in Asia where the new technologies are being adopted.

The labor displacement effect of tractor mechanization is another subject of disagreement. In general, despite the Thailand example, it would seem to be considerable. Bose and Clark, in interviewing farmers who had mechanized in West Pakistan, received remarkably consistent answers that the labor force per acre had been reduced about 50 percent from the pre-mechanization period.[14] Assuming an increase in the intensity of farming, they estimated that from six to seven hundred thousand laborers would be displaced in West Pakistan by 1985 if all farms over 25 acres were to be mechanized by that date. Making further assumptions about the cost of cheap housing and the capital necessary to provide urban jobs, they estimated that the cost of resettling these workers and giving them employment would be about 10 billion rupees. Another study based on 60 mechanized farms in the Punjab and Bahawalpur found that permanent labor on these farms declined from 2,000 to 340, with 100 of those remaining employed on tractors.[15] This was, however, without the benefit of the high-yielding varieties. And in the Indian Punjab, the man-days per acre required for wheat on a 10-acre mixed farm on well-irrigated land rose from 33.4 to 42.5 with the introduction of the high-yielding varieties. But they fell to 18.1 man-days per acre with the use of a tractor, despite a 20 percent increase in cropping intensity. The introduction of a wheat reaper caused a further decline to 12.1 man-days per acre.[16] The process of displacement of labor by machines will be aggravated to the extent that small farmers and tenants may be squeezed out by economic forces and replaced by larger unit farms.

IV.6. THE ATTRACTIONS OF TRACTORS

Why is the demand for tractors in much of Asia so heavy? On the face of it, this seems to be a rather strange situation, when capital and foreign exchange are so very scarce and when labor is plentiful and cheap. The reasons for this anomaly are very complicated. But the most important reason is that the scarcity of capital is not reflected in the prices that farmers are charged for tractors. Mechanization is made profitable because agricultural capital goods are substantially exempted from tariffs and taxes. As a result, tractors and machinery can be obtained at the official exchange rate for the price prevailing in the world market. Yet the Pakistani support price for wheat is about double the world price (as is the case in India as well). Pakistani farmers, therefore, pay only about one-half the amount of wheat that farmers elsewhere have to pay for a

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[13] D. R. Gulati, "Mechanization of Indian Agriculture" Draft from Office of the Agricultural Attache, American Embassy, New Delhi, 1969.

[14] Bose and Clark, *op. cit.*, p. 289.

[15] Quoted in Bose and Clark, *op. cit.*, p. 289.

[16] M. H. Billings and A. Singh, "Labor and the Green Revolution: The Experience in Punjab", *Economic and Political Weekly*, Review of Agriculture, December 1969, Table 2.

tractor of the same specifications. This amounts to a heavy subsidization of capital inputs, which in terms of relative scarcity in a capital-poor economy should be priced much higher *vis-a-vis* the abundant resource of labor. In other words, the price system in the economy is distorted, and tends to make labor-displacing machinery profitable even when wages are very low, and when there is a growing number of under-utilized workers. The effects of these distortions are extremely important to the prospects for employment in Asia.

Given the peculiar price structures in most of Asia, it has often been demonstrated that an analysis comparing direct costs and returns will show that tractors are more profitable than power tillers, and that power tillers are more profitable than animal draft. But these comparisons are not very useful in helping economists to understand why individual farmers adopt power and equipment. For one thing, the actual use of tractors in the field may be far less economical than their use on an experimental station. Aresvik noted that in West Pakistan, tractors are used only at about 25% of their capacity, and that they have a short working life, often less than five years, because of the lack of spare parts and servicing facilities.[17]

In some areas the attractions of mechanization are enhanced in addition to allowing the purchase of tractors at roughly the world price. In recent months, for example, the Indian Central Government has ceased its subsidies on seeds, fertilizers, and pesticides, while maintaining those on agricultural machinery. In areas such as Ludhiana District, cheap and plentiful credit is encouraging even those farmers with 15 acres or less to invest in tractors. Miss Frankel writes:

> The view that mechanization is not an economic proposition for the smaller farmers, i.e., in this context, cultivators with less than 25 or 30 acres, is also shared by the principal suppliers of agricultural machinery in Ludhiana. They suggest that easy credit is tempting small farmers to purchase machines without much thought for how they will repay the loans, in some cases, simply for prestige reasons — to keep up with the Singhs.[18]

A report from IRRI sees these and other factors at work.[19] The sharp increase in mechanization over the past three years in the Philippines is closely associated with the expansion of credit. And the reasons for the purchase of machinery appear to be related as much to social as to economic factors. On the one hand, there is a prestige factor in owning a tractor, which is reflected in the concentration of tractors in particular villages as opposed to others of equal economic strength. On the other hand, it is very difficult to separate out the economic benefits of tractor ownership, since the costs of bullock use are almost entirely subjective non-cash costs. Farmers who have the income potential needed to purchase a tractor begin to place a high cost on the time and nuisance asso-

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[17] O. Aresvik, *The Agricultural Breakthrough — Problems and Approaches*, paper presented to Project Heads' Conference, Dacca, December 5-7, 1968.

[18] Frankel, *op. cit.*, p. 22.

[19] Barker, Johnson, Alviar and Orcino, *op. cit.*

ciated with looking after animals. But farmers with limited financial resources can maintain a draft animal and raise its replacement with little, if any, cash expenditures. And as we shall see in the next chapter, even if mechanization does not reduce costs, large farmers are still employing tractors to permit the removal of tenants and of dependence on large numbers of laborers.

In deciding on the value of tractor mechanization, a distinction must be made between the private returns to an individual farmer and the returns to society. The private returns are calculated in terms of the prevailing market prices for inputs and outputs. They make no allowance for overvalued foreign exchange, undervalued interest rates, government subsidies, the cost of resettling and employing displaced workers, and other related costs and benefits that are included in social returns. It is very likely that, if allowance were made for these factors in most Asian countries, we should discover that the private returns are considerably higher than the social returns. Full measurements of the social cost and benefits of a tractor project are extremely difficult to make, because of the lack of conceptual tools and because of ignorance of the full effects of mechanization. Nevertheless, a preliminary attempt by Bose and Clark to assess tractor mechanization in West Pakistan concluded:

> The direct social benefits of tractor mechanization appear to be less than the direct social costs. There is no straight-forward method of taking all the indirect costs and benefits into account in such an analysis, but it is apparent that if they were included the net benefit of mechanization to society would be significantly negative.[20]

[20] Bose and Clark, *op. cit.*, p. 295.

CHAPTER V

technology and rural tensions

Rarely, if ever, have rural villages been as tranquil and homogeneous as pictured by Jean Jacques Rousseau. They have always contained the seeds of tension, a variety of interests and alliances. One of the most important aspects of the new agricultural technology is the degree to which it has heightened these tensions at a moment in history when the spread of communications and ideologies is making the articulation of these tensions both easier and more crucial to national development.

These tensions will derive in large measure from the increasing role of commercial practices in farming that is essential to agricultural development in the poor countries. This process in itself will inevitably change the traditional patterns of relationships between large and small farmers, between landlords and tenants, and between all of these groups and landless laborers. In traditional societies, it has been pointed out that "the typical employer is persuaded by social and political pressures to hire his share of the labor force whether he wants to hire this number or not".[1] The reality behind this assertion is very complicated. Most important, communities in traditional societies cope with changing demographic facts – and particularly the growth of the rural population – by devising ways to ensure that all their members have some means of livelihood. The relationships between landowners and tenants or between farmers and laborers are rarely conceived of purely as financial transactions, but are closely woven in with the structure of the community, kinship relations, caste, religious obligations and so on, so that there is a continual interaction between all these elements. Adjustments take place within that community to enable it to take care of its own people without very much outside influence.

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[1] P. Wonnacott, "Disguised and Overt Unemployment in Underdeveloped Economies", *Quarterly Journal of Economics*, Vol. XXVI, May 1962, p. 279.

The introduction of a new technology that is associated with a large potential rise in profitability and standard of living, and that requires much higher levels of inputs and more contacts with the outside world is bound to cause a major shock to the system. This shock will be exaggerated by the peculiar circumstances of the developing countries. The rural labor forces in these nations are growing fast, with an equally rapid increase in political awareness and in the possibilities for broader participation by people previously left outside the political life of their countries. These factors all indicate that the disruptions caused by the growth of commercial agriculture are likely to show themselves in a growing politicization of agricultural groups and an expression of tensions in both legal and extra-legal ways. How commercialization affects the farming community depends on the characteristics of the agrarian system, as well as on the policies and institutions through which the new technology is implemented.

V.1. THE POLITICIZATION OF AGRICULTURAL GROUPS

Within the existing agrarian systems of South and Southeast Asia, the introduction of the new varieties of wheat and rice is already creating social and political disruptions that threaten to spread. Landowners, and particularly large landowners with resources, gain with respect to other groups. The attractions of profit and prosperity begin to outweigh the traditional obligations to the rest of the community. This tends to lead large landowners to substitute cash wages and rents for customary relationships, and to extend their power and holdings at the expense of others. Landless laborers find that with the increase of profit levels and of demand for labor, they can gain from agitation for higher wages. This in turn encourages landowners to seek ways to relieve their dependence on their awakened labor force. Tenant farmers, as has been noted, find themselves the victims of rising rents and insecure tenure, for which the principal available remedy is political action.

Because of the lack of organization among rural groups and the dispersion of likely recruits to the ranks of active agitation, political movements have difficulty in harnessing rural discontent and misery. But the introduction of the new technologies, with the radical changes in rural relationships it implies, provides fertile ground for attempts to organize groups in the countryside. There is as yet very little understanding of the mechanics of this process. But there are indications that politicization is occurring and is likely to increase throughout Asia. In many areas leftist parties are moving to exploit the situation. They openly proclaim their intention of transforming the tendencies towards economic and social polarization into open political confrontation between the richer landowners and the rest of the rural population.

In Tanjore, Bihar, Kerala and West Bengal, for example, the activities of the Indian communist parties have been very strong. In some areas landless laborers have organized strikes against the landowners. And elsewhere the tensions have been expressed in violence, in illegal expropriation of land, and in assassination. In West Bengal, it was reported at the end of 1969 that over 170,000 acres of land had been forcibly seized by peasants who had the Marxist party behind them, and that about 380 people had been

murdered in 10 months.[2] Even allowing for a degree of inaccuracy in this report, the situation has proved grave enough for the Indian Ministry of Home Affairs to warn of an explosion if the growing disparity among rural people is not tackled effectively.[3]

Many of these troubled areas in India and elsewhere have a long history of agrarian disturbances. It seems likely that the unrest will grow and will ignite in other areas as the differences between regions and between groups within regions become more obvious in light of the Green Revolution. At the same time, the social forces making for stability are being broken down by commercialization, communication, and political agitation.

The agrarian unrest between landowners and laborers depends on the nature of their relationship and the degree to which each group can act as a cohesive force. In Ludhiana District, where there is no surplus of labor, and where laborers have been able to exact wage increases, many landowners are applying countertactics. They have denied laborers the traditional rights of taking fodder from the fields, and have stopped making additional payments in kind of fuel and vegetables. They also seem determined to mechanize harvesting operations as quickly as possible, in order to reduce their dependence on agricultural labor. In the Palghat District of Kerala, Miss Frankel reports:

> In anticipation of any agitation for implementation of the Agricultural Minimum Wages Act, landlords are already thinking in terms of stopping traditional bonus payment of paddy or other articles in kind at the time of festivals or other religious occasions, and of withdrawing any other facilities like loans and advances. Some have said that they will keep their land out of cultivation entirely if any effort to enforce higher wages is made. Others see a remedy in mechanization. By 1968-69, there were already 430 tractors in Palghat District, and the joint director estimates he could immediately dispose of an additional 1,000 without any subsidy, the major source of attraction being not greater efficiency in farm operations, but the opportunity to be rid of the laborers.

Nor is the political impact of these tensions restricted to local questions. The issue of "Who benefits from the Green Revolution?" may have been the key to the outcome of the 1970 general election in Ceylon. The ruling party was banking heavily on success in total rice production as the basis for winning the crucial farm vote. The opposition's victory in the election was based in large measure on their ability to convince poorer voters that the Green Revolution had made only the rich farmers richer. Since half of Ceylon's peasants own less than an acre of land, the opposition parties claimed that the agricultural sector was being polarized into a small group of relatively large low-cost farms that produce mainly for the market, and a larger group of small farms whose operators produce primarily for their own subsistence.

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[2] Reported in the *Washington Star*, December 14, 1969.

[3] Reported in the *Times of India*, December 8, 1969.

V.2. THE POLARIZATION OF AGRICULTURE

The effect that new technologies may have in widening the division between rural groups is perhaps best illustrated by the recent history of Mexico. The Green Revolution began in that country in the early 'forties. The Mexican Government decided to encourage overall agricultural production by concentrating resources on the farmers who were most likely to provide the biggest payoff. It gave the large commercial farmers in the north the irrigation, machinery, and credit they needed to expand their output using the newly-developed dwarf wheat seeds. In terms simply of national statistics, this policy has been an unqualified success. Between 1940 and 1960, agricultural output in Mexico grew at an average rate of 5 percent a year. Average daily caloric intake increased nearly 50 percent during this period, from 1,800 to 2,650 calories per person. And growth in cereal production has continued since then, increasing each year from 1960, when 495 pounds per person were produced, to 1968, when the figure was 680 pounds per person.[4]

Looked at more closely, however, these averages conceal gross and widening inequalities of income that tend to negate the contribution of the production successes to the alleviation of poverty. In 1960, for example, 54 percent of total agricultural output was produced on only 3 percent of Mexican farms. More important, in terms of the trend towards a growing polarization in the agricultural sector, this same 3 percent accounted for 80 percent of the increase in agricultural production between 1950 and 1960. It was these large-scale, capital-intensive, irrigated farms that were by far the largest beneficiaries of the new wheats. This radical increase in output and productivity in only a small part of the total agricultural economy, coupled with a rapid growth in population, meant that the number of landless laborers in rural Mexico grew from 2.3 million in 1950 to 3.3 million in 1960. Because of increased use of mechanization, the number of days worked by each laborer on average fell from 194 in 1950 to 100 in 1960, and his real income from such employment fell from $68 to $56.[5] Even the overall growth of the economy, about 6 percent a year, has been unable to provide enough employment opportunities in the urban areas to prevent this deterioration in the rural situation. There is likely to be a growing polarization along these lines in the majority of developing countries if present policies are pursued. Mechanization enables the rich to grow richer while the poor grow poorer, a spiral of inequity that must surely threaten to erode political stability as the population and its political awareness grow. The tragedy is that this form of polarization may prevent many millions of small farmers, tenants, and laborers from realizing the promise of the Green Revolution.

This prospect stands in striking contrast to the agricultural development of Japan and Taiwan. These countries relied on gradual

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[4] Calculated by the author from USDA data and quoted in Brown, *op. cit.*, Table 8, p. 140.

[5] R. Hanson, Unpublished draft of Ph.D. Thesis for the School of Advanced International Studies, Johns Hopkins University, Washington, D.C., 1969.

improvement of their agricultural resources and designed strategies to make full use of their most abundant resources. At no stage was there a discrete technological jump; the scale of agriculture typical in these two countries was stabilized by effective and thorough-going land reform programs; the technological inputs and associated services were developed specifically for this scale. Yields per acre were increased by the use of the available labor supply, and credit, extension services, and irrigation facilities could all be adjusted to the needs of the small farmers. When mechanization was introduced in response to growing labor shortages, it could also be on an appropriate scale. This enabled agricultural development and the resulting structural transformation to proceed without a sharp division between different classes of producers within the whole agricultural sector.

The contrast between agricultural development in Mexico and in Japan and Taiwan is primarily the result of the policies that were chosen in each case to implement new agricultural technologies. Other countries in Asia now have access to technologies that represent a marked superiority over existing methods of cereal cultivation. The challenge to these nations is to adapt their present institutions sufficiently fast to allow the benefits of the new high-yielding varieties to diffuse widely, rather than be concentrated in the hands of a relatively small group of commercial farmers. Unless deliberate decisions are made over a whole range of policy alternatives, the indications are that the countries of South and Southeast Asia will tend to follow the Mexican model, with severe implications for the patterns of their economic growth, and for their political futures.

CHAPTER VI

the broader employment implications

This study has so far dealt with the rather narrow topic of the direct effects of a new agricultural technology on employment. But the production of cereals is an integral and central part of the agricultural sector, which in turn plays a critical role in the overall economy of the developing countries. In 1965, more than 355 million acres in the non-communist countries of Asia were devoted to cereal production, comprising 58.1 percent of the total cultivable land.[1] And about 70 percent of the population lives in rural areas, with most of the people engaged in growing cereals.

The linkages between the cereal producing sub-sector and the rest of the economy will have a significant effect on the possibilities for the creation of more jobs in other sectors of the economy. The increased output must be processed and marketed; the additional income will stimulate demand; and the new inputs must be produced and supplied. At the same time, loosening of the constraint of food insufficiency can give more flexibility to government fiscal, monetary, and general agricultural policies. Unfortunately, with the present state of knowledge, it is impossible to estimate these effects with any precision.[2] But one can at least point out the possibilities, and the areas where policy decisions are needed.

VI.1. THE GROWTH OF DEMAND FOR CEREALS

With the new cereal varieties, the supply of food stuffs has become more responsive to demand. Employment opportunities in agriculture and in the linked sectors will depend in large part on how fast the demand for food grows. If demand increases rapidly,

[1] Asian Agricultural Survey, *op. cit.*, Table III.1, p. 211.

[2] To do so would require a whole set of schedules for cereal demand, supply, and the possibilities for factor substitution, as well as for the intersectoral effects.

then supply can rise at the same rate without prices falling. At the same time, the number of farm jobs will increase if the productivity of workers is not growing faster than the rate of increase of cereal supply. If the population in a typical developing country continues to increase at about 2.5 percent per annum, and if per capita income grows at two or three percent per annum, then the expected growth in demand for cereals would be of the order of 3.5 or 4.0 percent per annum. It is theoretically possible, then, to accommodate an agricultural labor force growing at, say, two percent per annum, and to allow for some increase in labor productivity.

If, however, the productivity of workers in one part of the agricultural sector is made to increase very rapidly, through the combined introduction of the new seeds and mechanization, then the possibilities for absorbing the growing agricultural labor force are slim. This implies that a combination of extensive and intensive farming systems may, in fact, be inappropriate for many developing countries. Of course, the situation is rather different in those countries that are presently importing food grains. They are able to expand their supplies of food grains faster than the growth of demand, thereby making up the deficit previously imported, and saving foreign exchange. In the next few years, this could give a significant boost to employment in such countries as India, East Pakistan, Ceylon and Indonesia.

The question of the pricing of cereals is intimately bound up with the relationship between supply and demand. The poorest groups in a developing society benefit greatly from a reduction in food costs, since they spend a very high proportion of their earnings on food. However, in countries where 70 or 80 percent of the population lives in rural areas, and where most of these people are not major participants in the market economy, the beneficial effects to the poor from a lowering of food costs may not be very widespread. Indeed, the benefits may apply to urban workers, but have relatively little impact on the great majority living in the countryside. Small farmers may find themselves worse off since they may be unable to lower their costs sufficiently to enable them to market produce profitably.

It is extremely hard to make predictions about what will happen to the supply of wheat and rice, allowing for the vagaries of the weather and the uncertainties about the future spread of the Green Revolution. Although the trends are not clear, use of the new technologies may allow the production of cereals in Asia to grow at about 5 percent a year: this seems to have been the average rate of growth over the past two years. If this continues into the future, and supply continues to outrun demand, then prices will fall, which will be detrimental to small farmers and tenants struggling to enter the market economy. If the employment effects of the new seeds are to be maximized, it is essential to work to keep supply and demand rising in tandem and at a rapid rate. There are basically three approaches that can be adopted.

The first of these is to try to increase directly the demand for cereals. Various methods such as improved distribution systems, promotional campaigns, and better processing can contribute to

this. Secondly, the increased efficiency of the new cereal varieties may allow the diversification of some agricultural resources into other types of production, such as feed grains, livestock, poultry, fruit and vegetables, and dairy products, for which the demand is growing as urban population and incomes increase. And lastly, as some countries reach the position of satisfying their internal demand for cereals, they may find prospects for exporting.

VI.2. DIVERSIFICATION

The need for diversification of the agriculture of the developing countries is hastened by the advent of the new seeds. In the Philippines, for example, if present trends in yields and demand continue, perhaps as many as half the small rice farmers of the Philippines will need to find alternative crops in the next few years to get them out of rice production if they want to remain in the market economy.[3] The supply of rice is growing faster than demand, and, as prices fall, many farmers will be unable to make a profit by selling their rice surplus. In the developing countries, with their relative shortage of land and abundance of labor, diversification into labor-intensive produce has particular advantages.

Fruits and vegetables, for example, both use a great deal of labor and have a very high value of output per acre. At the same time this type of produce requires careful processing, thereby creating further employment opportunities. The economic demand for fruits and vegetables in the developing countries of Asia starts from a low level but is growing rapidly. With support from the government in the forms of research, extension, credit, and marketing, this type of production may prove to be a very useful investment for these countries. There are also considerable prospects for some of these countries to export to the industrialized nations. Taiwan and Mexico have been very adept at making use of these opportunities. Pakistan and Afghanistan are beginning to export winter fruits and vegetables to the Soviet Union. Of course, there are very real problems of quality and disease, but the comparative advantage of the tropical and subtropical regions in this type of production should enable several of them to earn foreign exchange and create employment.

In the short run, dairy production may present the best opportunity in some countries for small farmers to increase their employment and income.[4] Dairy farming is an important agricultural commodity with a large existing production base. The demand for these products is very strong and the necessary technology is often suitable for small farmers.

Finally, the demand for livestock and poultry, and consequently for feed grains, is increasing fast as incomes rise and the demand for high-quality protein grows. This will allow the developing countries to diversify into these areas and to expand production and employment. Small farmers, however, will need help through research, and assistance with disease control and processing if they are to play a major part in this expansion.

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[3] Voelkner, *op. cit.*, p. 53.

[4] Mellor, *op. cit.*, pp. 13-16.

The employment effects of diversification cannot be spelled out from the available data. Suffice it to say that as farming is intensified, and with suitable mechanization policies, there is hope for providing more productive jobs in the rural areas than presently exist. Now that the introduction of the new seeds has eased the pressure to concentrate the majority of agricultural resources on the production of food grains, the governments of the developing countries can turn more of their attention to diversifying their agriculture to give more jobs and more income to the peasants.

VI.3. TRADE

An alternative approach to diversification is for the developing countries that are benefiting from the Green Revolution to try to gain a firmer footing in world export markets. The introduction of the new seeds has enabled Mexico, the Philippines, and West Pakistan to meet their own internal economic demands for their major food grains. Several other developing countries will probably reach this position in the next few years. This opens the possibility for exporting agricultural produce. At present, however, the prospects are slim for most developing countries to achieve really significant food grain exports. For one thing, these countries have difficulty meeting the quality standards demanded on the world market, and their internal prices are often considerably in excess of world prices (this is especially true of wheat). And the world food grain markets are already facing excess supply, with declining prices.

Some developing countries may be able to export food grains, but the quantities will not be large without a major realignment of cereal trading patterns. The problem is that the cereal policies of the rich countries are much more concerned with protecting their own farmers and exports than they are with encouraging efficient patterns of world production, which might in turn enable the peasant farmers of the developing countries to share the benefits of world trade. Japan, for example, is presently paying its farmers about three times the world price for growing rice and is even exporting on concessional terms some of the surplus it has created by this pricing policy. The U.S. is exporting subsidized rice; Western Europe hides its agriculture behind very high tariff walls, and France is subsidizing wheat exports by up to 50 percent of their domestic support prices while also supplying Indonesia with rice on concessional terms.

As the developing countries become more experienced in marketing and more fully able to exploit their comparative advantages in solar energy and abundant labor, a confrontation on cereal trade between these regions and the developed countries is distinctly possible. It will not be easy for the political leaders of the rich countries to back away from their past protectionist policies. And yet there are definite advantages if these nations can make the necessary structural adjustments, reduce their barriers to cereal imports, and stop the export of cereals on concessional terms where that is harming the export possibilities of poor countries.[5]

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[5] These issues have all been explored in more depth elsewhere. See e.g. Brown *op. cit.*, Ch. 19, and W. P. Falcon, *The Green Revolution: Generations of Problems*. A paper presented to the Summer Meeting of the American Agricultural Economics Association, Columbia, Missouri, August 9-12, 1970.

The taxpayers and consumers would benefit: they would have cheaper food, and they would not have to pay such heavy direct subsidies to their own farmers. Exporters of manufactured goods in the rich countries would also gain from the stimulus to world trade.

The farm policies of the rich countries now work to deprive the developing nations of the resources they need for development. But aside from the foreign exchange, the employment benefits to the developing countries from such trade are very considerable. The export of one million tons of rice would provide 25-30 million man-days of employment for farmers, in production alone. Much additional employment would be provided in processing, marketing, and transport.

But for the near future, the prospects for rationalizing the world cereal trade are rather dim. There are two principal reasons for this: (1) the negotiation and enforcement of international commodity agreements is a very lengthy and tricky business; and (2) the farm groups in the rich countries represent extremely powerful political lobbies.

Because of this, the developing countries have much more realistic opportunities for exporting products into which they can diversify as a result of the Green Revolution. There are several successful examples of this, particularly in fruits and vegetables. In 1950, sugar accounted for 80 percent of Taiwan's total exports, and almost all of its agricultural exports. By 1967, sugar exports, though still large, accounted for only 7 percent of the greatly expanded total; banana exports, mainly going to Japan, accounted for 10 percent. Exports of canned fruits and vegetables (principally mushrooms, asparagus, and pineapples) had climbed to $84 million. In Mexico, the production of strawberries reached 140 million pounds in 1968, almost entirely for export to the U.S., and production of watermelons and cantaloupes tripled in the preceding five years.[6]

The prospects for exporting feed grains to supply the burgeoning livestock industries of the world are also good. Thailand has in recent years developed a very successful corn exporting business. In 1969, it sold 1.5 million tons of corn abroad, primarily to Japan, Hong Kong, and Singapore. This amount exceeded the exports of rice, long almost the sole earner of their foreign exchange. This trend may provide possibilities for other developing countries.

One country, Taiwan, has really succeeded in combining the possibilities for diversification and trade to increase the number of productive jobs. As has already been noted, non-agricultural employment has been growing very fast. Yet, because of the very high birth rates in the 'fifties (averaging about 3.5 percent per annum), the absolute numbers of people in the rural areas has continued to grow. By making full use of multiple cropping and the opportunities to diversify, employment in agriculture increased at an average rate of 1.5 percent annually over the period 1960-68, while labor productivity grew about three times as fast.

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[6]Brown, *op. cit.*, pp. 162-3.

All of this occurred in a country where the average farm size is only about 2.2 acres.[7]

VI.4. INDIRECT EMPLOYMENT EFFECTS

Besides the opportunities for the expansion of employment in agricultural production, the industries which are linked to agriculture will also be stimulated by the Green Revolution. The distribution and marketing of the new seeds, of fertilizers, chemicals, and equipment, will all create jobs. So will the processing and marketing of the increased grain harvest. And there will be a further multiplier effect throughout the rest of the economy. It is possible, in fact, that the amount of employment created indirectly – to supply inputs to agriculture and to market the additional output from the high-yielding varieties – will exceed the direct employment effects of the Green Revolution.

In one of these linked industries – the manufacture of agricultural implements – the number of job opportunities created will be directly affected by the choice of the product. For example, if farmers demand complex machinery like tractors, these generally would have to be manufactured in large, capital-intensive factories.[8] But if they use less sophisticated equipment – such as tubewells, simple diesel engines, and animal-powered plows and seed drills – then these could be manufactured at the local level, in simple, labor-intensive factories. This has already been happening to a marked extent in those areas in which the Green Revolution has had its most significant impact. In the Pakistani Punjab, for example, the city of Dasca has grown into a center for the manufacture of simple diesel engines for tubewells and grain mills. There are now more than one hundred small factories producing diesel engines from principally local materials. More than 1,000 workers are employed there, all of them entirely trained in the local factories.[9] There are many similar examples elsewhere.

The whole area of marketing – in the broadest sense – will also provide new employment. Very large investments in storage, in feeder roads, in processing and in distribution will be required in order to maintain the momentum of the Green Revolution and to market the increased output. And all of these investments will create jobs.

It is too early to predict the likely extent of this process, but an example in one industry can give some idea of the possibilities. In India the baking of bread has become a rapidly growing industry. It has been estimated that 165,000 people are directly employed in bakeries. Nearly 93,000 people are employed in production alone, as compared with 52,000 people in 1961. At least part of this expansion can be laid to the extraordinary increase in wheat

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[7] *Taiwan Statistical Data Book 1969*, Republic of China, Charts 1-1b, 2-5a, 4-1, 4-4 and 4-6.

[8] Giles, for example, estimated that the number of jobs created by plants in Asia with the capacity to produce 12,000 tractors per year would be a mere 11,200. *Op. cit.*, p. 203.

[9] E. Smith, *The Diesel Engine Industry of Dasca, Sialkot District*, mimeo from USAID, West Pakistan, 1969.

production between 1966 and 1968.[10] In the overall context of the employment situation in India, it is important to note that many workers in this industry are in serious danger of losing their jobs, as a result of the recent loan to India from Canada for five automatic bread-making machines. The central point of this discussion is that if the problems of poverty and lack of jobs in Asia are to be alleviated, then governments should adopt deliberate policies to create as many jobs as possible both directly within agriculture and in the linked industries. The Green Revolution creates opportunities in both areas. How many jobs are provided in the linked sectors will depend on the choice of product and on the technologies used. There is a need for further study both of the present extent of job creation in the linked industries, and of the options that exist for the profitable use of labor-intensive technologies to augment the amount of employment provided indirectly by the new seeds.

If we turn to look at the economy as a whole, the increase in the supply of staple foods will have a multiplier effect on the economy, and will give governments much greater freedom to institute labor-intensive programs, a policy choice for which the main barrier in the past has been the fear of inflationary food prices. In regard to the first point, AID reports:

> It is too early to predict the effects HYV (high-yielding varieties) will have on the GNP (gross national product) and on industry. GNP can be expected to grow with greater agricultural productivity but the proper multiplier between agriculture and GNP is not known. A multiplier of at least 2 to 3 might be appropriate for most countries. Thus assuming agriculture is now 40-50% of GNP, a growth rate of 5% in agriculture compared with a present 2.5% would induce an acceleration in GNP growth of 1-2 percentage points. If initially, at least, the agricultural growth rate could be accelerated to 7-8% as present imports are substituted, then the acceleration on growth in GNP would be 2-3 percentage points above present rates. It is assumed that ability to export will be small unless the country is willing to subsidize exports to some extent.[11]

An acceleration of this magnitude in the growth rate of the economy should provide a useful stimulus to the process of job creation.

One effect of the high-yielding varieties is to make the supply of staple food grains more elastic, i.e., more able to respond to changes in demand. In the past, the fear of inflation generated by an inelastic food supply was responsible for dampening the desires of governments to engage in large, publicly financed programs that would have a major impact on the employment situation. Since a very large proportion of the wages of laborers is spent directly on food, and especially on staple food grains, an increase in government spending on labor-intensive projects tends to raise signifi-

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[10] USAID, *Changing Bread Consumption Pattern in India*, Airgram from AID, New Delhi, January 12, 1970.

[11] R. R. Newberg, *Emerging Problems – Some Economic Considerations*, paper for USAID Spring Review, March 1969, p. 23.

cantly the demand for food grains. Before the advent of the new varieties, this meant rising prices, since supply was unable to respond to the increase in demand. But this situation has been improved by the introduction of the new seeds. It may well be that with the growth of the labor force, and with no immediate possibility of absorbing all the increase in urban jobs, countries determined to attack their employment problems will have to engage in massive labor-intensive public works programs. These can be designed to provide the rural infrastructure necessary for agricultural development, as well as to improve the conditions of life for the millions in slums and shanty towns. Programs of this type have been made easier by the Green Revolution because of the additional responsiveness of the new cereal varieties to demand. It is very hard to conceive of public works programs providing a long-term solution to the employment problems of the developing countries, but as a medium-term palliative they form an important tool of policy.

Finally, if the increased rural incomes that derive from additional cereal production are distributed fairly evenly, they should increase the demand for the kinds of simple consumer goods that can be produced domestically. These kinds of goods have the additional advantage that they can be made in relatively simple, labor-intensive factories. And the employment generated in such industries will also help to increase the demand for food.[12]

There are, then, many ways in which the production successes of the Green Revolution can be translated into more jobs in agriculture, in industry that is linked to agriculture, and throughout the rest of the economy. Those governments that are concerned with the employment problem in the poor nations can design their policies to take full advantage of these opportunities.

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[12] Further discussion of these points may be found in:

(a) John W. Mellor, *Expanding Domestic Markets for Food*, a paper presented at the Cornell University Workshop on Some Emerging Issues Accompanying Recent Breakthroughs in Food Production, Ithaca, New York, March 30-April 3, 1970 (mimeo); and

(b) Stephen R. Lewis, Jr., Walter P. Falcon, and Carl H. Gotsch, "The Green Revolution and P.L. 480 – Some Parallel Problems?" Working Paper No. 3, in *Agricultural Price Policy and the Development of West Pakistan*, Vol. II, Harvard University Development Advisory Service (mimeo), 1969.

CHAPTER VII

a rural employment strategy

VII.1. INTRODUCTION

Agriculture is such a dominant feature of the poor nations that the strategies chosen to implement rural development will determine to a great extent the nature of the entire society that will emerge. It will, for example, be decades before agriculture ceases to provide a livelihood for most of the world's people. Whereas in recent years, the main objective of agricultural policies has been to increase the total amount of food produced, there has been relatively little concern with the wider aspects of rural development, particularly with how to bring rural families into the mainstream of modern life. But it now seems clear that national governments are becoming more sensitive to the broader range of issues, particularly to the closely related needs to create more rural jobs and a more equal distribution of income.

The governments of the developing countries will have to devise strategies specifically designed to achieve these goals of peasant welfare. The Green Revolution can play a very important part in these strategies, because it promises to raise the productivity and incomes of many millions of preasant farmers. But the new agricultural technologies also contain potential dangers. They may widen economic inequities within rural areas, and cause unrest threatening any rural development.

The many issues that have been raised in this paper about the Green Revolution can be summarized in three crucial questions:

(a) How can developing countries prevent needless mechanization in cereal production that will eliminate jobs for large numbers of people and polarize the agricultural sector?

(b) How can the abundant labor resources be put to the best productive use in cereal production?

(c) How can the developing countries capitalize on the breakthrough in cereal production to stimulate growth and to generate employment throughout the rural areas and the rest of the economy?

The answers to these questions lie in designing agrarian systems that are capable of using labor more intensively and, at the same time, of increasing agricultural output. These agrarian systems must also be linked with the rest of the economy in ways to encourage increased output and improved income distribution. This final chapter is devoted to suggestions for a possible rural development strategy that could use the Green Revolution to help provide productive jobs for the growing numbers of people in the agricultural sector, as well as initiate the necessary increases in productivity in order to raise the living standards of millions of peasants. This strategy can only be sketched in general terms, because the factors affecting farming vary widely both within and between developing countries.

Countries with different ratios between people, land, and capital have been able to achieve great increases in agricultural output and income by combining these factors in the most efficient way from the point of view of their society as a whole. Thus, in countries such as the United States and Europe, where there is relatively abundant land compared to the number of people working it, farmers have been able to increase output and income by substituting machinery for the scarce resource, labor. By contrast, farmers in Taiwan and Japan have increased output and income by substituting fertilizer and irrigation for the scarce resource, land. Mexico represents an intermediate situation in which machinery has been used in spite of an abundance of labor. Overall output has increased at a very satisfactory rate, but the incomes of most rural workers have not kept pace.

In most developing countries of South and Southeast Asia, the demographic situation is more closely akin to that in Taiwan and Japan. However, these countries have suddenly had a new, almost cost-free technology of great potency superimposed on their existing agrarian systems. This introduction strongly affects the urgency of reform in those systems. Unless great efforts are made to spread the benefits of this new technology widely, as quickly and as extensively as possible, the tendency towards polarization between rural groups is likely to congeal. Once large farmers taste the profits of the new technologies, they have even more strongly vested interests in resisting land reform, and in ensuring that credit and extension services continue to meet their needs above those of the small farmers. Once rich farmers experience the advantages of tractors, the same sort of resistance to change occurs. This means that agrarian reform should be easier to accomplish while the new varieties are being introduced, rather than after they have been successfully adopted.

None of this is intended to imply that reform of agrarian systems of the developing countries is going to be easy, from the point of view either of political expediency or of the institutional framework which must be created to effect widespread rural development. The chastening experiences of the rich countries have already shown us how much we have to learn.

For example, sharecropping became obsolete in the Mississippi Delta during the 'fifties when cotton was grown and harvested mechanically. The demands for unskilled labor declined 90 percent in ten years and more than half the farm population moved

away.[1] One can only speculate about the extent to which this and similar occurrences contributed to the urban crisis in the last decade.

But these difficulties do not diminish the need for action. In fact, decisive action is made all the more urgent by the introduction of the new cereal varieties, and by the fact that the rural populations of the developing world continue to grow. The following measures have been selected from the analysis of the previous chapters as most strategic for widespread distribution of the benefits of the Green Revolution:

(a) devising a national mechanization strategy
(b) land reform
(c) extending the Green Revolution
(d) expanding irrigation and improving credit systems
(e) increasing the demand for food
(f) slowing the rate of population growth.

Action in these areas, therefore, forms the heart of a strategy designed to take advantage of opportunities offered by the new cereal varieties to create more jobs and increase incomes.

VII.2. A NATIONAL MECHANIZATION STRATEGY

In most of South and Southeast Asia, government policies currently encourage mechanization, particularly the use of tractors, along with the spread of the Green Revolution. Furthermore, the accelerating trend towards mechanization is occurring at a time when the labor force in the rural areas is still growing. If this trend continues, millions of peasants in these areas are likely to find that they have no means of earning a living. So important is mechanization in defining the future of the agricultural sectors in developing countries that their governments should give the highest priority to conceiving coherent national strategies to deal with the whole set of issues raised. Special care must be taken to analyze the labor displacement effects of any mechanization that is permitted. Present indications are that serious labor displacements are being caused by introducing combines and tractors. At the same time, scarce foreign exchange and capital resources are being channeled into large-scale mechanization when agricultural production can be increased in ways more beneficial to the total society. If further research proves this to be the case, then a slow-down in farm mechanization is clearly indicated.

In order to develop a coherent mechanization strategy, the governments of the developing countries should establish a set of criteria to apply to demands for agricultural mechanization. The most important point to be addressed is the divergence between the net benefits accruing to farmers and those accruing to society at large. There are two main elements involved in this divergence. One is the fact that capital investment in agricultural machinery is subsidized today in various ways; the other is that individual employers and society evaluate labor differently.

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[1] R. H. Day, "The Economics of Technological Change and the Demise of the Sharecropper," *The American Economic Review*, June 1967.

In general, given a situation in which labor is abundant and capital is very scarce, the use of capital should not be subsidized. The problem of agricultural mechanization can be treated as part of the general problem of the imbalance between the prices of capital and labor in the developing countries. Righting this imbalance should be the aim of these nations if they want to make the most effective use of their abundant resources. The essential elements of the solution to this problem are to raise the interest rate and to value foreign exchange at a more appropriate, higher level. But, where there is reluctance to do this, special policies should be devised for agricultural mechanization because of the immediate, critical danger of rural labor displacement. At the very least, taxation and pricing policies should place the full burden of all costs on those farmers who purchase the machinery. Subsidies on agricultural machinery in the forms of undervalued foreign exchange, cheap subsidized credit, and similar devices should cease. Another approach would be to place heavy taxes on agricultural machinery, preferably graduated by horsepower. If a more drastic step were warranted, import controls could be imposed on agricultural machinery.

An even more difficult problem is the valuation of labor. It does not cost society anything if labor is employed at a subsistence wage in the agricultural sector, but there is a definite cost for employers. At the same time, if a laborer is displaced, there may be a net savings to the farmer who employs him, but society has to pay the cost of supporting him. And this cost rises if he moves to the city where he requires housing, sanitation, and other social services, as well as a job. It is very difficult to devise measures to correct this difference. One could subsidize the wages of all labor employed in agriculture, but this is not economically or administratively feasible for the developing countries. Theoretically, it should be possible to place the costs of labor on the employer whether or not he actually employs the labor. This possibility appears to be politically infeasible at the present time, although it should not be ruled out for the future. However, it might be possible to tax labor-displacing machinery sufficiently heavily to pay for relocating and employing the redundant workers it creates. A third alternative is to increase the number of self-employed, viable small farmers at the expense of large landowners, in which case the problem would be avoided.

If displacement of labor by machinery is not to become characteristic of rural development in the poor countries experiencing the Green Revolution, governments should strive to price agricultural machinery nearly in line with the prevailing factor endowments, i.e., make it more costly, because capital is so scarce compared to labor. This would conserve scarce capital and foreign exchange resources for projects more beneficial to the development of the society as a whole. There are two major exceptions to this principle. First, farmers may prefer to mechanize even though it may not be profitable for them to do so. We have seen examples where the motivation behind mechanization appeared to be either the prestige of owning a tractor, or the desire to be rid of dependence on laborers. If this becomes a widespread trend, then there would be a need either for

additional taxes or physical controls on the production and importation of tractors and tractor-drawn implements. The second exception concerns those areas where higher yields or intensified farming are heavily dependent upon tractor mechanization. This may be true especially of dryland farming areas, and of certain irrigated areas where the pressure on labor during the peak seasons is so intense that the possibilities for multiple cropping cannot be realized. Governments have a responsibility to determine those areas where tractor mechanization is essential and to devise suitable methods for supplying the needs for it. They could, for example, provide state-owned tractor stations with sufficient capacity to handle the needs of these special areas. Services could be priced in such a way that farmers in these areas would not obtain a competitive advantage over farmers in the non-tractorized areas.

There is an urgent need for research and manufacture of agricultural implements that can raise productivity and loosen labor bottlenecks, and yet be used by the great majority of peasant farmers without displacing unjustified numbers of laborers. At the same time, the possibilities of selective mechanization to complement labor utilization and to intensify agriculture deserve special attention. Irrigation is a case in point. Pumps and tubewells to facilitate water control should be exempted from the stringent measures advocated above. In other situations where serious seasonal labor shortages occur, there may be a case for exempting other types of machinery: threshing and drying machines are good candidates for this category. The Asian Productivity Organization or a similar institution could reasonably be expected to undertake regional research on these questions.

As for small farmers, choices again have to be made about the trade-off between, on the one hand, lowering their costs by developing small-scale tractors and implements and by extending custom-hire services, and, on the other hand, the possible adverse labor displacement effects of even this level of mechanization. Again this raises questions of using high opportunity cost capital and foreign exchange resources. Since agricultural labor forces will continue to expand over the next several years, it seems reasonable to postpone even these types of mechanization, except in cases where they can overcome seasonal labor shortages. In Taiwan, this restricted type of mechanization has been introduced only in the last decade, when the level of agricultural development was already well above that prevailing in South and Southeast Asia. Even in 1967, only about 15 percent of farm households owned garden tractors, which supplied less than 30 percent of the total power used per hectare.[2]

Wherever partial or full mechanization is adopted, governments should make every effort to encourage the local manufacture of farm machinery and equipment, if it is feasible to do so, in order to raise employment and to stimulate domestic industrial production.

All these issues call for tough decisions, particularly in view of the awareness of the present advantages of mechanization among large- and medium-sized farmers, and the power that these groups

[2] APO, *op. cit.*, tables 33, 34, 46.

have in the politics of the developing nations. At the same time, the rest of the rural population is becoming more sensitive to the changes occurring in their relationships with their landlords and employers. They feel increasingly insecure, and they see a relative if not absolute decline in their incomes, much of which can be blamed on mechanization. This dilemma demands construction of careful policies to maximize agricultural development while minimizing social conflict.

As discussed in Chapter 4, mechanization is closely related to the size of farms. On large farms, the difficulties of organizing sizable numbers of laborers efficiently makes large-scale mechanization well-nigh indispensable. Labor displacement on large farms seems, therefore, to be inevitable, even if large farmers are made to pay the full costs of mechanization. This is one of several strong arguments for a redistribution of land-holdings in much of South and Southeast Asia. Kusum Nair has summarized the issue effectively:

> Neither large machines nor large farms are indispensable to "modernity" or efficiency in agriculture; when and if the farmers become fewer and the farms can be bigger, the machines could be changed. But machines must not be permitted to determine the economic scale of efficiency, and thereby liquidate the small cultivator or prevent him from participating in the varietal and chemical revolution now under way.[3]

VII.3. LAND REFORM

A second area of concern to political leaders and administrators is the perenially difficult problem of land reform. Differences between sizes and types of ownership of farms are accentuated by the Green Revolution, which at present favors large over small farmers, and landlords over tenants. Land reform is concerned primarily with two basic relationships in rural society:

(a) the way in which the available farm land is divided among cultivators, and

(b) the character of the ties between those who own the land, and those who work it.

The evidence of the deteriorating landlord-tenant relationship as a result of the introduction of the new cereal varieties is a strong argument for a determined program to give the tenants security of tenure. This should encourage the tenants to invest in the land they farm, and to adopt the high-yielding varieties where they are suitable. Both of these advances would be supported by a plan to limit rents, if such a plan were politically and administratively feasible. But governments and farmers alike are too easily tempted to evade these reforms; rising land values encourage farmers to rent even more land, while land owners are encouraged to hold on to their land and to cultivate it themselves. But these trends only highlight the need for firm and effective action. Suffice it to say that the tenant farmer would seem to have a dim future in areas where high-yielding varieties are grown, unless measures are taken to uphold his status.

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[3] Kusum Nair, *The Lonely Furrow*, The University of Michigan Press, Ann Arbor, Michigan, 1969, p. 226.

More needs to be known about the relationship between the new farm technologies and tenant insecurity. Some of the initial reports have been discouraging. Governments and universities should undertake more research on the extent of this insecurity, on the degree of exploitation, and on the processes involved under different systems of tenure. Where the new technologies and the increased accent on the commercialization of agriculture exacerbate tenant insecurity, counteraction should be initiated immediately. This would involve, at the least, improving records of land occupancy and tenure conditions, registering tenancy, and enforcing existing regulations on rents and security of tenure. More ambitious programs to give tenant farmers a greater stake in rural development can follow. In many cases the ultimate goal may be to turn tenants into viable, small landowners who are capable of making full use of new agricultural technologies.

Fundamental to land reform is the extent to which governments of the developing countries are prepared to distribute land holdings more evenly. Land redistribution by itself is not a panacea for rural problems. For example, it is highly unlikely that all rural families in South and Southeast Asia could be given farms of viable size. And the process of reform itself is destabilizing; it changes the existing patterns of power. Finally, land reform alone may not bring increases in income to peasant farmers; its success depends on whether small farmers can be mobilized to take advantage of the new opportunities, and whether they can be provided with the necessary services to ensure their productivity.

A major study of land reforms in many countries has just been completed.[4] It has strengthened the economic case for land reform by demonstrating that in most of these countries, small farms have higher productivity per acre than do large farms.[5] Furthermore, the evidence available on post-reform experiences – in Mexico, Bolivia, Chile, Japan, Taiwan, and Egypt – shows that, although in some cases there was an initial decline, average productivity per acre increased rather substantially after these reforms.[6]

Despite the fact that land reform is not a complete solution, it is a key link in a strategy to increase rural employment opportunities. There are several reasons for this. In the first place, effective land redistribution obviates the need for the mechanization of large farms. The scale of farm units would be reduced, and the arguments about the difficulties of managing sizable numbers of laborers on a single unit would be eliminated. Then too, if all farms are roughly the same size, services such as marketing, credit, and irrigation can all be standardized and geared to that size. In most Asian countries today, there are essentially two agricultural service systems, one for the large commercial farmers, and the other to subsidize small farmers and tenants – with resulting in-

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[4]USAID, Spring Review Papers on Land Reform, June 2-4, 1970.

[5]See, for example, the evidence on India, Japan, Taiwan, the Philippines, Mexico, Brazil, Colombia and Guatemala in P. Dornel and D. Kanel, *The Economic Case for Land Reform*, paper for USAID Spring Review, June 2-4, 1970.

[6]*Ibid.*, p. 31, and country papers from USAID Spring Review, June 2-4, 1970.

efficiencies and inequities.[7] Land reform would also permit more even distribution of people on the land. As the new technologies are adopted in this situation, each small farm could use its family labor more fully and, at the same time, employ hired hands on a regular basis. A very large number of small farmers could thereby be brought into modern society, become part of the market economy, expand the demand for agricultural inputs and consumer goods that could be made locally, and supply a growing amount of agricultural produce.

The strong arguments for land reform in Asia and for consequent development on the Japanese and Taiwanese models do not answer the extraordinarily difficult questions of how and when to undertake this course. Land reform implies drastic revisions in patterns of income distribution, political power, and social hierarchies. All these changes will encounter strong resistance from vested interests. But what is the alternative? The value of viable farm plots is rising rapidly as a result of the Green Revolution. Power and status emanating from land ownership are increasing along with land values. Yet more people than ever before lack the benefits of land ownership. In this situation it would hardly be surprising to see more of the kind of *de facto* land redistribution already taking place in parts of South and Southeast Asia.

The introduction of the new varieties increases the urgency of the need for land reform because of its effect on land values and vested interests. At the same time, however, the Green Revolution may make it easier to convince large landowners that they can make a decent living with smaller holdings that do not expose them to the dangers of extra-legal appropriation by the disadvantaged. On equity grounds, too, it can be argued that the larger farmers have received the benefits of the Green Revolution at almost no cost to themselves: the research on the new varieties was financed by the foundations, by donor agencies, and by national governments; many of the necessary inputs are subsidized; and the increased incomes of the larger farmers are barely taxed. It is only reasonable then that the larger farmers should share some of the benefits with their poorer neighbors. Land reform is one way to achieve this.

We have seen that there are strong arguments for encouraging land redistribution in concert with the adoption of the new farm technologies, before their benefits create even stronger resistance to change. But how is this reform to be executed? Most Asian countries have legislation providing for ceilings on land holdings, although these laws are not well enforced. In most cases, national governments could make a start towards redistribution by enforcing ceilings in those areas where the new cereal varieties have been adopted or where they are likely to be introduced in the next few years. They should include provisions to ensure that the released land is redistributed to those who need it. Subsequently, land reform could be extended throughout the countryside, and the ceilings lowered to provide more equitable distribution of land

[7] The disadvantages of this dual system are discussed in Falcon, *op. cit.*, especially pp. 27-29.

holdings and income insofar as administrative constraints and financial and political pressures permit.

It is sometimes argued that progressive land taxation, preferably based on potential rather than actual output, could be a substitute for land reform. Progressive land taxes would help make incomes in rural areas more equal, while basing them on potential output would encourage production. It is, of course, extremely important for the overall economic development of the poor countries that their agricultural sectors provide capital for the growth of their industrial sectors. Taxing agricultural output is one way of doing this. But progressive land taxes based on potential output are very hard to administer. Such taxes fall more heavily on large farmers than small, and therefore raise political problems similar to those encountered in reforming land tenure. Moreover, evaluating potential and subsistence output is, in itself, both complex and controversial. Under present price structures, large farmers would be encouraged to maximize their profits which, in turn, would hasten the advent of mechanization and the displacement of labor. While progressive land taxes should provide more even distribution of income among landowners, they would in fact fail to overcome deficiencies in the basic agrarian system. And they would not help provide the necessary additional job opportunities. It would be better to view these taxes as complementing land reform efforts, rather than substituting for them. If changes in agricultural taxes were to follow land reform measures, governments would still have to cope with the inefficiency of taxing a large number of small holdings. But it can also be argued that:

> While administratively it may be easier to collect taxes from a small number of landlords than from numerous peasantry, politically just the reverse may be true. Actually land reform may serve as one of the means by which it becomes politically feasible to transfer the accumulating function from the landlord to the state.[8]

This is particularly true if taxes are imposed and collected by local authorities who can use a portion of the revenue to undertake projects which directly benefit local taxpayers.

VII.4. EXTENDING THE GREEN REVOLUTION

If opportunities presented by the Green Revolution to create more jobs are to be fully exploited, the area planted with the new cereals must be expanded. This is a complex subject which has been dealt with more fully in other studies.[9] But the principal areas for required action should be noted. They are:

(a) expanding the areas with controlled water supply;

(b) maintaining price incentives for producers;

(c) providing adequate supplies of seeds, fertilizers and pesticides;

(d) extending credit institutions to allow farmers to purchase the inputs;

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[8] Eckstein, "Land Reform and Economic Development", *World Politics*, July 1955, p. 660.

[9] See, *e.g.*, Brown, *op. cit.*

(e) intensive research on adapting the new cereal varieties to local ecological conditions and to local tastes;

(f) providing suitable extension and education services in the rural areas; and

(g) creating a marketing system capable of handling increased amounts of agricultural inputs and outputs.

However, extending the area planted to the new cereal varieties will not in itself solve the problems of rural poverty, even if every effort is made to create as many jobs as possible. Conditions are not suitable for raising the new wheats and rices in many areas. Moreover, the demand for these cereals may be met relatively easily. In order to capitalize fully on the employment opportunities in the rural areas, the Green Revolution must not be treated in isolation. Governments must recognize the fact that the increased productivity of the new cereals frees resources for diversifying agriculture. In particular, developing countries should adopt aggressive policies for diversifying their agricultural production into fruit and vegetable production, feed grains, and livestock and poultry industries. All of these types of production should help to expand both directly and indirectly the available number of productive employment opportunities.

Finally, opportunities for agricultural trade are open to those developing countries that can develop a comparative advantage in agricultural production. These opportunities are likely to have some impact in terms of employment for farmers. But their effect on jobs in marketing, processing, grading, and transportation should also be considerable.

VII.5. CREDIT AND IRRIGATION

From the point of view of employment, the two most critical factors in the advance of the Green Revolution are credit and irrigation. Farmers generally cannot adopt the new varieties of wheat and rice, nor can they intensify their agriculture, without irrigation. At the same time, they need improved credit systems both to provide more irrigation facilities and to finance working capital, especially for fertilizer. The technological requirements of the new seeds have created a huge demand for private tubewells and low-lift pumps. In many areas this development is the hinge upon which the future of the Green Revolution rests. Despite the rapid payoff on investments in water control, the initial capital required for a tubewell is well beyond the means of most small farmers. In the Indian Punjab, for example, a small tubewell costs approximately Rs 6-7,000 ($860-$930). It is apparent, therefore, that small farmers must have access to medium-term credit for such investments.

When we look at credit for working capital, we find that there is conflicting evidence about the role of credit institutions in spreading the new seeds. On the one hand, traditional sources of village credit – savings and money lenders – apparently can provide more resources than was often believed in the past. At the same time however, insufficient working capital has resulted in small farmers using far less than optimum amounts of fertilizers and pesticides in many places. And small farmers make good use of institutional credit when it is available at a reasonable cost.

Two major problems are involved in providing adequate credit for small farmers. The first is the cost of the credit. Increased administration and risks make the cost of supplying credit to small farmers higher than it is to large farmers. And, because their credit is more expensive, many small farmers may be prevented from adopting the new technologies, or, at least, from using them to the full. In either case, there are serious implications for employment and for the economic viability of small farms. Should credit to small farmers be subsidized? In each case a range of factors must be considered, including the opportunity cost of the subsidy, the expected rates of rates of return from farmers' investments, the extent to which small farmers are dependent on credit, and the feasibility of supplying cheap credit to them as opposed to larger farmers, given the political nature of many credit institutions and the difficulty of defining the two categories of cultivators. Many of these difficulties would be avoided if effective land reforms were implemented. But in the meantime, governments must experiment with new ways of supplying relatively cheap credit to small farmers if they want them to participate in the Green Revolution, and so to create additional income-earning opportunities.

The second major problem concerns the structure of credit institutions. In many Asian countries, cooperatives that supply much of the credit are often controlled by traditional village political leaders, namely, the larger farmers. It is hardly surprising therefore that large farmers have better access to credit than do smaller farmers. Further studies of the dynamics of lending at the village level would help to reveal the extent of this problem and to suggest possible solutions. One helpful step would be a systematic and equitable redistribution of land. The credit system would then only have to cater to the needs of one principal size of farm unit.

Aside from the general category of farmers working small plots of land, tenant farmers have special credit problems. A program to guarantee their security of tenure must be linked with the installation of procedures to ensure them access to reasonable credit despite their inability to provide collateral. In many parts of Asia this may require a special credit operation guaranteed by government funds. There is room for experimentation with several types of credit institutions, and a need to compare the experiences of different countries in coping with credit problems.

VII.6. INCREASING THE DEMAND FOR FOOD

As we have seen in the last chapter, the potential for increasing the area under the Green Revolution is closely related to the rate at which the demand for food grows. In food-deficit countries, the demand for food can grow rapidly for a few years through the displacement of imports. But once the economic demand for food is satisfied domestically, the growth rate of demand will be determined primarily by the population growth rate, the increase in per capita income, and food prices. It is at least possible that, with the new technologies, the increase in supply can outrun the increase in food demand resulting from these factors.

Several policy measures can be implemented to make full use of the more flexible supply of food. The most important of these are

public works programs. The principal input for public works programs is unskilled human labor, thus helping to ease the unemployment situation. Moreover, these unskilled laborers spend a high proportion of their income on food, so that the demand for food rises with their incomes. Public works programs also help to build the infrastructure necessary for rural regeneration – the roads, dams, houses, and schools that are essential investments for a better standard of living. And such programs tend to be far more productive and profitable in rural areas where crop yields are rapidly increasing.

A similar argument can be used to encourage the restructuring of industry towards medium- and small-scale industries. These would provide simple consumer goods such as textiles, utensils, and furniture to satisfy the increased rural purchasing power of farmers using the new cereals, and of laborers employed in public works. Such industries tend to use local raw materials, and employ relatively large numbers of workers for relatively small amounts of capital. Like the laborers on public works programs, these workers spend much of their income on food. These medium- and small-scale industries cannot, however, grow without help. Their managers often lack the knowledge and capital to expand by themselves. Governments can encourage expansion in this sector through a package of assistance, comprising research and design services, credit, joint training operations, and marketing.

Medium- and small-scale industries could form the nuclei of a network of rural growth centers which would also help to increase the level of employment and the demand for food. This network would consist of a series of small country towns strategically placed to supply goods and needed services to rural villages. They, in turn, would be linked to service centers and supply lines in large towns. The Green Revolution presents an ideal spur to such a strategy because the new agricultural technologies encourage the growth of the market economy and increase the demands for productive inputs, marketing facilities, and consumer goods. The growth centers could help meet these needs as well as provide social services quickly and cheaply to the farming community, thus raising its real income. They could have agricultural processing facilities and, like Dasca in West Pakistan, they could manufacture simple, improved tools for the new technologies. The centers could provide seasonal employment for laborers during the slack agricultural periods. They could also serve as alternative foci of migration for surplus farm workers who would otherwise move to metropolitan centers. Thus, growth centers could make a vital contribution to a rural employment strategy.

VII.7. SLOWING POPULATION GROWTH

All the components of a rural employment strategy outlined above may be negated unless the rate of population growth is slowed in the developing countries. The population explosion is a prime cause of the lack of employment opportunities and resulting low standards of living. In the first chapter, it was argued that the present high rates of population growth will increase rural populations at least for the next generation. Of course, eventually, slowing the population growth rate will reduce the number of

people requiring jobs, but this will take about 15 years. Thus, a reduction in the growth rate of the labor force in the second half of the 1980s depends on decisions made *now* to reduce the rate of population increase. In the long term, the employment problem will be much easier to handle if developing countries initiate effective family planning programs immediately.

The situation in Kenya illustrates the importance of slowing population growth in order to provide sufficient good jobs:

> The current rate of population growth is adding 126,000 persons to the labor force every year; the annual increments in labor force associated with (population growth rates of) 2.5 percent, 1.5 percent and 1.0 percent are 95,000, 57,000, and 38,000.[10]

But there are other, equally cogent arguments for seeking lower population growth rates, also related to rural employment. In the short run, a decline in the rate of population growth will have a profound effect on rates of saving and on the composition of investment. There seems to be an inverse relationship between the number of children per adult in a society, and the aggregate rate of private saving in a society.[11] At the same time, if each worker has a large number of dependents, relatively larger sums are required for social investment in the forms of schools, housing, and other factors. If there were fewer dependents per worker, some of the investment could be diverted to activities that contribute directly to production, and so could provide higher growth rates and more employment.

What are the chances for limiting population growth? Though the relationships are complex and by no means clear, it appears that the introduction of the new agricultural technologies may create a favorable climate for change which will facilitate family planning programs. This is not immediately apparent. After all, as agricultural output and incomes rise, we can anticipate an improvement in rural nutrition, which, in turn, should lead to a decrease in infant mortality, and to an increase in the rate of population growth. But, paradoxically, the decrease in infant mortality may be a prerequisite for effective family planning programs. One of the chief motivations for parents to have more children is to insure that they have support in their old age. If infant mortality can be reduced, there will be less pressure on parents to produce so many "insurance" births.

At the same time, many experts feel that parents will be motivated towards planning their families only when they start to participate in the fruits of progress. The countries that have had the most successful family planning programs (such as Japan, Taiwan, and Singapore) are also those in which the majority of the population has been able to enter the mainstream of modern life and to experience new attitudes towards change. People in these

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[10] D. P. Ghai, *Employment Performance, Prospects and Policies in Kenya*, a paper presented to the Overseas Studies Committee Conference, University of Cambridge, 1970, p. 19.

[11] This relationship has been explored in N. H Leff, "Dependency Rates and Savings Rates", *American Economic Review*, December 1969, pp. 886-896.

countries generally have more secure economic prospects than elsewhere in the developing world. If unemployment and poverty really grow significantly in the other poor countries, then the chances of their being able to reduce their birth rates would appear to be rather slim.

The speed with which the new cereal varieties have spread has shown that millions of peasant farmers are capable of accepting new attitudes and ways of life. They have found that they can improve their lives by adopting a new technology. It is possible therefore that in this atmosphere of change, peasants may be more inclined to accept another innovation, namely contraception, that can also profoundly benefit their futures.

VII.8. IMPLICATIONS FOR DEVELOPED COUNTRIES

It is essentially the governments of the developing countries who will make the decisions about whether to be concerned over rural employment and, if so, what strategies will be followed. But the actions of the developed countries and of the aid donor agencies will have some impact on the effectiveness of those decisions. What are the most important implications for the developed countries of policies designed to use the Green Revolution to increase rural employment?

Vast amounts of agricultural inputs will be required to extend the Green Revolution. The FAO Indicative World Plan forecasts, for example, that fertilizer use in the developing countries will rise at a yearly rate of 11.3 percent during the period 1962-85.[12] This expansion cannot take place without either direct exportation from the industrialized countries or transfers of technology and capital. In both cases, the large agribusiness corporations can play a large role in advancing the Green Revolution, as they can in marketing many other inputs and outputs.

Substantial amounts of capital and technical assistance are also required to expand irrigation facilities, credit, and extension services. All of these elements are essential for any strategy to include small farmers in the benefits of the new technology and to provide more rural employment opportunities. Foreign assistance can make an important contribution to these needs. However, there may have to be some departures from the traditional practice of supplying only assistance for that part of a project that entails the spending of foreign exchange, since many agricultural projects for small farmers include a very high proportion of local costs. In addition, the practice of supplying aid primarily for the import components of projects puts an artificial premium on the use of capital-intensive technologies. If, therefore, donor agencies are really concerned about rural employment problems, they should consider granting assistance to finance the local costs of those projects which will provide the most employment and income opportunities.

Finally, there is an enormous lack of knowledge about the ways in which rural jobs and income are created in developing countries. Intensive research is required on the technological, economic,

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[12] Food and Agriculture Organization, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, p. 180, 1969.

political, and social aspects of these processes. The developed countries can help to generate the research capacity to find answers to the extremely difficult questions that have been raised in this monograph.

Mechanization is the most urgent issue which needs to be examined from the point of view of rural employment. A great deal more must be known about the effects of tractors on crop yields and rural employment in different situations, about their private and social costs and benefits, and about the possibilities of improving animal-drawn implements and developing other mechanized farm implements suitable for local conditions. Aid donor agencies have been remarkably slow in developing techiques to analyze the overall effects of their loans for large-scale agricultural mechanization. They have tended to evaluate mechanization projects only in terms of the net private benefits at prevailing prices. They rarely look beyond the project itself to examine the nature of the agricultural sector and how the project will affect it. Until new forms of project analysis are developed, we shall not be able to determine the true costs of mechanization projects, in terms of displaced labor and of scarce foreign exchange and capital resources. Viewed within the narrow framework of traditional project analyses, mechanization projects often seem advantageous to developing countries. But there are indications that a broader approach would demonstrate that many loans for tractors are not only inappropriate but actually harmful to the developing countries.

For example, the International Development Association (IDA) recently loaned the Indian Government $27.5 million on soft terms to purchase 8,000 tractors for Punjab farmers. IDA appeared to evaluate the loan on the basis of the tractors being imported at the world price and at the official rate of exchange, with only a three percent sales tax applied in India. Because the price of wheat in India is well above world levels, the loan on these terms is expected to yield a reasonable rate of return. But no attempt seems to have been made to attach shadow prices to the cost of capital, nor does there seem to have been any allowance made for the costs of displacing labor. IDA apparently dismissed the problem of labor displacement by saying that there was a seasonal labor shortage in the Punjab, and that any labor displaced by the tractors would be absorbed in such activities as marketing, transport, and small industries. But it is by no means certain that this will actually occur. In any case, IDA stated that farmers should be encouraged to use their tractors throughout the year for a wide range of farm operations including spraying, planting, and especially harvesting. Thus the loan could create permanent labor displacements rather than ease a peak season labor shortage.

The loan also provided for 40 combine harvesters and 200 tractor-drawn harvesters. IDA suggested that since similarly favorable conditions could be found throughout northwest India, this part of the loan could lead to the spread of mechanized harvesting throughout the wheat belt. However, there seemed to be no comment made about how this development would affect employment and income opportunities throughout the region.

But perhaps most worrying of all is the fact that IDA apparently did not attempt to assess the impact of the loan on small farmers in the Punjab who would not have access to cheap tractors. Nor was any ostensible concern expressed about aggravating imbalances between states by giving Punjabi farmers cost-reducing tractors which could strengthen their hold over the wheat market in India.

This project emphasizes the need for aid donor agencies to be aware of a broad range of issues, particularly those of regional balance, equity, and employment, when considering project proposals. This is true not only of mechanization projects, but of all projects concerned with spreading the Green Revolution. The type and location of processing industries, methods of irrigation, and a host of other factors should be evaluated in terms of their overall impact on development.

VII.9. SOME CONCLUDING OBSERVATIONS

As the developing nations strive to attain a desirable balance between their goals of maximum output and those of full employment and more equitable income distribution, the new technologies for cereal production assume a key role. Although application of these new technologies is relatively limited to date, they have already had a strong impact on the Asian countryside. And it is in the rural areas that the majority of the populations of these countries must make their living. Thus the future of the Green Revolution will determine in large part the future of poverty among the peasant families of Asia. As the successes of the new cereal varieties spread to other parts of the poor world, the same will be true there.

The Green Revolution brings opportunities for raising productivity among farmers, for intensifying and diversifying agriculture, for giving governments more flexibility in their pursuit of development, and hence for creating more jobs. It brings hope to the majority of the world's poor. But the opportunities are mixed with danger – the threats of growing inequalities between rich and poor farmers, of men being replaced by machines before other jobs are available to them, and of some regions outpacing others in development. It should be stressed that the essence of the Green Revolution is simply the creation of a superior agricultural technology. But the *effects* of this technology on society will depend on the policies and institutions that implement it. We have seen that there are two distinct models, those of Mexico and East Asia, which can come about from different ways of applying the new technologies. But the Green Revolution itself affects the behavior of its users. For example, adopting the new cereal varieties necessitates the commercialization of agriculture which, in turn, alters the whole pattern of human relationships in the countryside. It is the nature of these changes, combined with the prospect of growing rural populations in the developing countries, that makes action by governments to control and direct the distribution of benefits from the Green Revolution so central to the future development of poor nations.

Making fuller use of the employment potential of the Green Revolution is a critical part of the solution to the employment

problems of the poor world. Its significance lies not only in the possibility of giving more productive jobs to people on the land, but also in the prospect of increasing food supply, and thus stimulating the rest of the economy. The new cereal varieties can, if they are wisely used, help both to slow the migration of people to urban areas and to provide good jobs for the partly or wholly unemployed already in the cities. But the overall size of the employment problem and the urgent nature of its social and political consequences mean that other complementary strategies will be required to cope with it. This is, of course, particularly true of those countries where the course of the Green Revolution aggravates labor-displacement. Nobody knows what is the true extent of the waste of human resources in the developing countries. But there is a consensus that the problem is huge and growing.

Tackling this problem will require massive international efforts. The poor nations themselves will have to face painful and difficult adjustments in their present policies. But the policy decisions of the rich countries toward trade, aid, private investment, and the transfer of technology will also be very important. If the developing countries can at least manage to maintain their present share of world trade over the coming decades, they can generate more employment as well as boost their overall economic growth rates. But expansion in the poor nations' exports requires reductions in the number of barriers in the rich world to that trade. At the same time, the wise use of foreign aid would help to stimulate general economic growth, such an essential part of the solution of the world's employment problem.

Private investment also brings great resources into the developing countries, and can make a substantial contribution to employment, provided that these resources are used carefully. Finally, the complex issue of the transfer of technology should be taken in concert with trade, aid, and investment policies. There is much room for the imaginative use of technology appropriate to unique situations in the developing countries. But who is to develop these technologies? Here the establishment of research funds and institutions by the rich nations could be of enormous value.

Clearly the waste of human resources in the developing countries is a problem of major significance, with wide international implications. To combat it will require great efforts on the part of both the rich and the poor countries. And it is in the interest of all of us that these efforts be undertaken urgently. As Robert McNamara asked, "Can we imagine any human order surviving with so gross a mass of misery piling up at its base?"

72/73

the author

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jobs and agricultural development

Robert d'A. Shaw

There are nearly two billion people in the rural areas of the developing world today. Most of them are very poor. In recent years, great progress in agricultural technology has taken place, giving hope for a better life to many of these people. At the heart of this technology is the creation of new, highly productive cereal varieties – which have spread so rapidly in Asia that they have been called the "Green Revolution".

But the new technology brings with it dangers as well as hope. The principal threat revolves around the fact that, with existing institutions, large farmers are benefitting from the high-yielding cereals far more than are small farmers, tenants, or laborers. Therefore, the rich landowners can buy more land, and displace labor with machinery. These trends, in turn, are leading to marked deterioration in the relationships between rural groups.

The Green Revolution is occurring just as the rapidly growing problem of unemployment threatens to become one of the central crises facing the developing countries in the 'seventies. The high rates of population growth mean that, throughout the poor nations, more people must be provided jobs in the rural areas over the next decade.

How can this new agricultural technology be used to create more income-earning job opportunities in the rural areas of the developing world? The answer to this question requires a comprehensive strategy of social and institutional reform. This monograph analyzes what has been happening to employment opportunities as a result of the introduction of the high-yielding cereals. And it suggests a possible strategy for broadening the distribution of their benefits. Among the principal areas for action are:

- devising a national mechanization strategy to minimize labor displacement;
- encouraging land reform for greater equity and more intensive farming;
- increasing the demand for food;
- designing policies for diversifying agricultural production and expanding trade;
- slowing the rate of population growth; and
- increased levels of appropriate aid from the rich countries, combined with a lessening of their discrimination against the agricultural products of the poor countries.

overseas development council monograph number three

VT 013 609
HALFIN, HAROLD H; COURTNEY, E. WAYNE
PROFESSIONAL EDUCATION COMPETENCIES OF SECONDARY VOCATIONAL INSTRUCTORS.

OREGON STATE UNIV., CORVALLIS. DIV. OF VOCATIONAL, ADULT, AND COMMUNITY COLL. EDUCATION.
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ABSTRACT - THE PURPOSE OF THIS STUDY WAS TO DETERMINE THE COMMON TRAINING NEEDS AND REQUIREMENTS FOR SECONDARY TEACHERS OF VOCATIONAL EDUCATION. REPRESENTING 10 STATES, RESPONDENTS FOR THE STUDY INCLUDED TEACHERS OF VOCATIONAL AGRICULTURE, TRADE AND INDUSTRY, HOME ECONOMICS, BUSINESS, AND DISTRIBUTIVE EDUCATION. FACTOR ANALYSIS OF 130 ITEMS INDICATED THAT ITEMS TENDED TO CLUSTER INTO COMMON GROUPINGS WHICH WOULD LOGICALLY FORMULATE A BASIS FOR ORGANIZING INSTRUCTIONAL PROGRAMS FOR TRAINING VOCATIONAL TEACHERS. THE COMMONALITIES FOUND WITHIN THE FIVE DISCIPLINES TENDED TO VERIFY THE THOUGHT THAT SEVERAL ELEMENTS WITHIN THE VARIOUS TRAINING PROGRAMS MAY LOGICALLY BE OFFERED IN A COMMON TRAINING EFFORT. THE SURVEY INSTRUMENT AND A BIBLIOGRAPHY ARE APPENDED. (GB)

VT 013 609

Professional Education Competencies of Secondary Vocational Instructors

Technical Report

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Division of Vocational, Adult, and
Community College Education
Oregon State University
Corvallis, Oregon

July, 1971

VT013609

PROFESSIONAL EDUCATION COMPETENCIES

of

SECONDARY VOCATIONAL INSTRUCTORS

by

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July, 1971

Division of Vocational, Adult, and Community
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TABLE OF CONTENTS

Preface v

List of Tables and Illustrations iv

Chapter I

Introduction to Study 1
Statement of Problem 1
Direction of Study 1

Chapter II

The Design 7
The Dependent Variable 7
The Experimental Design 7

Chapter III

The Results 10

Chapter IV

The Conclusions and Implications 22

Chapter V

Bibliography 25
Appendix 31

791

LIST OF TABLES AND ILLUSTRATIONS

TABLE I. Factor Pattern for Items 11

FIGURE I. Location of States 9

PREFACE

This study was originally published in May, 1970, through the auspices of the Board of Regents of Wisconsin State Universities, Madison, Wisconsin. The format and slight modifications were made in the text in order for the document to conform to other complementary reports of the Division of Vocational, Adult, and Community College Education, Oregon State University. The authors strongly suggest that, for curriculum purposes, the results which are reported in the present study be used in conjunction with the other Division reports by Spaziani and Courtney (1971) and Gunderson, et al. (1971).

E.W.C.
June, 1971
Corvallis

CHAPTER I

Introduction to the Study

I. STATEMENT OF THE PROBLEM

The central problem of this study was to determine the common training needs and requirements for teachers of vocational education. Respondents for the study represented secondary level teachers of vocational agriculture, trade and industry, home economics, business, and distributive education. In all, ten (10) states were arbitrarily selected and cooperated in the study. The problem involved the following major premises:

1. the use of a common training needs instrument.
2. the factor analysis of data to determine the common proficiency needs of teachers of vocational subjects.
3. the formulation of implications for curriculum activities and teacher education.

II. DIRECTION OF THE STUDY

The primary literature impinging upon the present problem is that which has been reviewed in previous reports (Courtney, 1968, and Courtney and Halfin, 1969) which established the rationale for the present study. Thus, an elaborate review of literature is not here included and readers are referred to the above references for such a presentation.

For the present study, the major interest was directed toward determining the common training requirements of secondary level vocational teachers. The bulk of the research up to this time has been directed toward the establishment of various teacher models (e.g., Sedgwick, 1966) which aligned themselves to various occupational patterns. The plan for

the present study was to factor analyze the responses of 150 randomly selected vocational teachers respesenting a geographic region encompassing ten states. Proficiency scores were obtained from the respondents using a Vocational Education Training Needs Instrument which was developed earlier (Courtney and Halfin, 1969).

The present research resolves into a problem with teacher education curriculum ramifications. The knowledge of the proficiency needs of teachers in the field, along with a factor-based grouping of job activities, is important to designers of curricula in vocational education. The study brings some of these elements into quantitative focus.

Commonality of Content

The suggested basis for curriculum planning in occupational education programs is to search for a common core of training experiences which will lead to the development of competent teachers of vocational subjects. Using the centripetal approach (cf. Courtney and Coster, 1963), curriculum planning is centered on identifying the elements of the common core. The elements are likely to resemble fragments of abilities or knowledges and are apt to be general rather than specialized except as specialization may relate to the entire field of vocational education. This approach may appeal to educators who see the need for cooperative training programs of teacher education.

A summary of the literature validates this approach as the theoretical framework under which this problem may be studied. According to this premise, the following resumes may be used as guiding principles in the organization of an empirically-based procedure for determining vocational teacher curricula content.

1. Factor identification may be accomplished using as a base an occupational groups classification system. Such identifications reveal areas of differentiation among workers.

2. Job requirement components provide for large spectrum analysis descriptions of worker (teacher) populations. Through such descriptions, components of training program preparation needs may be studied.

3. Subject matter content may be descriptively grouped for analysis purposes. From such groupings, patterns of training may be established for workers in vocational teaching so that the basic common elements and necessary common experiences among training programs can be identified.

As content is identified, behavioral objectives associated with the curricula for training teachers of occupational subjects can be specified. Using the sequences of behavioral objectives, instructional strategies may then be identified for the training programs of occupational teachers.

Desirable Changes

If we are to speculate that the teacher of occupational subjects is going to be able to organize and direct programs for training people to enter the world of work, we will expect that he should be capable of:

1. directing learning experiences within a democratic society.

2. understanding and applying the basic principles underlying occupational preparation.

3. operating within a specialty area of work.

In accord with these capabilities, the characteristics of the trained teacher should include (1) flexibility, (2) adaptability, and (3) a thorough grounding in learning theory, sociology of education, and the processes of people's interest in work.

From the results of previous work and based upon an expressed need for research in education, it would appear that there should be developed a quantitative basis for making judgments on content to be included in vocational teacher training programs. Further, it would seem that vocational teacher education should be looked at in terms of the three basic blocks of content including Professional Education Training, Technical

Content, and Liberal Arts Content. Under this arrangement, the principal thrust for future training emphasis is toward the development of a teacher of vocational subjects who is occupationally oriented. From the viewpoint of teacher educators, it is valuable to know the qualities and the parameters inherent for the basic blocks of content here presented.

The central issue is the documentation, or the content, for teacher education which will indicate the professional education training needs for teachers of occupational subjects. The basic thesis surrounding this issue is that a standard set of dimensions can be developed which will give guidance to content selection in the training of vocational teachers.

The Research Model

The theoretical construct of this approach may be translated into an appropriate set of objectives which reveal the nature of the problem's description. In analyzing the various factors related to the needed research, the following objectives are given:

1. To determine the professional education content needs for teachers of vocational subjects.

2. To determine the competency levels required for the professional education needs of teachers of vocational subjects.

3. To extract the common core of subject matter for professional educational needs and training elements being studied in order to terminally develop a listing of common professional education training needs for teachers of vocational education.

Hence, the questions to be answered as a result of this line of inquiry include the following:

1. What are the professional education training elements needed in the field by teachers of vocational subjects?

2. What are the common professional training needs for teachers of vocational subjects?

3. What competency levels are necessary for teachers in the field for the subject items considered by the study? What is the importance level for each component studied?

4. Is there any indication of grouping for the training elements being studied?

The present approach, concerned with identifying and analyzing the common core of experiences among vocational training programs, features the identification of populations, the selection of a stratified-random sample of respondents, the use of a valid data-collecting instrument, and the analysis of the collected data using appropriate analytical comparisons. The specific procedures for the approach are outlined below:

A. General Design

The general design is patterned after the studies outlined previously for related curriculum and teacher training needs. Modifications from these design patterns have been initiated to include the following:

1. The population for the study may be drawn from vocational teachers representing the following disciplines:

   a. Trade and Industrial Education

   b. Business Education

   c. Home Economics Education

   d. Vocational Agriculture Education

   e. Distributive Education

   Data may be collected from teachers who represent each discipline.

2. In studying commonalities among vocational training programs, a factor analysis may be employed.

   This step in the research is considered as one of the most important aspects of the proposed research and is expected to provide data

answering questions relating to the central issues of the investigation. The principal objective of this step was to identify items which fall under the factors resulting from the analysis, with the resultant items comprising scales which describe the factors upon which the items load.

CHAPTER II

The Design

I. THE DEPENDENT VARIABLE

The dependent variable in the study was a score judgmentally assigned by teachers of occupational education to denote their feelings about the necessity for various knowledges and skills in their work. A total of 130 items were included in the study* with the assignment of ratings being based upon the following Likert-type scale:

1. My job requires no proficiency with this activity.
2. My job requires slight proficiency with this activity.
3. My job requires moderate proficiency with this activity.
4. My job requires considerable proficiency with this activity.
5. My job requires complete proficiency with this activity.

II. THE EXPERIMENTAL DESIGN

The basic design for the study was a factor analysis design in which a Varimax rotation was used. One hundred fifty respondents represented teachers who were randomly chosen from each of five vocational disciplines. In all, 130 items were included in the study's instrument.

Within each of the ten (10) states, a total of fifteen (15) vocational teachers were chosen as respondents. Three teachers were used from each of five disciplines (i.e., vocational agriculture, home economics, trade and industry, distributive and business education). Populations were identified through lists which were obtained from the

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*See Appendix for a copy of the instrument.

various State Directors' offices. The locations of the states used in the study are shown in Figure 1.

The data for the study were collected through mailed instruments with respondents being asked to judgmentally assign scores to each of the items included in the study.

Figure 1. Distribution of States in the Study

CHAPTER III

The Results

The Varimax rotation method of factor analysis extracted a total of six interpretable factors. Sub-factors were described through a comparison with elements of a theoretical teacher model. The analysis accounted for 44% of the common variance in the six interpretable factors.

Means were considered as an indication of the importance which the respondent attached to the item. Generally, means were high for those items with large factor loadings. Means were expected to be high for all items which were included in the study because of their relative importance within the structure of the theoretical model. However, Factors II and VI had several items with means below 2.9500. Factor II stood out with its high loadings and low means.

There was a distinct stability in the array of factors which the analysis produced for the study and the generated clusters tended to correspond to large segments of the theoretical framework. Only in isolated instances did items tend to migrate from the model. Common variance accountability was projected and would have continued to increase 53% with ten factors. The factors, along with the mean scores, loadings and commonalities for each item are shown in Table I.

Table I

FACTOR PATTERNS FOR ITEMS

FACTOR I

Sub-Factor: Teaching Strategies (A)

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
4.6067	30	maintain discipline in the shop shop or laboratory	.532	.330	.859
4.5000	101	maintain discipline in the classroom	.606	.469	.783
4.1933	130	evaluate teaching effectiveness through student achievement	.571	.419	.778
4.5267	105	motivate the student in the shop or laboratory	.627	.508	.774
4.5067	100	maintain attention during the presentation of classroom lessons	.650	.551	.765
4.4667	75	maintain attention during the presentation of demonstrations	.561	.418	.754
4.5333	128	be stimulating in your work as a teacher	.509	.347	.745
3.4733	87	use progress charts	.493	.338	.719
3.8200	99	develop performance tests to measure achievement	.577	.481	.692
4.4000	60	provide appropriate practice for skill learning experiences	.607	.552	.667
4.1533	96	summarize the classroom lesson	.593	.576	.609
4.1933	129	conduct follow-up studies for purposes of determining the effectiveness of instruction	.474	.376	.598
4.2467	110	select instructional materials for the shop or laboratory	.518	.553	.486
3.9400	68	develop related instruction sheets	.429	.389	.473
4.2600	70	maintain a clean, orderly laboratory or classroom	.604	.540	.688

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
4.0600	73	control your desire to work at a faster pace when dealing with activities	.455	.256	.811
3.6067	81	assess the difficulty of teacher-made tests	.408	.491	.338
		Sub-Factor: Course Construction			
3.9733	114	understand the social class structure of the local community as it relates to students enrolled in vocational classes	.452	.356	.574
3.8067	118	use the information contained in professional journals for the improvement of instruction	.404	.366	.447
4.3267	33	conduct periodic updating of the course of study in accord with recent occupational trends	.427	.421	.434
FACTOR II					
		Sub-Factor: Test Use and Analysis			
2.6333	18	use sociograms	.521	.344	.789
2.9267	83	interpret the "norming" data associated with standardized tests	.604	.515	.710
3.6600	78	assess the reliability of teacher-made tests	.544	.544	.535
3.2267	57	use the results of standardized tests for instructional purposes	.526	.565	.490
3.7533	69	assess the validity of teacher-made tests	.470	.507	.435
3.0200	61	select standardized tests to measure achievement	.461	.531	.400
		Sub-Factor: Special Program Development			
2.4667	46	provide special education training for the mentally handicapped	.662	.452	.968
2.4400	76	provide special education training for the physically handicapped	.702	.532	.927

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
3.0200	125	provide special education training for the gifted	.592	.425	.825
3.6867	5	promote and maintain adult vocational programs	.507	.352	.730
2.9400	47	make use of the State Plan for Guidance in securing reimbursement for vocational programs	.535	.408	.702
FACTOR III		Sub-Factor: Active Community Participation			
3.7400	108	take the initiative when dealing with other teachers	.418	.387	.452
3.2267	4	involve yourself in civic community activities not related to the school	.422	.446	.399
3.2800	95	take responsibilities for leadership in civic community activities	.544	.579	.511
FACTOR IV		Sub-Factor: Teaching Strategies (B)			
4.6200	6	use questions during classroom presentations to aid student learning	.622	.424	.913
4.5400	10	use questions during demonstrations to aid student learning	.574	.363	.908
4.3067	44	relate the daily lesson plan to the course of study	.668	.541	.823
4.2267	28	develop visual materials for instructional purposes	.732	.672	.796
4.3333	71	select appropriate audiovisual materials for instructional purposes	.719	.652	.794
4.1200	107	develop audiovisual materials for instructional purposes	.601	.574	.630
4.7200	3	make a shop or laboratory demonstration meaningful to the individual student	.527	.445	.624
4.2067	86	change your teaching style (i.e. teacher-centered to student-centered) during a classroom lesson	.479	.416	.551

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
3.9133	90	review a demonstration	.539	.540	.538
4.1467	120	change your teaching style (i.e., teacher-centered to student-centered) during a demonstration	.485	.449	.524
4.6000	58	make a classroom lesson meanful to the individual student	.479	.449	.511
4.3400	31	select appropriate visual materials for instructional purposes	.528	.575	.486
		Sub-Factor: School Community Relations			
4.1600	13	arrange for and conduct field trips	.556	.529	.584
3.6667	29	obtain the cooperation of available communications media personnel	.418	.359	.485
4.1000	63	interpret the vocational program to other teachers	.403	.461	.352
		Sub-Factor: Produce and Select Instructional Materials			
4.0667	72	produce and use resource units	.692	.626	.766
4.4867	37	select instructional materials for the classroom	.640	.584	.702
4.3867	65	develop appropriate course objectives	.487	.540	.439
FACTOR V					
		Sub-Factor: Organizing Vocational Programs			
3.4933	26	secure appropriate on-the-job training positions for students	.733	.562	.956
3.4667	49	organize local vocational advisory committees	.714	.634	.805
3.9667	98	break down an occupation or job into its component parts for instructional purposes	.664	.594	.743
3.4800	93	use the services of local vocational advisory committees	.604	.499	.731

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
3.4800	127	Develop articles for news releases	.525	.412	.668
4.1733	45	interpret the vocational programs to administrators	.530	.424	.663
3.5867	66	conduct community surveys for purposes of improving instruction	.558	.517	.601
3.8533	48	take the initiative when dealing with administrators	.458	.363	.577
3.7733	106	develop job sheets to aid instruction	.479	.404	.567
4.0933	17	use the existing local school administration system to initiate and maintain the vocational program	.460	.380	.558
3.8333	62	relate the vocational instruction program to other areas of curriculum	.437	.343	.556
3.8267	27	know the special state requirements for vocational facilities	.484	.506	.463
3.1067	126	make use of programmed learning materials	.484	.506	.463
3.9600	89	interpret the vocational program to the community	.425	.466	.387
3.7200	104	lead a conference	.456	.550	.377
		Sub-Factor: Providing Vocational Guidance			
3.9600	121	provide specific information to groups of students concerning the nature and requirements of occupations	.712	.619	.819
3.5000	19	aid the student in obtaining work placement after training	.672	.498	.906
3.9733	113	provide specific information to indiviudal students concerning the nature and requirements of occupations	.593	.535	.658
3.7533	97	aid the student in entering educational training programs at the post high school level	.693	.566	.849

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
3.7400	64	break down an occupation or job into its component parts for guidance purposes	.560	.489	.642
3.5267	94	use directive counseling techniques to help students solve personal and social problems	.404	.306	.534
2.8333	91	use the results of standardized tests for job placement	.473	.504	.444
3.5400	32	interpret the results of vocational interest inventories	.644	.613	.677
FACTOR VI					
		Sub-Factor: School Administration			
3.7467	22	understand state teacher certification requirements	.569	.355	.912
3.8933	40	understand the legal provisions of teacher liability	.531	.344	.818
3.3533	117	understand the reasons for compulsory school attendance laws	.632	.561	.712
3.8467	34	make use of school student record-keeping procedures	.480	.345	.668
2.6800	2	interpret the provisions of teacher tenure laws	.500	.388	.642
3.7133	124	interpret local school policies	.596	.570	.623
3.1133	59	maintain anecdotal records as a part of the student's cumulative folder	.444	.332	.594
3.5267	24	make use of school budget-keeping procedures	.429	.334	.551
3.6333	92	utilize the services of state and local agencies responsible for vocational education	.488	.478	.498
3.9400	82	maintain the necessary report forms required by state agencies	.474	.462	.486
3.7867	9	make use of the innovative provisions of the Vocational Act of 1963	.432	.467	.400

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
3.7067	23	aid in the development of the total school program	.489	.419	.570
3.6267	79	know the special state requirements for vocational shops and laboratories	.478	.457	.500
3.1667	84	use anecdotal records for informational purposes	.506	.485	.528
3.6533	54	make use of the State Plan for curriculum guides	.400	.418	.382
		Sub-Factor: History and Philosophy of Vocational Education			
3.5133	35	interpret statements of ethics as set forth by your professional organizations	.549	.467	.645
3.0400	50	understand the history of education	.529	.469	.597
3.2867	20	understand the history of vocational education	.488	.399	.596
3.3067	80	understand similarities and differences between two or more educational philosophies	.505	.514	.496
4.0267	56	understand the similarities and differences between the goals of general and vocational education	.490	.534	.449
4.3133	36	understand the role of the school in providing vocational preparation for the student	.474	.515	.437
3.6800	119	understand the similarities and differences between vocational and technical education	.452	.497	.411
		Sub-Factor: Community Conformity			
3.8467	115	conform to acceptable community social behaviors for teachers	.409	.559	.300

SPURIOUS ITEMS

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
FACTOR VI					
2.9867	1	participate in the direction of non-vocational extra-curricular activities	.264	.210	.333
FACTOR II					
3.6867	7	use formalized criteria in the selection of textbooks	.415	.388	.535
FACTOR VI					
3.4933	11	utilize your background in general or liberal studies to advantage while participating in community activities	.449	.378	.533
FACTOR IV					
4.6200	14	understand the goals of vocational education	.288	.285	.291
FACTOR III					
2.8667	25	locate available standardized tests	-.448	.527	.381
FACTOR VI					
3.6667	42	understand the student informal social groups	.408	.322	.516
FACTOR II					
3.4333	43	make use of the provisions of the Smith-Hughes, George-Deen, and George-Barden Acts	.363	.396	.332
FACTOR VI					
3.8267	51	use non-directive counseling techniques to help students solve personal and social problems	.353	.313	.399

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
FACTOR I					
4.0800	53	interpret your own educational philosophy	.295	.420	.372
FACTOR IV					
3.8267	67	use the information contained in professional journals for personal improvement purposes	.395	.438	.357
FACTOR I					
3.8933	74	utilize prescribed shop classroom, and laboratory equipment organizational plans	.394	.245	.632
FACTOR II					
3.9267	88	conform to local standards of dress and appearance for teachers	-.431	.578	.322
FACTOR II					
3.2000	102	understand the history of industrial and agricultural development	.326	.325	.326
FACTOR V					
3.8733	41	direct the student's participation in competitive events related to vocational education	.385	.344	.432
FACTOR V					
4.0933	85	interpret the vocational program to parents	.367	.436	.309
FACTOR VI					
4.3133	15	understand the goals of gen-education	.358	.214	.599

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
FACTOR VI					
4.1400	8	adapt your physical appearance to acceptable standards of the school	.311	.412	.235
FACTOR VI					
4.0800	103	interpret the vocational program to students	.487	.460	.516
FACTOR IV					
3.7000	109	develop subjective tests to measure achievement	.357	.423	.301
FACTOR II					
2.8000	111	evaluate your subject matter teaching performance compared to college grades obtained in that subject	.442	.272	.717
FACTOR IV					
3.9600	112	relate current events to classroom instruction	.314	.286	.344
FACTOR II					
3.6267	122	operate duplicating equipment	-.290	.235	.359
FACTOR VI					
3.8733	123	make use of the guidance and counseling services which are available to the school	.483	.481	.486
FACTOR IV					
4.3933	12	purchase appropriate equipment and supplies for instructional purposes	.396	.280	.560
FACTOR IV					
3.8000	77	make a daily lesson plan	.250	.165	.379

Mean	Item Number	Item Description	Factor Loading	h2	Pure* Score
FACTOR IV					
3.7800	52	build a display	.303	.245	.376
FACTOR I					
4.5400	39	motivate the student in the classroom	.384	.297	.495
FACTOR I					
4.3933	38	develop objective tests to measure achievement	.398	.346	.459
FACTOR I					
4.0600	21	relate technological advances to laboratory instruction	.361	.309	.425
FACTOR III					
3.4267	116	control your desire to work at a faster pace when dealing with people in the community	.380	.381	.378
FACTOR IV					
4.5667	16	provide appropriate practice for classroom learning experience	.481	.348	.417
FACTOR IV					
4.1733	55	draw from personal vocational interests to enrich instruction	.361	.363	.359

*The Pure Score is the percentage of the total common factor loading which is contributed by the particular factor. An example of this computation is shown below:

Factors			Sum of the Squares of Loading			Commonality	Pure Score
I	II	III	I	II	III		
.60	.10	.10	0.36	0.01	0.01	.38	$\frac{.36}{.38} = .947$ or 95%

CHAPTER IV

The Conclusions and Implications

The present study was designed to identify the common training needs of teachers of vocational education using a factor analysis method of research. Based on the results of the study, the following conclusions and implications were drawn:

1. The factor analysis of 130 items indicated that items tended to cluster into common groupings. Such groupings logically formulate the basis for organizing instructional programs for the training of vocational teachers.

2. The commonalities found within the five disciplines tended to verify the thought that several elements within the various training programs may logically be offered in a common training effort. Hence, the need for proliferating courses to accommodate the instruction within the various disciplines seems both undesirable and unnecessary. Thus, the items which clustered under Factor I (Teaching Strategies) could be offered to the training programs of all of the types of vocational teachers included in the study in a common course of instruction.

3. The means of the items which loaded above .40 tended to be high, indicating that they were regarded as being related to the vocational teacher's job in the field. Thus, they should be included in the curricula of programs which train vocational teachers.

4. Because some ninety-eight of the items studied loaded on six independent factors, it appears that the factor analysis method is appropriate for developing such groupings. Consideration of all 130 items

which were included in the instrument seems to conclude that the resulting factors logically formulate a valid base for a common curriculum for professional training in vocational education.

5. We have the responsibility of taking these items and reorganizing them into a learning system. We would caution against using each cluster (factor) or sub-factor as a course in itself, even though this may be the initial inclination. Instead, we would suggest that the implementation be to either (1) fit the items into existing courses, (2) individualize them via instructional packages, or (3) develop a series of mini-courses which would use them as competencies stated in behavioral form.

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APPENDIX

VOCATIONAL EDUCATION TRAINING
NEEDS STUDY INSTRUMENT

DIRECTIONS: Following is a list of proficiency items related to training needs and requirements for teachers of vocational education. For each statement (item) please circle the rating (1 2 3 4 5) which best indicates YOUR FEELING about the necessity for the knowledge or skill with regard to YOUR JOB. The following Key should be used for the assignment of the ratings:

1. My job requires no proficiency with this activity.
2. My job requires slight proficiency with this activity.
3. My job requires a moderate proficiency with this activity.
4. My job requires considerable proficiency with this activity.
5. My job requires complete proficiency with this activity.

Do not take too much time in thinking about any particular item. Please do not leave out any item -- there are no right or wrong answers. We are primarily concerned with how YOU FEEL about the training requirements for vocational education teachers.

Here is an example:

1. develop objective tests to measure achievement 1 2 3 4 (5)

This person, in marking the "5" rating, felt that his job required complete proficiency with this activity.

Put a circle around the answer which comes closest to representing your feeling. Even if your exact feeling is not found in one of the choices, pick the one which comes closest to your true feeling. Sometimes it will be difficult to make up your mind, but do the best you can and do not leave out any items.

TEACHER EDUCATION INSTRUMENT

What proficiency must you have in your work as a teacher in the ability to:

		no proficiency	slight proficiency	moderate proficiency	considerable proficiency	complete proficiency
1.	participate in the direction of non-vocational extra-curricular activities	1	2	3	4	5
2.	interpret the provisions of teacher tenure laws	1	2	3	4	5
3.	make a shop or laboratory demonstration meaningful to the individual student	1	2	3	4	5
4.	involve yourself in civic community activities not related to the school	1	2	3	4	5
5.	promote and maintain adult vocational programs	1	2	3	4	5
6.	use questions during classroom presentations to aid student learning	1	2	3	4	5
7.	use formalized criteria in the selection of textbooks	1	2	3	4	5
8.	adapt your physical appearance to acceptable standards of the school	1	2	3	4	5
9.	make use of the innovative provisions of the Vocational Act of 1963	1	2	3	4	5
10.	use questions during demonstrations to aid student learning	1	2	3	4	5
11.	utilize your background in general or liberal studies to advantage while participating in community activities	1	2	3	4	5
12.	purchase appropriate equipment and supplies for instructional purposes	1	2	3	4	5
13.	arrange for and conduct field trips	1	2	3	4	5
14.	understand the goals of vocational education	1	2	3	4	5
15.	understand the goals of general education	1	2	3	4	5
16.	provide appropriate practice for classroom learning experience	1	2	3	4	5
17.	use the existing local school administration system to initiate and maintain the vocational program	1	2	3	4	5
18.	use sociograms	1	2	3	4	5

What proficiency must you have in your work as a teacher in the ability to:	no proficiency slight proficiency moderate proficiency considerable proficiency complete proficiency
19. aid the student in obtaining work placement after training	1 2 3 4 5
20. understand the history of vocational education	1 2 3 4 5
21. relate technological advances to laboratory instruction	1 2 3 4 5
22. understand state teacher certification requirements	1 2 3 4 5
23. aid in the development of the total school program	1 2 3 4 5
24. make use of school budget-keeping procedures	1 2 3 4 5
25. locate available standardized tests	1 2 3 4 5
26. secure appropriate on-the-job training positions for students	1 2 3 4 5
27. know the special state requirements for vocational facilities	1 2 3 4 5
28. develop visual materials for instructional purposes	1 2 3 4 5
29. obtain the cooperation of available communications media personnel	1 2 3 4 5
30. maintain discipline in the shop or laboratory	1 2 3 4 5
31. select appropriate visual materials for instructional purposes	1 2 3 4 5
32. interpret the results of vocational interest inventories	1 2 3 4 5
33. conduct periodic up-dating of the course of study in accord with recent occupational trends	1 2 3 4 5
34. make use of school student record keeping procedures	1 2 3 4 5
35. interpret statements of ethics as set forth by your professional organizations	1 2 3 4 5
36. understand the role of the school in providing vocational preparation for the student	1 2 3 4 5

What proficiency must you have in your work as a teacher in the ability to:

		no proficiency	slight proficiency	moderate proficiency	considerable proficiency	complete proficiency
37.	select instructional materials for the classroom	1	2	3	4	5
38.	develop objective tests to measure achievement	1	2	3	4	5
39.	motivate the student in the classroom	1	2	3	4	5
40.	understand the legal provisions of teacher liability	1	2	3	4	5
41.	direct the student's participation in competitive events related to vocational education	1	2	3	4	5
42.	understand the student informal social groups	1	2	3	4	5
43.	make use of the provisions of the Smith-Hughes, George-Deen, and George-Barden Acts	1	2	3	4	5
44.	relate the daily lesson plan to the course of study	1	2	3	4	5
45.	interpret the vocational program to administrators	1	2	3	4	5
46.	provide special education training for the mentally handicapped	1	2	3	4	5
47.	make use of the State Plan for Guidance in securing reimbursement for vocational programs	1	2	3	4	5
48.	take the initiative when dealing with administrators	1	2	3	4	5
49.	organize local vocational advisory committees	1	2	3	4	5
50.	understand the history of education	1	2	3	4	5
51.	use non-directive counseling techniques to help students solve personal and social problems	1	2	3	4	5
52.	build a display	1	2	3	4	5
53.	interpret your own educational philosophy	1	2	3	4	5
54.	make use of the state plan for curriculum guides	1	2	3	4	5
55.	draw from personal avocational interests to enrich instruction	1	2	3	4	5
56.	understand the similarities and differences between the goals of general and vocational education	1	2	3	4	5

What proficiency must you have in your work as a teacher in the ability to:

		no proficiency	slight proficiency	moderate proficiency	considerable proficiency	complete proficiency
57.	use the results of standardized tests for instructional purposes	1	2	3	4	5
58.	make a classroom lesson meaningful to the individual student	1	2	3	4	5
59.	maintain anecdotal records as a part of the student's cumulative folder	1	2	3	4	5
60.	provide appropriate practice for skill learning experiences	1	2	3	4	5
61.	select standardized tests to measure achievement	1	2	3	4	5
62.	relate the vocational instruction program to other areas of the curriculum	1	2	3	4	5
63.	interpret the vocational program to other teachers	1	2	3	4	5
64.	break down an occupation or job into its component parts for guidance purposes	1	2	3	4	5
65.	develop appropriate course objectives	1	2	3	4	5
66.	conduct community surveys for purposes of improving instruction	1	2	3	4	5
67.	use the information contained in professional journals for personal improvement purposes	1	2	3	4	5
68.	develop related instruction sheets	1	2	3	4	5
69.	assess the validity of teacher-made tests	1	2	3	4	5
70.	maintain a clean, orderly laboratory or classroom	1	2	3	4	5
71.	select appropriate audio materials for instructional purposes	1	2	3	4	5
72.	produce and use resource units	1	2	3	4	5
73.	control your desire to work at a faster pace when dealing with students	1	2	3	4	5
74.	utilize prescribed shop, classroom, and laboratory equipment organizational plans	1	2	3	4	5
75.	maintain attention during the presentation of demonstrations	1	2	3	4	5

What proficiency must you have in your work as a teacher in the ability to:

		1	2	3	4	5
		no proficiency	slight proficiency	moderate proficiency	considerable proficiency	complete proficiency
76.	provide special education training for the physically handicapped	1	2	3	4	5
77.	make a daily lesson plan	1	2	3	4	5
78.	assess the reliability of teacher-made tests	1	2	3	4	5
79.	know the special state requirements for vocational shops and laboratories	1	2	3	4	5
80.	understand similarities and differences between two or more education philosophies	1	2	3	4	5
81.	assess the difficulty of teacher-made tests	1	2	3	4	5
82.	maintain necessary report forms required by state agencies	1	2	3	4	5
83.	interpret the "norming" data associated with standardized tests	1	2	3	4	5
84.	use anecdotal records for informational purposes	1	2	3	4	5
85.	interpret the vocational program to parents	1	2	3	4	5
86.	change your teaching style (i.e., teacher-centered to student-centered) during a classroom lesson	1	2	3	4	5
87.	use progress charts	1	2	3	4	5
88.	conform to local standards of dress and appearance for teachers	1	2	3	4	5
89.	interpret the vocational program to the community	1	2	3	4	5
90.	review a demonstration	1	2	3	4	5
91.	use the results of standardized tests for job placement	1	2	3	4	5
92.	utilize the services of state and local agencies responsible for vocational education	1	2	3	4	5
93.	use the services of local vocational advisory committees	1	2	3	4	5
94.	use directive counseling techniques to help students solve personal and social problems	1	2	3	4	5

What proficiency must you have in your work as a teacher in the ability to:

		no proficiency	slight proficiency	moderate proficiency	considerable proficiency	complete proficiency
95.	summarize the classroom lesson	1	2	3	4	5
96.	take responsibilities for leadership in civic community activities	1	2	3	4	5
97.	aid the student in entering educational training programs at the post high school level	1	2	3	4	5
98.	break down an occupation or job into its component parts for instructional purposes	1	2	3	4	5
99.	develop performance tests to measure achievement	1	2	3	4	5
100.	maintain attention during the presentation of classroom lessons	1	2	3	4	5
101.	maintain discipline in the classroom	1	2	3	4	5
102.	understand the history of industrial and agricultural development	1	2	3	4	5
103.	interpret the vocational program to students	1	2	3	4	5
104.	lead a conference	1	2	3	4	5
105.	motivate the student in the shop or laboratory	1	2	3	4	5
106.	develop job sheets to aid instruction	1	2	3	4	5
107.	develop audio materials for instructional purposes	1	2	3	4	5
108.	take the initiative when dealing with other teachers	1	2	3	4	5
109.	develop subjective tests to measure achievement	1	2	3	4	5
110.	select instructional materials for the shop or laboratory	1	2	3	4	5
111.	evaluate your subject matter teaching performances compared to college grades obtained in that subject	1	2	3	4	5
112.	relate current events to classroom instruction	1	2	3	4	5
113.	provide specific information to individual students concerning the nature and requirements of occupations	1	2	3	4	5

What proficiency must you have in your work as a teacher in the ability to:

		no proficiency	slight proficiency	moderate proficiency	considerable proficiency	complete proficiency
114.	understand the social class structure of the local community as it relates to students enrolled in vocational classes	1	2	3	4	5
115.	conform to acceptable community social behaviors for teachers	1	2	3	4	5
116.	control your desire to work at a faster pace when dealing with people in the community	1	2	3	4	5
117.	understand the reasons for compulsory school attendance laws	1	2	3	4	5
118.	use the information contained in professional journals for the improvement of instruction	1	2	3	4	5
119.	understand the similarities and differences between vocational and technical education	1	2	3	4	5
120.	change your teaching style (i.e., teacher-centered to student-centered) during a demonstration	1	2	3	4	5
121.	provide specific information to groups of students concerning the nature and requirements of occupation	1	2	3	4	5
122.	operate duplicating equipment	1	2	3	4	5
123.	make use of the guidance and counseling services which are available to the school	1	2	3	4	5
124.	interpret local school policies	1	2	3	4	5
125.	provide special education training for the gifted	1	2	3	4	5
126.	make use of programmed learning materials	1	2	3	4	5
127.	develop articles for news releases	1	2	3	4	5
128.	be stimulating in your work as a teacher	1	2	3	4	5
129.	conduct follow-up studies for purposes of determining the effectiveness of instruction	1	2	3	4	5
130.	evaluate teaching effectiveness through student achievement	1	2	3	4	5

VT 013 699
SMITH, MERLE
WORLD OF MANUFACTURING: EVALUATION REPORT OF A JUNIOR HIGH SCHOOL INDUSTRIAL TECHNOLOGY DEMONSTRATION PROGRAM.

PONTIAC SCHOOL DISTRICT, MICH. OFFICE OF EVALUATION.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - 70 43P.

DESCRIPTORS - *INDUSTRIAL ARTS; INDUSTRIAL TECHNOLOGY; *MANUFACTURING; EDUCATIONAL INNOVATION; *JUNIOR HIGH SCHOOLS; STUDENT ATTITUDES; PARENT ATTITUDES; STATISTICAL ANALYSIS; QUESTIONNAIRES; *PROGRAM EVALUATION; ACHIEVEMENT TESTS; COMMUNITY ATTITUDES; INTERVIEWS; PROGRAM EFFECTIVENESS
IDENTIFIERS - WORLD OF MANUFACTURING; *INDUSTRIAL ARTS CURRICULUM PROJECT; IACP

ABSTRACT - THE WORLD OF MANUFACTURING, DEVELOPED BY THE INDUSTRIAL ARTS CURRICULUM PROJECT AT OHIO STATE UNIVERSITY, IS DESIGNED TO ACQUAINT THE STUDENT WITH ALL THE MAJOR PHASES OF THE MANUFACTURING INDUSTRY. THIS IS AN EVALUATION OF THE PROGRAM AS IT WAS UNDERTAKEN IN FIVE JUNIOR HIGH SCHOOLS IN PONTIAC, MICHIGAN. THE SUMMARY STATISTICS ARE BASED ON A TOTAL OF 300 STUDENTS WHO HAD SCOREABLE PRE- AND POST-DATA. THE EVALUATION IS TO DETERMINE IF THE PROGRAM ATTAINS ITS GIVEN OBJECTIVES THROUGH THE USE OF A COMPREHENSIVE ACHIEVEMENT TEST AND STUDENT QUESTIONNAIRES AND INTERVIEWS. VISITOR REACTIONS WERE DETERMINED THROUGH THE USE OF A QUESTIONNAIRE AND AN ATTEMPT WAS MADE TO OBTAIN PARENTAL REACTION THROUGH A TELEPHONE SURVEY. STATISTICAL ANALYSIS AND DATA COMPARISON TECHNIQUES WERE USED TO EXAMINE THE RESULTS WHICH INDICATE THAT THE THREE PROGRAM OBJECTIVES WERE MET. HIGH STUDENT INTEREST AND POSITIVE ATTITUDES RELATIVE TO THE COURSE WERE EVIDENCED. (GEB)

VT 013 699

Evaluation Report
World of Manufacturing
1970-71

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Evaluation Report

World of Manufacturing

A Junior High School Industrial
Technology Demonstration Program
1970-71

Merle Smith ~~Ph.D~~
Office of Evaluation
Pontiac Schools

Evaluation Report
World of Manufacturing

This is a report of the product evaluation carried out on the World of Manufacturing program in the Pontiac School District.

Description of the Program

The World of Manufacturing is an Industrial Arts Curriculum Project (IACP) designed to acquaint the student with all the major phases of the manufacturing industry. The program was written at Ohio State by Dr. Willis Ray and Dr. Donald Lux.

The curriculum is written for junior high students. The texts workbook, and teacher guides are supplied by Ohio State. Teachers attended inservice training sessions at Ohio State during the summer of 1970. The sessions were designed to train teachers to implement the program.

There were also periodic citizen advisory board meetings at which the project director gave status reports to the members. The teachers met on a weekly basis to discuss particular problems and make needed revisions in the weekly plan of operations.

The basic objective of the program was to teach students the various procedures used in the manufacturing industry as well as exposing the student to the broader context of industrial technology. Students worked on various projects throughout the two semester course. Unlike many industrial arts courses, the production of a particular model or object is not a primary objective of the World of Manufacturing Course. Rather, the project serves as a means by which the students learn the technology of manufacturing. Specific skills are not the focus: the focus is on processes and inter-relationships of man and industrial technology.

The project was undertaken in five junior highs in the city of Pontiac. Seventh, eighth, and ninth graders participated in the two semester course.

Research Procedures

The evaluation design for the "World of Manufacturing" endeavors to ascertain whether or not the program attains its given objectives. The objectives of the program are as follows:

1. Enables students to understand the concepts, principles generalizations, problems, and strategies of industrial technology.
2. Encourages an interest in and an appreciation for industry as that element of economic system that provides industrial material goods for the satisfaction of human wants.
3. Provides knowledge and skills that will be useful in life situations of occupations, recreational, consumer, and socio-cultural significance.

Objectives one and three are measured by the Comprehensive Achievement Test provided by Ohio State University. This test is a criterion referencedtest which was designed specifically for the World of Manufacturing curriculum.

The second objective is measured by the use of student questionnaires and interviews. Visitor reactions were ascertained through use of a questionnaire. An attempt was made to obtain parental reaction through a telephone survey.

Data Collection and Analyses Procedures

Students were given the Comprehensive Achievement Test, World of Manufacturing, Form 2 at the beginning of the program (September 1970) and the same test was given in June of 1971. Both the pre and post achievement tests were scored by the data processing unit at Oakland Intermediate School District.

The World of Manufacturing comprehensive examination is a criterion related test consisting of fifty items. The reliability of the test as computed by Kuder-Richardson Formula 20 is .853. This coefficient is based on the post test data for the total group. A coefficient of .762 was obtained on the seventh grade group and a coefficient of .885 for the eight grade group. The reliability for the small sample of fifteen ninth graders, however, is only .224 which is unsatisfactory for meaningful interpretation of the data.

A readibility study carried out in connection with the evaluation indicated that the vocabulary level of the test was on the college level. This readibility study, however, was carried out using the Dale-Chall formula and the list of common words. Since the test items contain many technical words, such a procedure does not give a complete picture of the reading level of the test. Personal communication with Dr. Ray, Co-Director of IACP indicated that a more appropriate procedure for determing the reading level of the test involves the application of the Rutgers readibility formula devised by Fry. (Fry, 1970) Using the Rutgers readibility graph, the test is found to have an eighth grade reading level. Because of the relatively high reading level, teachers were asked to read the question and answers along with the students.

A pacer analysis was used to determine in what areas the students evidenced growth. (Joos, 1970) Pacer analysis examines percentages of students responding to each answer on a multiple answer test. The t test for correlated means described by Garrett was used to determine the significance between pre and post test means. (Garrett, 1959) The latter statistical tests were done with the assistance of personnel from the Pontiac Schools Data Processing Center.

The student questionnaires given at the end of the first and second semesters were examined in regards to the number of students responding in the various categories. Students were also interviewed by members of Educational Services and Products, Inc. Visitor reactions were obtained by giving the visitors a reaction form to fill out and mail directly to Educational Services and Products. The number of replies to each question were tabulated.

One attempt was made to secure the impression of parents through a telephone survey. This procedure however did not work successfully thus no parent reaction results are available at this time.

Results

The first part of this section will report on the findings regarding student growth as measured by the World of Manufacturing, comprehensive examination. Table I gives the pre test means and standard deviations. The summary statistics are based on a total of 300 students. Only individuals having complete, scoreable pre and post data constitute the total sample of 300 students.

Table I

Pre Test Means, Standard Deviations: World of Manufacturing Comprehensive Examination

Grade Level	N	Mean	SD
7th	94	14.84	5.08
8th	191	15.25	6.01
9th	15	12.87	4.84
Total	300	15.01	5.69

Table II below gives the summary statistics for the post test data.

Table II

Post Test Means, Standard Deviations, World of Manufacturing Comprehensive Examination

Grade Level	N	Mean	SD
7th	94	18.46	6.69
8th	191	17.68	10.74
9th	15	12.20	2.68
Total	300	17.67	9.45

Inspection of Table II reveals that the mean scores continue to be low when it is considered that the comprehensive examination has a total of fifty possible points.

Table III gives the mean gain scores made by the three groups and the t tests carried out to determine the significance of the gain scores.

Table III

Mean Gain Scores - t tests

Grade Level	Pre-Test Mean	Post-Test Mean	Gain	df	t
7th	14.84	18.46	3.62	94	3.62 **
8th	15.25	17.68	2.43	190	2.66 **
9th	12.87	12.20	-.67	14	-.46 ns
Total	15.01	17.67	2.66	299	4.06 **

ns= Non-significant
**= Significant .01 level

From Table III it can be seen that the mean gain made by the total group in significant in a statistical sense. Both the seventh and eighth grade groups show significant gains whereas the ninth grade group showed a loss or lack of gain. While the gains are deemed statistically significant, the actual gain appears to be of little magnitude. It is questionable to what extent such gains can be interpreted as having significant educational implications.

The loss evidenced by the ninth graders could have several possible explanations. The school has had some disruptions during the school year so that the students did not attend classes on days that the school was closed. Another possibility is that the small size of the sample (n=15) having both pre and post data does not represent the ninth grade population at the school enrolled in the World of Manufacturing curriculum. There were two changes in teachers during the school year. Nothing is known at this time regarding testing conditions at the time the post tests were given: adverse testing conditions could explain the loss. It is also noted that the reliability of the test for ninth graders is extremely low. The reliability coefficient established by Kuder Rediardson Formula 20 is .224. A coefficient that low suggests that for

this particular group, the test lacks sufficient reliability.

Without more data it is not possible to clarify with any degree of certainty the reason for the net loss shown by the ninth graders.

The data derived from the post tests of the comprehensive examination were also subjected to a pacer analysis which permits examination of the percentage of students responding correctly to each item. The following tables indicate the percentage of students giving the correct response to the items. The question stems are included in the table. The reader is referred to the appendix where a complete test is included.

Table IV

Percentage of Correct Responses Total Group

Item Stem	Percent Correct Pre-Test	Percent Correct Post-Test
1. A conversion process changes raw materials into	40	25
2. Which of these statements would come from a sales forecast?	35	35
3. Which is not one of three general stages in developing a design solution?	26	29
4. As a factory supervisor, you learn that some components are too long after shearing. You will first	52	39
5. Which of these terms best identifies the economic system used in the U.S. today?	19	41
6. A thermostat that measure and controls temperature represents which principle of automation?	23	24
7. A survey to find out what kind of product people want to buy is a?	27	38
8. Servicing a product is sometimes also called?	25	33
9. Three basic ways of separating materials are?	38	44
10. The printing process that put ink on this page was a?	36	48
11. An example of chip removal is?	23	32

Table IV continued	Pre-Test	Post-Test
12. Which product is a non-durable good?	52	46
13. The products shown in Figure 1 probably were assembled by what process?	32	12
14. When material is refined, any leftover substance that has no further use is regarded as a?	53	44
15. A corporation's name, purpose, and how it will be financed are all stated in the?	20	28
16. Which step occurs before actual production begins?	35	36
17. A common way to get money to start a corporation is by	11	47
18. Which of these is not a basic stage of primary metals processing?	32	39
19. About three-fourths of America's business sales are made by?	35	29
20. Set-up cost is the cost of?	32	31
21. The "Industrial Revolution" was?	26	21
22. An economic system based on free enterprise is closly related to?	31	32
23. In tooling up for production, the last step probably would be?	30	35
24. Mechanical, radiant, nuclear, chemical, heat, and electrical are classes of?	47	40
25. Forging, bending, and drawing operations occur in what forming processes?	23	34
26. Heating metal and then letting it cool slowly, so that it will be more useable in manufacturing, is an example of a?	35	42
27. The most economical way to make the automobile fender shown in Figure 2 is by?	24	24
28. Which one of these managers is specially trained to be a work-measurement specialist?	27	40
29. Which of these groups is in charge of tooling-up for production?	21	30
30. Which is not a physical property of materials?	35	36
31. Which is not a basic way of forming material?	22	27

Table IV continued	Pre-Test	Post-Test
32. Which of these events was not part of the Industrial Revolution?	31	34
33. In a factory, the receiving, unpacking, and storing of input materials can be classified as?	23	29
34. Two basic purposes of shearing are to?	27	15
35. If some parts of a product must be taken apart and put back together frequently, they should be held together by?	12	70
36. Small bits of material are lost along the parting line during?	44	47
37. Removing and clearning a spark plug is an example of?	35	40
38. Forging is done by what types of forces?	31	35
39. "Machine time" and "man time" are concepts used in?	31	39
40. The people who define problems and develop solution for computers are called?	19	20
41. Which group of items are material-converting practices?	28	33
42. The chart in Figure 3 would be used in what type of production control?	30	36
43. Which of these is not a reproducable raw material?	24	29
44. The stencil shown in Figure 4 can also be called a?	25	20
45. Which of these will reduce the change of error in quality control?	19	26
46. Which product was invented within the past twenty-five years?	25	28
47. To test the quality of light bulbs, a few from each production lot are tested. Choosing a few items for testing--rather than the whole lot--is called?	19	23
48. Which of the following would not force a corporation to go out of business?	26	31
49. The process of a corporation's going out of business is called?	24	25
50. A corporation is run by its?	18	24

Table IV points out that when a comparison of the number of correct responses are made between pre and post tests, a higher percentage of correct responses occur on thirty-seven of the items. Again many of the changes of pre and post percentage of correct responses are of a small magnitude and some could occur merely by chance. Thirteen of the items showed a decrease in the precentage of students giving the correct response.

Examination of Table IV can be used by teachers to determine particular units which need to be stressed during the 1971-72 school year.

Summary-Discussion of Achievement Test Results.

Comparisons between pre and post mean scores indicate that statistically significant gains were made by seventh and eighth graders in the program with the ninth graders showing no gain. A higher number of correct responses were obtained on thirty-seven of the fifty items when on the pre and post tests were compared. These two findings indicate that the program met its two objectives related to achievement.

A closer examination of the data, however, reveals that while the gains were significant, they were of small magnitude. The computed post test means are considerably below what one would expect on a criterion related test having a high degree of content validity. The low mean score obtained by the ninth graders can be explained on the basis of the low test reliability for that group as well as the general disruptive conditions at the particular school during the last school year. Possible explanations for the small gain in scores could take the form of the following assumptions:

1. The test does not measure exactly what is taught in the classes.

2. The test vocabulary is not an integral part of the curriculum.

3. There is too long of a time lag between course content presentation and the administration of the test.

4. Teachers are not adequately prepared to teach the World of Manufacturing curriculum.

The above assumptions or hypotheses could be tested out with and evaluation design providing for process evaluation and collection of interim achievement data.

The next section of this report includes the results of the analyses done on the first and second semester student questionnaires.

Student Reaction to the
World of Manufacturing Program
First Semester
1970-71

Student views of the first semester of the World of Manufacturing were measured by a questionnaire given to students on the program. Table V below shows the number of yes and no answers to the first 11 questions.

Table V
Number of Yes and No Responses
Direction of Attitude

Question Number	YES	NO	Attitude
1	215	90	Positive
2	208	96	Positive
3	137	166	Negative
4	110	195	Positive
5	124	210	Positive
6	232	74	Positive
7	178	126	Negative
8	261	41	Positive
9	189	117	Positive
10	115	188	Negative
11	194	109	Positive

QUESTIONS FOR STUDENT EVALUATION OF THE
INDUSTRIAL ARTS CURRICULUM PROJECT

"The World of Manufacturing"
First Semester

1. Do you feel the things you have done and learned during this semester in this class were as interesting and exciting as what you originally thought? YES NO

2. Were the things you have done and learned this semester in this class as interesting and exciting as any other things you ever did before in industrial arts? YES NO

3. If you really knew at the beginning of the semester what you now know about this program, would you want to do it all about the same way again? YES NO

4. Would you rather make projects such as garden trowels, funnels and other metal objects instead of working with the tools and materials used in manufacturing technology? YES NO

5. If you really knew at the beginning of the semester what you now know about this program, would you want to be placed in a different class? YES NO

6. Would you advise your best friend to enroll in the IACP Program? YES NO

7. If you really knew at the beginning of the semester what you now know about this program, would you want to do less studying? YES NO

8. Do you feel that what you studied in this class helped you understand what the manufacturing industries are all about? YES NO

9. If you really knew at the beginning of the semester what you now know about this program, would you want to start over and do a better job of studying? YES NO

10. Do you feel that what you learned in this class helped you understand some of your other classes, such as mathematics, science, social science or English any better? YES NO

11. Has the manufacturing technology class helped you like school more this year than before? YES NO

The results of Table V indicate that in general students express positive views toward the first semester of the World of Manufacturing course.

The negative response pattern to question 3 suggests that students may have some ideas of changing the course. Question number 7 was also answered in the negative direction but again the meaning is not clear. Perhaps it reflects the students' desire to do less studying. This probably would hold for any course the student is taking.

The responses to question 10 indicates that students do not see a relatioship between the World of Manufacturing and other subjects. They may indicate a need for change in the presentation of materials so that more relationships can be brought out.

The manner in which the students responded to question number six indicates that students are very positive in their attitude toward the program. The fact that over 76% of the students reply that they would advise their best friend to take the course strongly indicates that students view the program in a positive manner.

The replies to question 8 indicate that the large majority of students, 82%, feel that the course has helped them understand the World of Manufacturing. Evidently the course instructors are conveying the content of the course in a meaningful manner.

Analysis - Second Half

Student Questionnaire (First Semester)

At the end of the first semester students were given a questionnaire designed to elicit their reactions to the course. The analysis of the

First half of the questionnaire was reported to the Advisory Board in February of 1971. The remaining items were subjected to item analysis.

The students were asked to indicate the content areas of the World of Manufacturing that they viewed as having the most value in terms of learned materials. Two-hundred-eighty-nine questionnaires were available for analysis. On pages 15 and 16 the items and number of students responding in each category are shown. On the following page the items are rank ordered in terms of the frequency counts.

Inspection of the rank order list indicates that the students view stories of primary metals, Textile Mill Products, Petroleum Products, or Chemical Products as being the most productive in terms of learning. This is followed by the item "Manufacturing Technology".

The item which the students view as the least productive in terms of learning was "Refining the Design Solution". In general the rank order of the items suggests that the students see the importance of the content of the World of Manufacturing course. There is less value attached to items concerning the economic impact of the manufacturing industry and the labor aspects of the industry. Somewhat unfortunate in some respects is the low rank order of the item.

"Employment and Occupations in Manufacturing". Hopefully the course content would contain more of a career guidance componant so that students would become aware of the career patterns in the manufacturing field.

NUMBER OF STUDENTS' ANSWERING EACH CATEGORY

12. Which parts of "The World of Manufacturing" do you feel you learned the most from? (Check the best choice for you on each unit heading)

Table VI

	I LEARNED			
	A Lot	Some	Not Much	Nothing
Man and Technology	86	140	51	12
The Evolution of Manufacturing	86	144	44	15
Manufacturing and the Economic System	109	110	54	16
Manufacturing Technology	152	100	28	8
Manufacturing Management Technology	125	117	30	16
Researching and Developing	148	99	27	14
Designing Manufactured Goods	107	136	32	13
Creating Alternate Design Solutions	104	107	60	17
Making Three-Dimensional Models	86	117	57	28
Refining the Design Solution	79	121	53	35
Engineering the Product	110	105	61	12
Designing Power Elements	105	106	44	33
Making Working Drawings	107	119	42	20
Building the Production Prototype	127	106	35	20
Technical Writing and Illustrating	86	116	58	28
Obtaining Approval of Management	107	118	51	12
Planning Production	99	127	46	16
Planning Processes	88	140	48	11
Designing and Engineering the Plant	94	122	56	16
Supplying Equipment and Materials	89	133	41	25
Employment and Occupations in Manufacturing	70	135	52	30
Automating Processes	120	94	37	36
Tooling Up for Production	98	140	40	10
Installing Production Control Systems	83	128	56	21
Processing Data or Information	125	101	41	21
Using the Computer	86	122	59	21
Inputs to Manufacturing	90	122	61	15
Organization, Ownership and Profit	105	105	55	23
Identifying Consumer Demands	83	132	48	25

Table VI continued

	I LEARNED			
	A Lot	Some	Not Much	Nothing
Operating Quality Control Systems	119	118	32	19
Measuring Work	79	130	57	22
Estimating Cost	106	116	51	15
Hiring and Training	100	129	38	21
Manufacturing Personnel Technology	70	148	56	14
Manufacturing Production Technology	88	129	48	23
Organized Labor and Collective Bargaining	94	115	55	24
Working, Advancing, and Retiring	109	117	50	12
Establishing Accident Prevention Programs	127	105	39	17
Securing Reproducible Raw Materials	114	112	47	15
Extracting Raw Materials	123	109	44	12
Harnessing Energy from Nature	157	82	34	15
Manufacturing Production Technology	168	77	27	16
Converting Raw Materials to Industrial Materials	177	73	23	15
Making Industrial Materials into Standard Stock	181	69	22	16
Stories of Primary Metals, Textile Mill Products, Petroleum Products or Chemical Products	232	32	13	11

Table VII

RANK ORDER

Items on which Students Learned Most

Rank	
1	Stories of Primary Metals, Industrial Products
2	Manufacturing Technology
3	Converting Raw Materials to Industrial Materials
3	Making Industrial Materials into Standard Stock
4	Researching and Development
5	Manufacturing Production Technology
6	Designing Manufactured Goods
7	Harnessing Energy from Nature
8	Tooling up for Production
9	Making Working Drawings
10	Manufacturing Management Technology
11	Operating Quality Control Systems
12	Building the Production Prototype
13	Establishing Accident Prevention programs
14	Hiring and Training
15	Planning Processes
15	The Evolution of Manufacturing
16	Man and Technology
16	Planning Production
16	Processing Data or Information
16	Working, Advancing, Retiring
16	Securing Reproducible Raw Materials
17	Making three Dimensional Models
17	Obtaining Approval of Management
18	Supplying Equipment and Materials
18	Estimating Cost
19	Manufacturing and the Economic System
20	Manufacturing Personnel Technology
21	Identifying Consumer Demands
21	Engineering the Product
21	Designing and Engineering the Plant
22	Automating Processes
23	Inputs to Manufacturing
24	Installing Production Control Systems
24	Designing Power Elements
24	Creating Alternate Design Solutions
25	Organization, Ownership, Profit
26	Measuring Work
26	Organized Labor and Collective Bargaining
27	Using the Computer
28	Employment and Occupations in Manufacturing
29	Technical Writing and Illustrating
30	Refining the Design Solution

An item analysis was also done on the student questionnaires given at the end of the second semester. Table VIII gives the frequency count for the first eleven items.

Table VIII

Frequency Count - Student

Questionnaire Responses

Second Semester

		YES	NO	Attitude
1.	Exciting	172	54	Positive
2.	Interesting	162	64	Positive
3.	Make Object	82	144	Positive
4.	Advise Friend	157	69	Positive
5.	Prefer Different Class	83	143	Positive
6.	Understanding	177	49	Positive
7.	Transfer	104	122	Negative
8.	Like School More	128	98	Positive
9.	Career	146	80	Positive
10.	Occupation Choice	126	100	Positive
11.	Study More	115	111	Positive

QUESTIONS FOR STUDENT EVALUATION OF THE
INDUSTRIAL ARTS CURRICULUM PROJECT

"The World of Manufacturing"
Second Semester

1. Do you feel the things you have done and learned during this year in this class were as interesting and exciting as what you originally thought? YES NO

2. Were the things you have done and learned this year in this class as interesting and exciting as any other things you ever did before in industrial arts? YES NO

3. Would you rather make projects such as garden trowels, funnels and other metal objects instead of working with the tools and materials used in manufacturing technology? YES NO

4. Would you advise your best friend to enroll in the IACP program? YES NO

5. Would you rather have been in a different kind of class, other than manufacturing technology during this year? YES NO

6. Do you feel that what you studied in this class really helped you understand what the manufacturing industries are all about? YES NO

7. Do you feel that what you learned in this class helped you understand some of your other classes, such as mathematics, science, or social science? YES NO

8. Has the manufacturing technology class helped you like school more this year than before? YES NO

If you said "yes" to #8 would you tell why this class helped you like school more this year?

9. Do you feel the things you have studied in manufacturing technology will be of help to you in deciding what career to follow after you graduate from high school? YES NO

10. Do you feel you would like to work in some phase of a manufacturing industry as an adult? YES NO

11. Would you like to study more about some parts of "The World of Manufacturing" in high school? YES NO

If you said YES to question #11, what kinds of things would you like to study more about in manufacturing?

12. Which parts of "The World of Manufacturing" do you feel you learned the most from? (Check the best choice for you on each unit heading)

Table IX

		I LEARNED			
		A Lot	Some	Not Much	Nothing
12.	Material Forming Practices	59	113	39	15
13.	Casting or Molding	85	114	20	7
14.	Compressing or Stretching	58	106	49	13
15.	Conditioning Material	53	104	54	15
16.	Making Assemblies or Finished Products	98	82	38	8
17.	Material Separating Practices	70		54	14
18.	Shearing	81	101	32	12
19.	Combining Components	72	100	35	19
20.	Chip Removing	90	90	32	14
21.	Separating by Other Processes	61	103	50	12
22.	Bonding	66	100	46	14
23.	Coating	80	101	30	15
24.	Mechanical Fastening	58	106	40	22
25.	Mixing	79	84	47	16
26.	Combining Subassemblies	90	110	32	14
27.	Preparing for Distribution	61	103	50	12
28.	Servicing Manufactured Products	66	100	46	14
29.	Story of Printed Products	80	101	30	15
30.	The Manufacturing Corporation	58	106	40	22
31.	Forming a Corporation	79	84	47	16
32.	Locating the Plant and Securing Inputs	65	110	35	14
33.	Relating People to the Corporation	71	80	54	21
34.	Making the Sales Forecast	46	86	69	25
35.	Designing and Engineering the Product	77	89	44	16
36.	Obtaining Capital, Estimating Profits, and Keeping Records	66	83	55	22
37.	Planning Production Processes	55	109	46	18
38.	Establishing Production and Quality Control	55	91	55	25
39.	Making and Combining Components and Assemblies	78	83	47	13
40.	Arranging for Distribution and Sales	62	100	46	18
41.	Liquidating the Corporation	47	87	50	42
42.	Manufacturing in the Future	47	82	52	45
43.	Story of the Telephone	47	53	23	103

852

Again the results suggest that the students hold many positive attitudes toward the World of Manufacturing curriculum. However students continue to express the view that the content of the manufacturing technology does not aid in the understanding of content in other courses. This consistent finding indicates that the curriculum of the technology course is not perceived by students as being related to other disciplines.

Students were asked to indicate the units within the curriculum that was most productive for learning. The frequency counts for the four possible categories to each question are given in Table IX.

Next the items were rank ordered in terms of the frequency counts. The rank order is given in Table X.

Table X

Rank Order
Items on which students
Learned Most (N=226)

1	Making assemblies or finished products
2	Combining Subassemblies
2	Chip removing
3	Casting or molding
4	Coating
4	Story or printed products
5	Forming a corporation
5	Shearing
6	Mixing
7	Making and combining components and assemblies
8	Designing and engineering the produce
9	Material seperating practices
10	Relating people to the corporation
11	Combining components
12	Bonding
12	Servicing manufactured products
12	Obtaining capital, estimating profits, and keeping records
13	Locating the plant and securing inputs
14	Seperating by other processes

Table X continued

14	Preparing for distribution
15	Arranging for Distribution and sales
16	Material forming practices
17	Compressing or stretching
17	Mechanical fastening
17	The Manufacturing corporation
18	Planning production processes
18	Establishing production and quality control
19	Conditioning material
20	Liquidating the corporation
20	Manufacturing in the future
20	Story of the telephone
21	Making the sales forcast

The rankings shown on Table X indicate that during the second semester, students viewed the making of assemblies or finished products the most productive units in terms of learning the World of Manufacturing curriculum. The unit dealing with the making of a sales forcast was least productive in terms of perceived learning on the part of students.

Generally, the most important units, as far as students are concerned, deal with concrete, relatively specific activities and skills. More abstract concepts as reflected by the units such as manufacturing in the future, the manufacturing corporation, and liquidation procedures are viewed by students as being relatively non-productive. A similar trend was descerned when unit rankings on the first semester questionnaires were made.

Student reaction was also ascertained through student interview data. Representatives from Educational Services and Products, Incorporated interviewed students. This independent, external study of student reaction is discussed next.

STUDENT RESPONSES
TO
THE PONTIAC JUNIOR HIGH SCHOOLS INDUSTRIAL
TECHNOLOGY EXEMPLARY PROGRAM: IACP WORLD OF MANUFACTURING

A randomly chosen group of five students for each of eight World of Manufacturing classes were interviewed to obtain their reactions to this industrial arts program. The set of questions used earlier to evaluate the program formed the basis for this interview. Rather than a simple Yes-No response, each of the five students was asked to indicate on a five point scale their reactions to each question. Discussion was encouraged and recorded on a cassette tape for later review and abstraction. These tapes will be merged to form a single half-hour tape of student reactions to the World of Manufacturing program in Pontiac. The questions are attached. Following are student responses to the questions.

1. Interest-

Like it, move around.
Buzzers didn't turn out.
Like building group - get done quicker.
Is uninteresting - don't like to do the bookwork.
Burgler alarms didn't work right. Made wrong - wasn't enough time. Would rather work alone - if mess up, whole class is mad because you ruined their alarms. If work alone and it doesn't work it is only your own fault.
Real - liked working in groups. Got done faster.

2. Comparison to previous classes-

Like better than previous classes.
Larger variety of things.

3. Keep the program the same-

Assembly line did not work well - parts missing. Some didn't know there jobs. If do over, would rather work by themselves. Want more tools to work with.
Get rid of buzzer. If worked by self, might be able to make it better.
Nobody worked together, didn't stay organized (buzzer). Put the buzzer at the end of the year.
Black and white students worked together okey.
Hard to work together.
Would like to work on cars. More wood products. Some kids don't like to do things because they have to them in a group. When work in groups, some pupils ask others to do their work, they just sit around, expecting others to do their job.
Need more time to work on items.
Work on real cars. Don't talk to instructor as far as changes.

4. Make other metal objects-

Nothing we do on assembly line turns out too good.
Four out five want to work together on projects.
Would like to make items useful at home. Working together is generally ok. Sometimes when working together, some guys mess up on purpose and make one good for themselves.
Would like to use more wood.

5. Different class-

Get hard classes over first (math), relax in this class. Some guys goof off, some pranks.
Have problems with set-up and clean-up with early and late classes.
Not enough equipment. Equipment stolen.
Would like less homework, less written work. Like being active, not just talking.

6. Advise friend-

Yes, this class and other shop classes.
Learn how to use more tools.
Like to work with friends.

7. Less studying-

More studying.
Study for tests.
If more time spent studying, less time for work.
Didn't expect tests to be so hard. Learn more about materials before work with it.

8. Understand manufacturing industries-

Less goofs in industry (class items didn't work).
Pleased with class.
Would like to see work on electricity.
On assembly line you learn one job that you can do. Get help from others.
Helped understand hardships in manufacturing. Course keeps you busy, don't have time to goof off.

9. Better job of studying-

(Did not discuss) covered under number 7.

10. Helped understand other classes-

Helped in science - area of soil used in shop work.
Helped in science, math, and reading.
No transfer between classes.
Helped by more reading - learned reading. Helps in math because of measuring.
Help both ways. Math helps most. Like school more because of this class.

11. Helped like school more-

We make things rather than just read and write and sit. Can move around.
I don't want to get behind.
Liked school better because technology class is a time when do what I want, makes rest of day go good. Would like class to last 2 hours.
Like more - make things. Less pressure than other classes.

12. Parent's opinion-

Improved grade in math.
Show things to parents and they approve.
Learn how to use parent's tools. Talk about this class at home.

13. Student's opinion-

Like class despite instructor.
Don't like to study terms. Drop the alarm.
No racial problems. Put more things in books. Like group work.

INTERVIEW
QUESTIONS FOR STUDENT EVALUATION OF THE
INDUSTRIAL ARTS CURRICULUM PROJECT

"The World of Manufacturing"

Response Form:

1.	Very Interesting	29		10		1	Dull
		1	2	3	4	5	
2.	(skip)						
3.	Same	7	8	13	10	2	All Different
		5	4	3	2	1	
4.	All Other Products	4	3	9	9	16	Same Products
		1	2	3	4	5	
				Hrs/Subject			
5.	Different Class	2				33	Same Class
		5	4	3	2	1	
6.	Encourage	22	8	5			Avoid
		1	2	3	4	5	
7.	More Study	14	13	11	1	1	Less Study
		1	2	3	4	5	
8.	Helped Understand	30	9	1			No Help
		5	4	3	2	1	
9.	(skip)						
10.	Helped Other Class	8	12	9	5	6	No Help
		5	4	3	2	1	
11.	Parent's - Like Opinion	21½	7	10	1½		Do Not Like
		5	4	3	2	1	
12.	Pupil - Like Opinion	24	10		1		Do Not Like
		5	4	3	2	1	
13.	Like Better	25	8	7			Worse
		1	2	3	4	5	

SCHOOL Cumulative Freq.

CLASS NO.

The above data gathered from student interviews substantiate the findings from the questionnaires filled out by the students. The comments made by the students generally are of a positive nature. At the same time, the students point out problems within the course content and areas which need to be changed.

The majority of students find the course to be of high interest to them. The majority of students indicate that they would encourage their friends to take the course and that the course content would remain approximately the same. Striking too is the finding that being enrolled in the World of Manufacturing increased the liking of school. The interview data also supports the earlier finding that there is not a clsoe relationship between the curriculum and other courses. On question ten where the students are asked if the World of Manufacturing curriculum aides in the understanding of other courses, twenty students indicated that it was of some help while twenty students indicated little or no help.

The student reaction data indicates that the course does encourage interest on the part of the students and engenders positive attitudes toward manufacturing technology. The second objective of the program, then, is deemed to have been met by the program.

To get impressions from other educators, a questionnaire was devised by Educational Services and Products and given to visitors to the program. The completed questionnaires were mailed by the visitors to Educational Services and Products, Inc. This procedure proved to be faulty in that there was a extremely low rate of returned, completed questionnaires.

Generally, the visitors reviewed the program in a positive manner: They perceived the course content as relevant and as a means to encourage student success and motivation. The visitors also pointed out some program defects such as spare limitations and cost.

VISITOR RESPONSE
TO
THE PONTIAC JUNIOR HIGH SCHOOLS INDUSTRIAL TECHNOLOGY EXEMPLARY PROGRAM: IACP WORLD OF MANUFACTURING

The Pontiac EACP World of Manufacturing program has received attention by a number of visitors interested in the merits of this exemplary industrial arts program. To capture visitor reactions to the program, a visitor response form was distributed to those viewing the program. Following are the results of a tabulation of their responses. The response form is attached.

A. Characteristics of the IACP World of Manufacturing Program.

	Characteristics	Frequency of Response- Emphasized	Not Stressed
1.	Educationnaly Sound	11*	1
2.	Flexible and Adaptable	6	5#
3.	High Student Motivation	11*	1
4.	Student Success Experiences	11*	-
5.	Teaching Effectiveness	9	1
6.	Program Efficiency	6	3
7.	Occupational Orientation	9	1
8.	Content Relevancy	12*	-
9.	Decreased Discipline Problems	8	3
10.	Organized Knowledge	10	1
11.	Language Development	9	3
12.	Behavioral Objectives	9	2
13.	Cost of Program Established	7	6#
14.	Teacher Education	11*	1

* Items where emphasis was noted by most respondents.

\# Items noted as receiving relatively little stress.

Number of respondents was 16

Comments by Respondents-

1. Great program for beginning teacher since everything is planned for you.
2. Program is one-sided in that it tends to glorify working in a factory a little too much.
3. Casual observations indicate that funds might not be adequate or shop area large enough for the number of students involved.

B. Integration of Men, Machines, and Materials.

Involvement	(Low) 1	2	3	4	5 (High)	
		Judgements-				
Pupils with Instrictor-		1	4	3	8	-Avg. 4.1
Pupils with Program Materials-		1	2	4	8	-Avg. 4.0
Pupils with Equipment-	1	1	4	6	3	-Avg. 3.4

Comment by one Respondent-

Too many pupils and they apparently weren't entirely eager to go ahead.

C. Attributes Influencing Initiation of Program - Comments.

I might use to help introduce students to some of the aspects of industry, but as it stands now I don't think that I would base my whole program on the IACP Program.

High student motivation, occupational orientation, and student success experiences.

Organization, uniform coverage, identification of broad concepts and relationships.

Would not initiate at this time due to limited information feed-back as to actual accomplishment of program.

Sound behavioral objectives; the context is relevant to todays world, and IACP is much better than what we teach now.

High Motivation.

Low cost per pupil expense - can include more students in our shop area. Sounds like a much improved program.

Student involvement and satisfaction.

The concept approach rather than the skills approach seems worthwhile to interest kids in something.

Completeness of coverage.

Well planned materials, daily lessons, variety of projects.

D. Previous Experience with Program by Respondents.

No prior contact - 14 visitors

Some exposure - 2 visitors

Number having previewed materials: No - 7 visitors
Yes - 9 visitors

Preview Locations - Haven Hill Conference
Michigan State University
Central Michigan University - course
Dr. Jennings, Eastern Michigan University
West Junior High, Ypsilanti, Michigan
Dowagiac Public Schools, Michigan

Submitted by: T. Ploughman
E.S.P., Inc.

V I S I T O R R E S P O N S E

THE PONTIAC JUNIOR HIGH SCHOOLS INDUSTRIAL
TECHNOLOGY EXEMPLARY PROGRAM: IACP WORLD OF MANUFACTURING

The IACP World of Manufactoring program is a focal point for many industrial arts educators across the nation. To capture visitor reactions to the program and particularly the program as it exists in Pontiac's Junior High Schools, we ask that you provide us with critical responses to the following questions:

A. The IACP World of Manufacturing program you have reviewed is intended to emphasize the following characteristics:

1.	Educationally Sound	8.	Content Relevancy
2.	Flexible and Adaptable	9.	Decreased Discipline Problems
3.	High Student Motivation	10.	Organized Knowledge
4.	Student Success Experiences	11.	Language Development
5.	Teaching Effectiveness	12.	Behavioral Objectives
6.	Program Efficiency	13.	Cost of Program Established
7.	Occupational Orientation	14.	Teacher Education

Pontiac staff members would appreciate your response to what you have observed and discussed relative to specific examples of apparent emphasis or lack of attention to certain of the above listed characteristics. Please express your opinion freely.

Emphasis Noted - (comments)

Circle Characteristics Emphasized

1	5	9	13
2	6	10	14
3	7	11	
4	8	12	

_____ _____ _____ _____ _____

Deficiencies Noted - (comments)

Circle Characteristics Not Stressed

1	5	9	13
2	6	10	14
3	7	11	
4	8	12	

VISITOR RESPONSE - IACP World Of Manufacturing

B. The IACP World of Manufacturing program focuses on how industry integrates men, machines, and materials into efficient production systems. What did you observe about Pontiac's program that illustrates success towards this goal?

Involvement - (comments)	Your Judgement
Pupils with Instructor -	Low __ __ __ __ __ High
Pupils with Program Materials -	Low __ __ __ __ __ High
Pupils with Equipment -	Low __ __ __ __ __ High

C. Based upon your review of the Pontiac program and prior understanding of IACP World of Manufacturing please identify those attributes which would influence you to initiate such a program.

D. What has been your experience with the IACP World of Manufacturing program?

1. Are you presently using the program?

   No __ Yes __ When Implemented _____ yr.

2. Have you previewed materials previous to today?

   No __ Yes __ Workshop _____(where, when)

   School Setting _____(where, when)

   _____

3. The following information is optional:

   Name _____ Position _____

   Educational System _____

   Address _____

   _____

Summary

The evaluation of the World of Manufacturing indicates that the three program objectives were met:

1. students increased their knowledge of industrial technology.
2. students increased skills related to manufacturing technology.
3. high interest was deomonstrated by the students.

Statistically significant achievement gains were made by the seventh and eighth grade groups while ninth graders showed no gain. The gains, while statistically significant, are small and the actual quantitative mean scores are quite low when it is considered that the measure used to test achievement is a criterion related test: that is, the test is based directly on the curriculum. Few of the items were given correct responses by the majority of students and the actual achievement must be considered as minimal despite the significance of the gain scores. Possible reasons for this relatively low level of achievement are discussed in the report.

High student interest and positive attitudes relative to the course was evidenced by student questionnaires, student interviews, and visitor responses.

Recommendations

1. Analysis should be carried out on the periodic achievement tests rather than basing the evaluation solely on a pre-post basis.
2. Curriculum revisions need to be made by teachers after close scrutiny of the item analysis completed on the comprehensive examination.
3. The curriculum needs to be more flexible allowing more time for units showing relatively low achievement.

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APPENDIX

COMPREHENSIVE EXAMINATION

THE WORLD OF MANUFACTURING

1. A conversion process changes raw materials into

   A. more raw materials
   B. consumer finished goods
   C. primary materials
   D. industrial materials

2. Which of these statements would come from a sales forecast?

   A. There is a supply of labor available
   B. Production equipment is adequate
   C. Raw materials can be bought
   D. There would be a large market for the product

3. Which is not one of three general stages in developing a design solution?

   A. Constructing a mock-up
   B. Sketching and making rough models
   C. Developing a production flowchart
   D. Research

4. As a factory supervisor, you learn that some components are too long after shearing. You will first

   A. check the quality-control procedures at the shearing machine
   B. order a new machine
   C. fire the machine operator
   D. change the detail drawing for the part

5. Which of these terms best identifies the economic system used in the U.S. today?

   A. Bartering
   B. Monetary
   C. Utilitary
   D. Trading

6. A thermostat that measures and controls temperature represents which principle of automation?

   A. Mechanical handling
   B. Data processing
   C. Feedback
   D. Program control

7. A survey to find out what kind of product people want to buy is a

   A. planning survey
   B. sales survey
   C. production survey
   D. consumer survey

8. Servicing a product is sometimes also called

   A. pre-processing
   B. post-processing
   C. processing
   D. producing

9. Three basic ways of separating materials are

   A. shearing, chip removal, and other separating practices
   B. casting, molding, and conditioning
   C. compressing, stretching, and mixing
   D. coating, bonding, and mechanical fastening

10. The printing process that put ink on this page was a

    A. mixing process
    B. bonding process
    C. coating process
    D. mechanical fastening process

11. An example of chip removal is

    A. shearing
    B. chemical separating
    C. thermal erosion
    D. drilling

12. Which product is a non-durable good?

A. Screwdriver
B. Table
C. Musical instrument
D. Shirt

13. The products shown in Figure 1 probably were assembled by what process?

A. Batch assembly
B. Continuous assembly
C. Lot assembly
D. Minimum production assembly

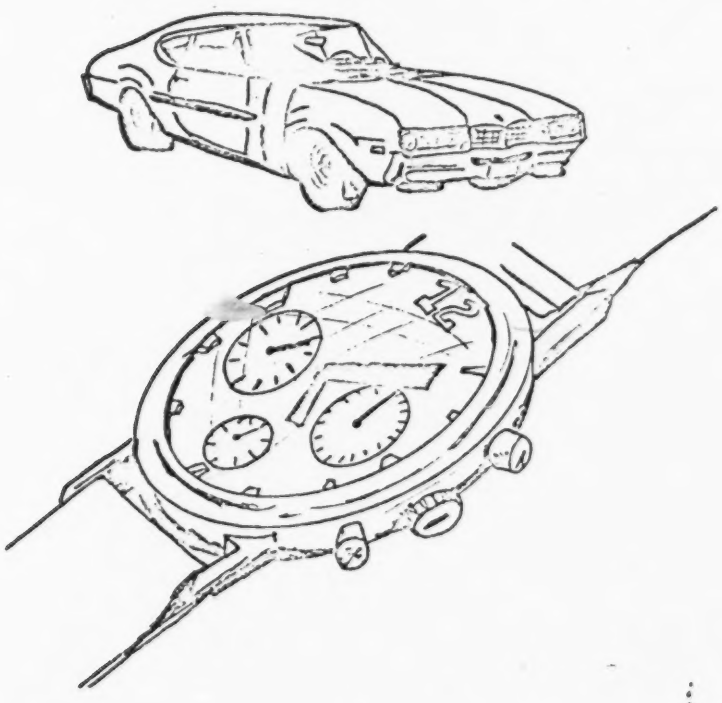

FIGURE 1

14. When material is refined, any leftover substance that has no further use is regarded as a

A. by-product
B. waste material
C. reproducible material
D. standard stock

15. A corporation's name, purpose, and how it will be financed are all stated in the

A. deed
B. charter
C. liability
D. stock

16. Which step occurs before actual production begins?

A. Distribution
B. Servicing
C. Finishing-off
D. Tooling-up

17. A common way to get money to start a corporation is by

A. taxing the workers
B. taking orders for the product
C. selling refreshments to the workers at a profit
D. selling stock

18. Which of these is not a basic stage of primary metals processing?

A. Refining ore
B. Converting raw materials to pure metals and alloys
C. Forming metal into standard stock
D. Designing a product for the market

19. About three-fourths of America's business sales are made by

A. corporations
B. partnerships
C. proprietorship
D. the federal government

20. Set-up cost is the cost of

A. doing one operation on one production unit
B. getting ready to do an operation
C. buying one component part
D. setting items on an overhead conveyor belt

21. The "Industrial Revolution" was

A. a revolt of workers against their employers for better wages
B. a revolution between two industries
C. the invention of a steam engine, which made factories absolutely necessary
D. the change from making goods by hand to making goods by machine

22. An economic system based on free enterprise is closely related to

A. communism
B. socialism
C. capitalism
D. isolationism

23. In tooling up for production, the last step probably would be

A. conducting a trial run
B. choosing the operations
C. providing jigs and fixtures
D. estimating the cost of tooling up

24. Mechanical, radiant, nuclear, chemical, heat, and electrical are classes of

A. materials
B. energy
C. tools
D. processes

25. Forging, bending, and drawing operations occur in what forming processes?

A. Casting and shearing
B. Compressing and stretching
C. Conditioning and separating
D. Bonding and combining

26. Heating metal and then letting it cool slowly, so that it will be more usable in manufacturing, is an example of a

A. compressing or stretching process
B. conditioning process
C. shearing process
D. coating or bonding process

27. The most economical way to make the automobile fender shown in Figure 2 is by

A. stamping
B. casting
C. thermal conditioning
D. chip removal

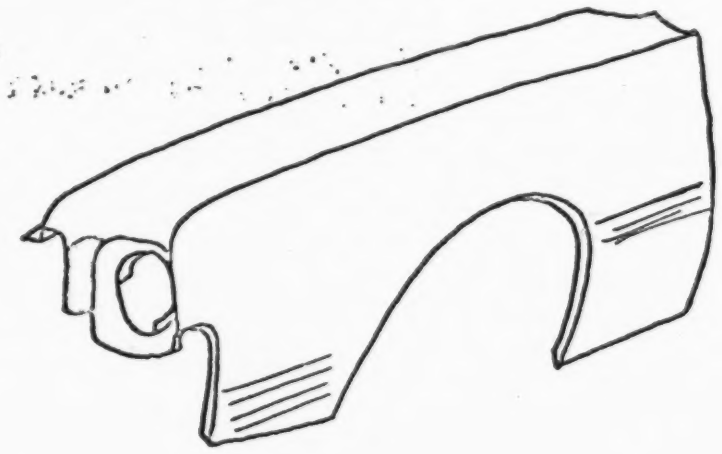

FIGURE 2

28. Which one of these managers is specially trained to be a work-measurement specialist?

A. Computer analyst
B. Vice President of marketing
C. Time-study analyst
D. Office manager

29. Which of these groups is in charge of tooling-up for production?

A. Time-and-motion study group
B. Material-handling group
C. Final-inspection group
D. Industrial engineering group

30. Which is not a physical property of materials?

A. Hardness
B. Ductility
C. Weight
D. Cost

31. Which is not a basic way of forming material?

A. Casting
B. Compressing
C. Stretching
D. Chip removal

32. Which of these events was not part of the Industrial Revolution?

A. The change from hand-made goods to machine-made goods
B. The invention of the wheel
C. The use of mechanical power to drive machines
D. The growth of the factory system of production

33. In a factory, the receiving, unpacking, and storing of input materials can be classified as

A. personnel induction
B. post-processing
C. processing
D. pre-processing

34. Two basic purposes of shearing are to

A. divide material and give it shape
B. crumble and shred material
C. increase the amount of material and its strength
D. make the material flat and smooth

35. If some parts of a product must be taken apart and put back together frequently, they should be held together by

A. fusion bonding
B. conversion coating
C. mechanical fastening
D. adhesives

36. Small bits of material are lost along the parting line during

A. casting
B. chip-removal
C. shearing
D. stretching

37. Removing and cleaning a spark plug is an example of

A. processing
B. maintenance
C. altering
D. automating

38. Forging is done by what types of forces?

A. Casting and pouring
B. Shearing and chip removing
C. Hammering and continuous squeezing
D. Mixing and bonding

39. "Machine time" and "man time" are concepts used in

A. marketing research
B. advertising
C. work measurement
D. sales prediction

40. The people who define problems and develop solutions for computers are called

A. systems analysts
B. section supervisors
C. technicians
D. key-punch operators

41. Which group of items are material-converting practices?

A. Sorting, screening, washing
B. Pasteurizing, distilling, evaporating
C. Fabricating, building, constructing
D. Extracting, mining, excavating

42. The chart in Figure 3 would be used in what type of production control?

A. Advertising
B. Marketing
C. Inventory
D. Research & development

ITEM	QUANTITY	SIZE
Washers (flat)	591	1/2"
Stove bolts	213	3/8"x2"
Nuts (hex)	1 gross	6-32 NC
Machine Screws	7 dozen	4-40 x 1/2"

FIGURE 3

43. Which of these is not a reproducible raw material?

A. Meat
B. Wood
C. Eggs
D. Petroleum

44. The stencil shown in Figure 4 can also be called a

A. chuck
B. template
C. burr
D. trammel

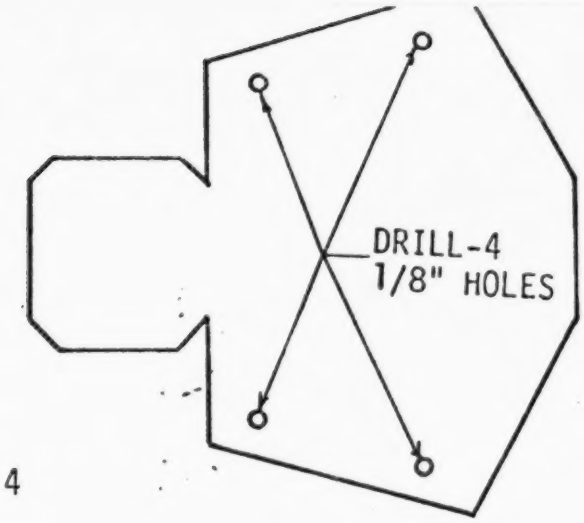

FIGURE 4

45. Which of these will reduce the chance of error in quality control?

A. Jigs and fixtures
B. Washers and nuts
C. French curves and dividers
D. Scribers and scratch awls

46. Which product was invented within the past twenty-five years?

A. Telephone
B. Fluorescent lamp
C. Transistor radio
D. Airplane

47. To test the quality of light bulbs, a few from each production lot are tested. Choosing a few items for testing--rather than the whole lot--is called

A. selecting
B. specifying
C. statistics
D. sampling

48. Which of the following would not force a corporation to go out of business?

A. Bankruptcy
B. Failure to give bonuses to older employees
C. Failure to meet state obligations
D. Lack of activity

49. The process of a corporation's going out of business is called

A. dissolution
B. resolution
C. declaration
D. application

50. A corporation is run by its

A. stockholders
B. staff
C. directors
D. production workers

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THE EMIGRATION OF HIGHLY-SKILLED MANPOWER
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QUESTIONS OF MEASUREMENT AND EVALUATION OF
THE MOVEMENTS. THE DEVELOPING NATIONS WHICH
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CONDITIONS IN THEIR OWN COUNTRIES, BUT THEIR
EDUCATION IS ORIENTED TOWARD THE NEEDS OF
DEVELOPED NATIONS. WHEN SALARY, MATERIAL
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CONSIDERED, THE DEVELOPING NATIONS ARE AT A
MAJOR DISADVANTAGE. IMPROVEMENT OF THE "BRAIN
DRAIN" REQUIRES INTERNATIONAL CHANGES IN
EDUCATIONAL STRATEGIES, SALARIES,
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Emigration of Highly-Skilled Manpower from the Developing Countries

by

GREGORY HENDERSON

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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THE EMIGRATION OF HIGHLY-SKILLED MANPOWER FROM THE DEVELOPING COUNTRIES

BY

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801 U.N. Plaza, New York, N.Y. 10017

1970

PREFACE

There has been steadily rising awareness by the United Nations family about the problems resulting from the migration of trained personnel from developing to developed countries. A report of the Secretary-General in 1967 urged further study of the subject by the United Nations and concerned international agencies specifically including UNITAR. The Institute has been engaged in a variety of research activities concerning this problem ever since its Board of Trustees that same year approved work in this field. The General Assembly of the United Nations in its resolution 2388 (XXII) of 19 November 1968 commended the Institute's study on the international migration of professionals from developing to developed countries and, in resolution 2417 (XXIII) of 17 December 1968, took note with interest of the "important contribution" made by UNITAR to the preparation of the United Nations study on this subject.

The UNITAR study that served as a basis for the Secretary-General's report on the "Outflow of Trained Personnel from Developing to Developed Countries" (A/7294, 5 November 1968) has been recast and updated and is now reproduced in full in the UNITAR Research Report Series. The author of this study, Mr. Gregory Henderson, was a research officer at UNITAR from 1966 through 1969 and is now Associate Professor of the Fletcher School of Law and Diplomacy, Tufts University, Medford, and Acting Director of its Edward R. Murrow Center for Public Diplomacy.

The views, interpretations, and conclusions contained in this report are Mr. Henderson's and are not presented as those of the Institute, its trustees or staff. UNITAR itself takes no position on the matters studied under its auspices.

In addition to this report, UNITAR's work on the "Brain Drain" project has included organization and supervision,

in co-operation with the United Nations Department of Economic and Social Affairs, of five "country studies" in the Cameroon, Colombia, Lebanon, the Philippines and Trinidad and Tobago on factors motivating migration and their effect on the economic and social development of the countries concerned.

A more extensive multinational survey to ascertain the conditions and motivations behind the "brain drain" phenomenon is currently under way. The research includes questionnaire surveys of large samples of students from developing countries studying abroad, of those who have stayed-on in the country of study, those who have returned to their home countries and the employers of the latter. Standard sampling and interviewing techniques are being used in this survey in which UNITAR has secured the co-operation of leading research institutes in the various countries. We anticipate that some 15 - 20,000 interviews will be conducted altogether. After processing and analysis of the data a comprehensive volume will be published towards the end of 1971. A progress report with some preliminary findings will be issued earlier. We are also preparing a paper on recommendations and suggestions that have been made by experts for dealing with the problem at the national and international level.

It is my hope that UNITAR's research in this field will help in bettering understanding and in taking practical action in regard to a situation which is of great concern to many of the developing countries.

S. O. Adebo
Executive Director

December 1970.

TABLE OF CONTENTS

		Page
I.	INTRODUCTION ...	1a
II.	THE NEW MIGRATION ...	1
	A. The components ...	1
	1. The changed movement ...	1
	2. Definitional question ...	4
	3. Immigration policies of developing countries ...	5
	4. Immigration policies of developed countries ...	6
	5. The resulting migration changes ...	9
	B. The statistics of Professional Migration	
	1. Introduction ...	10
	2. Immigration statistics ...	11
	3. Drawbacks and limitations of statistics ...	12
	(a) Lack of statistics in many countries ...	12
	(b) Reverse flow ...	13
	(c) Problems in fixing immigration origin ...	15
	(d) Distortion in balance of flow or net flows ...	15
	(e) Aid personnel ...	16
	(f) Variety in Evaluation ...	18
	4. Professional Migration in key countries ...	19
	(a) Canadian immigration ...	19
	(b) Australian immigration ...	21
	(c) The Netherlands ...	25
	(d) United Kingdom immigration ...	26
	(e) Immigration into the United States ...	29
	(i) The recent record ...	29
	(ii) The special medical case ...	31

(f) Other developed receiving countries ... 36
(i) France ... 36
(ii) The Federal Republic of Germany ... 39
(iii) Others ... 39
(g) Developing countries ... 40
(i) An example: Turkey and the Middle East ... 40
(ii) Colombia ... 42
(iii) Trinidad and Tobago ... 43
(iv) Jamaica ... 44

5. Future trends ... 46

III. The Migration of Middle-Level Personnel ... 50
A. The general problem ... 50
B. National instances: ... 52
1. United States ... 52
2. Canada ... 54
3. Australia ... 54
4. France ... 55
5. Latin America ... 55
6. Africa ... 56
7. General effects ... 56

C. A Special Case: Nurses ... 58
D. Conclusions ... 60

IV. DIFFERENCES AMONG NATIONS IN RESPECT TO PROFESSIONAL MIGRATION ... 62
A. General problem ... 62
B. Large contributors ... 63
C. Small contributors and recipients ... 64

D. Conclusion ... 66

V. EDUCATION AND MIGRATION ... 68

A. Introduction ... 68

B. Growth of education abroad ... 70

C. The orientation of education abroad ... 71

D. Study abroad and talent migration ... 78

E. The doctorate and migration ... 81

F. Internal educational factors ... 83

VI. ECONOMIC AND SOCIAL FACTORS AFFECTING OUTFLOW: PUSH AND PULL EFFECTS ... 87

A. Introduction ... 87

B. Salaries ... 88

1. Salary gap between developing and developed countries ... 88

2. Internal salary maladjustments ... 89

C. Qualitative under-employment ... 90

1. Unemployment ... 90

(a) General ... 90

(b) Educational surplus ... 90

(c) Planning errors ... 92

(d) Over-centralization ... 92

(e) Job content ... 93

2. Career expectation ... 93

D. Employment procedures ... 94

E. Isolation and institutional settings ... 95

F. Social settings ... 96

G. Research ... 97

H. Perspective on scale ... 99

I. Summary: A new world of communication ... 100

VII. THE ADVANTAGES AND DISADVANTAGES OF MIGRATION OF SKILLED PERSONS ... 102

A. Introduction ... 102

B. The question of damage to development ... 103

1. Factors involved ... 103

2. Loss of stock of educated men ... 106

3. Effect of outflow on manpower requirement ... 108

4. Loss of the costs of education ... 114

5. Loss of the effect of trained individuals.. 119

(a) Migration of unemployed ... 119

(b) Mal-distribution of talent ... 120

(i) Educational ... 120

(ii) Non-use of talent in rural areas ... 121

(iii) Other mal-distribution of talent ... 122

(c) Under-valuation of talent ... 122

(d) Lack of adequate support for professionals ... 122

(e) Migration of the fully-employed ... 123

C. General value of the highly-educated ... 124

Leadership initiatives ... 124

D. Offsetting factors for developing countries ... 125

1. Remittances ... 125

2. Contributions to knowledge ... 127

(a) Student returnees ... 127

(b) Professionals from developing countries active abroad ... 127

3. Relief of unemployment ... 128

4. Channel of communication ... 129

5. Emigration as stimulation ... 130

E. Advantages to the developed countries ... 130
1. Deductions from immigration legislation ... 130
2. Valuation on the job ... 131
(a) Postulates of the value of education and training ... 131
(b) Questions regarding careers in developed countries ... 133
(c) Other values ... 134

F. Offsetting factors for developed countries ... 134
1. Educational Places ... 134
2. Postponing solution to internal problems ... 135

G. Conclusion ... 136

VIII. MEASURES CURRENTLY BEING TAKEN REGARDING THE OUTFLOW OF TRAINED PERSONNEL ... 137
A. The climate of action ... 137
B. Steps taken by developing countries ... 138
C. Stemps taken by developed countries or international bodies ... 143

IX CONCLUSIONS, STRATEGY AND RECOMMENDATIONS ... 140
A. Conclusion ... 140
B. Strategy for developing states ... 152
1. Formulation of national policies ... 152
(a) Science policies ... 152
(b) Regional arrangements ... 153
(c) Policy toward study abroad ... 153
(d) Policy toward attracting foreign scientists ... 155
(e) Manpower policies ... 155
2. Education in developing countries ... 155
3. Employment ... 156
4. Salary and status structures ... 156
(a) Salary ... 156
(b) Status ... 157

C. Strategy for education abroad ... 157
D. Strategy in developed countries ... 158
1. Education ... 158
2. Immigration ... 160
3. Research help ... 160
E. International strategy ... 161

ANNEXES

I Tables

			Page
I	:	Immigrants admitted into the United States, by country of origin and occupation from the year ended 30 June 1962 to the year ended 30 June 1967 ...	166
II	:	Immigrants admitted into the United States, by country of origin and occupation A: from the five years ended 30 June 1962 to 30 June 1966, and B: for the year ended 30 June, 1967 ...	170
III	:	Immigrants admitted into Canada, by country of last permanent residence and occupation, 1962 - 1967 ...	171
IV	:	Immigrants admitted into Canada, by country of origin and occupation, over the period 1964 - 1967 ...	172
V	:	New working licences issued to foreigners by the French Government by country of origin and occupation over the period 1962 - 1966 ...	173
VI	:	Foreign students in France in 1966/1967 by country of origin and field of specialization ...	175
VII	:	Student enrolment at universities and other institutions of higher learning in France, as of 31 March 1968 ...	177
VIII	:	Aggregate immigrants into Canada by occupation in the years 1962 - 1967 ...	178
IX	:	Aggregate immigrants into the United States by occupation in the years 1962 - 1969 ...	179
X	:	Stocks of professional manpower by country around 1960 and of medical personnel around 1964 ...	180
XI	:	Proportion of professional, technical and kindred workers out of total immigrants with occupation into the United States and Canada over the period 1962 - 1966 ...	185

	XII	: Annual number of graduates by country and field of study around 1960	... 187
	XIII	: Ratio of the annual number of emigrants to the annual number of graduates from the related field of study by country of origin or last permanent residence over the period 1962 - 1966	... 190
	XIV	: Number of graduates per 100,000 inhabitants and percentage distribution of graduates by broad fields of study and selected countries	... 192
	XV	: Awards for Ph.D.'s and Federal Funding for basic research, 1958 - 1967, United States	... 194
	XVI	: Immigration of Middle-level skills	... 195
II	Graphs	:	... 196
	1	: Annual number of "professional, technical and kindred workers" immigrating into the United States by region of origin, 1952 - 1967	... 196
	2	: Percentage of "professional, technical and kindred workers" out of immigrants with occupation admitted into the United States by region of origin, 1952 - 1967	... 197
	3	: Percentage of "professional, technical and kindred workers" out of total immigrants into the United States by region of origin, 1952 - 1969	... 198
III	United States Visa Terminology		... 199
IV	Bibliography		... 202
V	Country index		... 209

I. INTRODUCTION

The tendency of skilled and highly educated people to go from lesser developed countries to more highly developed ones and remain there involves at least two problems which are interrelated but which cannot be understood unless separately analyzed. The first is the size, character and causes of the movement of trained personnel from developing to developed countries together with a consideration of the specific countries from which this flow occurs and those to which it proceeds. The other is the evaluation to be placed upon this migration, both for the various countries concerned and for the receiving countries; in brief, the question as to whether and to what extent the migration of the skilled is a problem, and the migration of the highly-educated a "brain drain".

Within these problems lies the distinction between those who are already skilled or educated and who migrate and those who proceed abroad to acquire skills and education, after which they migrate. Those studying or training abroad are, of course, not treated as migrants or "brain drain" within our definition. Those who remain following education and training which, in all places received, totals sixteen years or over or who take steps to acquire a more permanent immigration status than that on which they entered are considered migrants or "brain drain". The assumption employed here is that education and training are necessary components of development and might be used for developmental ends wherever created. Our persuasion is hence development. This assumption together with the problem of education as a road to migration are examined below. (Chapter V).

The dimensional question of the migration of the skilled and trained is at present considerably clearer than the problem of evaluating its effects. Indeed, the picture of migration has recently become sharper. Statistics are not, of course, anywhere nearly complete on a worldwide basis; they are in particular incomplete in regard to those returning to developing countries. Immigration in the technical sense of those whom the country of entrance considers to be immigrants has gradually come to be statistically described to the extent that both totals for certain important countries and also trends stand out with increasing factual clarity. These demonstrate beyond question that: (a) there are numerous flows of skilled and trained persons from

developing to developed countries; (b) these flows are, however, currently characterized by large flows from a comparatively small number of developing countries to a small number of developed countries and by smaller flows from an increasingly large number of developing countries; (c) in these flows engineers, medical personnel and scientists have unusually large weight; (d) the above flows have mounted rapidly in recent years until the 1968-69 fiscal year; (e) the greater the skill or training, on the whole the greater the susceptibility to migration tends to be; (f) the flows increasingly respond to the changed economic complexity of world societies and to legislation, much of it new, which reflects the demands of a new economic era; (g) the above flows relate to flaws in national educational systems and to the poorly-planned or unplanned training of students from developing countries in developed countries; (h) except possibly for South America, there have been, at least until 1968-69, no signs that the above talent migration is decreasing; there are fairly definite signs that its increase will, under present conditions, probably mount with some rapidity on a long-term basis.

The presence of trained and educated men has come to be universally regarded as a vital component of development, often as its most vital component. The present study draws inspiration from this belief and responds to the interest of the United Nations in the development and utilization of human resources for development with a view to narrowing present gaps between developed and developing countries. Present migration, as demonstrated above, would appear to run logically counter to such aims and might tend to qualify the belief in the utility of talent for development on which much education and training abroad presently rests. The statistics behind the above propositions define the migration of the trained within certain areas. These statistics are summarized in the appendices. They provide a factual framework relevant and stimulating to further inquiry into the migration phenomenon and its apparent failure to conform to beliefs and hopes in development. They do not, however, define migration as a problem nor can statistics tell us whether damage is done to development and, if so, how much.

The reason for this is that trained and educated persons add widely different value to the countries they enter, their migration is of very varied cost to the countries they leave. The value of trained men within alternative situations is subject to so many variables and the degree to which that value

can be, especially in science and technology, communicated beyond international frontiers so diverse that no agreed upon totals of economic costs and prices can yet be affixed to the results of migration nor is any concensus regarding the costs and gains involved presently in sight. The apparent conflict of intellectual migration with developmental aims implies that general statements of the value of training and education for development may not be as widely valid as many claim: what matters is the capacity of the given country to use the training involved. This capacity depends on many complex factors in the educational, administrative, social, economic and institutional systems of developing countries. These factors do not permit accurate quantification or exact evaluation, whatever accuracy migration statistics may have. They do, however, justify far more exact attention than economists and social scientists have hitherto given to the creation and utilization of human skills for development and they may well lead to a number of practical consequences for development and educational planning.

Meanwhile present trends have been viewed with rapidly increasing national and international concern both within developed countries (including the United States Congress), within the United Nations, and, to a lesser and uneven extent, within developing countries. Though evaluation differs, the kinds of values, of advantages and disadvantages which are thought to apply can be described, some tentative conclusions drawn, and various initial, ameliorative measures, mostly modest, suggested for consideration by the international community. Demonstration of a "brain drain", in other words, cannot be made in a sense meaningful for development on the basis of migration statistics alone; it must be made by some evaluation of the meaning of these statistics in development terms. Such process cannot be ended with this paper; it can only be begun. Continuous study and international review will be necessary. Demonstration of damage or lack of damage to development and of how this damage occurs when trained personnel are unutilized or depart will be the required subject of further study and review.

II. THE NEW MIGRATION

A. The Components

1. The Changed Movement

Migration is older than human history. Until comparatively recent times, however, most migration was little controlled except by war, disease, force or other physical restraint. Prominent intellectuals migrated, but they did so largely as individuals; their movement was not a general or steady phenomenon. Migration, especially that from Europe in the nineteenth and early twentieth century to colonial or former colonial areas was over-whelmingly of the unskilled. It was often accompanied with an outflow of capital from the countries of origin which had the effect of aiding the employment of the migrants. Without such flows, many countries, prominently the United States of America, Canada, Australia, New Zealand, South Africa and Argentina could not have developed themselves and Europe might have known starvation.[1/] Freedom of movement and residence is inscribed into the Universal Declaration of Human Rights.

Following the Second World War and the completion of programmes for the repatriation or resettlement of human beings dislocated by the conflict, there began a new population movement across frontiers, smaller in size and altered in kind. The United States continued as in the previous century to be the principal destination of those moving, with Canada and Australia next. The United Kingdom, not previously a country of immigration, became a member of that class. France received many persons from areas formerly dependent on it.

The changes which marked the movement as of a new kind were several: a great shift in the geographical origin of a large part of the movement; a changed occupational distribution; increasing controls imposed by almost all states, developed or developing, over immigration. People from independent

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1/ See Stevan Dedijer, "Early Migration" and Brinley Thomas, "Modern Migration", in The Brain Drain, Walter Adams, ed. MacMillan, 1968. For professional immigration into the United States, see graphs 1-3 appended. Canadian immigration has become still more skill-intensive than the United States as can be seen by comparing Tables III and IV with Tables I and II. Only in the instance of physicians is Canadian immigration less skill-intensive.

countries increased in the migration, in which Europeans had previously been predominant. Professional, technical and kindred workers mounted greatly; unskilled labor, relatively suddenly, became far more immobile except over a few neighboring borders.[1] Though statistics are sketchy, total migration is probably down compared to its 1890-1914 levels and is certainly now a smaller proportion of the world population than then.[2]

For the skilled and the talented, however, the flow is no longer, as formerly, one of isolated individuals; it is large, steady and growing. In this it is likewise responsive to a number of phenomena: the tremendous increase in world education; the movement, internally as well as externally toward urban centers which industrialization has fed; the spread of transportation and of the knowledge of employment opportunities; continuing adverse conditions for professionals in developing countries; and the official encouragement of the preference provisions, work permits and other rubrics in the new immigration laws and regulations of a growing number of states. The effect of such conditions has been a many-fold increase in highly-educated migrants since the 18th and 19th centuries. In the period 1907-1923, only 2.6% of the 6,905,000 immigrants to the United States were in the professional classes, an average of 10,560 per year. In 1968, 48,753 professional, technical and kindred workers entered the United States out of a total immigration of 454,448, or 10.8%. Before World War I, a majority of all immigrants were industrial and agricultural laborers; now the percentage permanently entering has fallen below 5%.

1/ See Brinley Thomas, "The International Circulation of Human Capital", Minerva, vol. 4, 1967. Migrations of Greek, Italian, Turkish, Spanish and Portuguese workers to countries of northern Europe and of labor across neighboring borders of certain parts of Africa and Latin America are partial exceptions to this. Such migrations differ, however, not only by propinquity but because they are almost entirely of the unskilled and are usually not permanent.

2/ In three decades from 1931-60, the total number of immigrants to the United States was less than one-half that of the single decade from 1901-1910. In the last ten year period, annual arrival figures have increased from 1959's 260,000 to over 360,000 in 1967 to 454,448 in 1968 (U.S. Immigration and Naturalization Service, Annual Report, 1967, p. 3 and 1968, p. 3, Washington, D.C.) 454,448 was, however, the largest total since 1924. The total included many Cuban refugees (99,312) and was, partly as a result, slightly less skill-intensive than the previous year, probably temporarily so.

Since professionals constitute under 1% of the population in most countries, the migration mobility of professionals and their families has grown greatly in comparison with other groups within the population.[1/]

The above changes have drawn to the current international movement of population the attention not only of demographers but of those concerned with the problems of international development. This interest reflected the importance, in devising an effective strategy of development, of the mobilization and increase of the "human resources" of the new nations and of those already there who were still economically disadvantaged. In a world where science and technology have so changed the processes of getting and spending, satisfaction of the urgent claims of the developing world on the developed nations for help in fashioning prosperity involved, in addition to capital transfers, the transmission of scientific and technological capability and knowledge of the associated entrepreneurial arts of management and administration. The mechanisms of transfer were many and included private and public assistance. In the developing countries themselves economic growth implied massive occupational changes which required training and retraining of a great part of the economically active population. Allocation of large amounts of scarce resources were made to education at every level to accomplish this, some according to plan, more in response to the clamor of the people for schooling. An added resource was provided by expatriate instructors, some locally-financed, others funded from abroad. Another such resource was training and education abroad whose current costs were variously funded.

By such means there took place a great increase in the number of people in the developing countries equipped with education and training of a high order in natural science, engineering, medicine, social science, the humanities and arts. Many, though probably not sufficient, cadres of persons at intermediate levels of education on whom to draw for supporting services were created. Meanwhile, great demand for these services was generated within developed countries.

1/ UNESCO SC/WS/57, 29 February 1968, p. 9; "Scientific Brain Drain from the Developing Countries", 23rd Report by the Committee on Government Operations, US House of Representatives, March 28, 1968, p. 3 (Hereafter cited as House Report March 28, 1963).

It is the movement of these human beings, and particularly of physicians, engineers and scientists, which has altered the distribution of the occupation of entrants shown in the statistics of immigration. The question to which development strategists seek an answer is whether this movement is to be interpreted as a waste of resources of the developing countries and whether such distribution of resources increases the gaps between developed and developing countries.

Students of the matter do not agree on the elements to be considered in framing a correct reply. In addition, data are incomplete, geographically limited, insufficiently refined for purposes of this inquiry, and with few exceptions cover population movement in only one direction. The imperfections of the measurements which the data permit are complicated by the ambiguity of the phenomenon itself.

Despite these drawbacks, there has recently been an increasing quantity and sophistication of statistics in this field. These suffice for some generalization and can serve, in many cases, as specific policy guides, especially for developing countries.

2. Definitional Questions

It would be desirable in studying the migration of the skilled if all countries used comparable definitions of specialty with some breakdowns for the level reached. Unfortunately, despite the standardization efforts of the ILO, definitions of qualified manpower are not always exactly the same. The category: "Professional, Technical and Related Workers" which, with some variety of phrasing, is widely used, is thus defined by the ILO: "Workers in this major group conduct research and apply, in a professional capacity scientific knowledge and methods to a variety of technological, economic, social, industrial and governmental problems, carry out technical tasks auxiliary to scientific research, development and practice, and perform religious, educational, legal, artistic and literary functions. Those classified in this major group perform tasks which usually require training in a specific scientific or other professional field, at a university, technical institute or similar establishment or which require creative ability in literature or art or talent in entertaining".[1/] This category is followed with more

1/ International Labour Office, International Standard Classification of Occupations, Geneva, 1958.

or less slight variations by many countries. For example, "athletes" (a numerically insignificant but much publicized immigration category) are included in the "professional, technical and kindred workers" in the American definition but not in the Canadian "professional and technical" classification. Even in the more specific rubrics within the ILO definition of "engineers, scientist, and medical doctors" (or "medical personnel", which includes nurses), "medical doctor" may refer to persons granted a degree as a result of medical undergraduate study in poorly-equipped institutions as well as to highly-skilled surgeons with years of post-graduate work in famous medical centers. Likewise, the definition of what, for immigration purposes, is an engineer, is broad and, in immigration contexts, may be applied by officials who are not experts in the fields and standards of engineering.

In general, except where noted, the above differences do not appear to result in substantial alterations of meaning or conclusion for purposes, at least, of a preliminary study of the present kind. On the whole, the demands of the new immigration legislation of developed countries speak for the quality of the professional migrant; indeed, he is a highly-selected person, especially in regard to standards normally applicable in most developing countries. Until definitions which are more truly international have been widely accepted, the statistics obtainable must be used with consciousness that the calibration of their accuracy is far from millimetric but that conclusions generally deducible rest on comparatively safe ground.

3. Immigration Policies of Developing Countries

Migration is importantly shaped by national immigration policies; without known exception, these emphasize control, not freedom. While the immigration policies of industrialized countries are undoubtedly more important factors in changing recent migration patterns than those of developing countries, the latter have also recently adopted legislative changes which limit immigration to those possessing needed skill or wealth. Such immigration changes likewise appear to have some significance for world migration movements. The Philippines, for example, abolished general immigration in 1960 and adopted selective immigration "to facilitate entry of foreigners who can contribute to the well-being and economy of the country". Thailand, with a total quota of only 200 immigrants per year gives preference to applicants who have considerable capital to invest in Thailand, who have professional or technical quali-

fications or who are closely related to Thai citizens. Measures of this kind are almost universal in southeastern and eastern Asia; they are not confined to this area. In general, "entry for permanent settlement is now restricted almost entirely to close relatives of citizens and, in several countries, to a few professional or highly skilled workers."[1/] This restricting of immigration into developing countries may influence in small degree the increasing tendency for migration to developed ones; in any case it is part of a world-wide pattern of augmented control.

The effectiveness of these measures has never been studied or summarized as a whole. Such legislation would appear to provide evidence that the developing nations concerned do value skills despite the fact that some of them complain little about great losses of their own skilled men. Here, as in so many other areas of migration, there are apparent paradoxes and a need for further study.

4. Immigration Policies of Developed Countries

The policies of several of the world's rapidly expanding economies and largest recipients of immigrants have had the most international weight. Most major receiving nations have written into law or regulation preference provisions for skilled labor and professionals and have left decreasing room for unskilled entrants outside the family members of those admitted: Canada, in two steps, the most recent in October 1967, the United Kingdom in 1962 and 1965, the United States in 1962 and 1965, Australia in 1958 and 1966 [2/] and others. At the same time and usually, in the above legislations or regulations,

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1/ R.T. Appleyard, "Immigration Policies and Economic Development in southeastern and eastern Asia", Migration, No. 9, October 1967. Some countries like Jamaica require many years of residence for citizenship and permit entry for purposes of work only to those with prior employment or to those with sufficient capital to support their own employment for businesses. Entry for work is on work permits renewable by the Ministry of Labor.

2/ Australia's immigration policy is not written into legislation. The Minister for Immigration is given power to admit such persons as he sees fit. Until 1938, encouragement was usually given only to British migration. Since 1947, the range of immigrants from Europe has increased. It remains "cardinal with us that Australia should remain a substantially

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the United States and Canada have relaxed and Australia has moved to relax previous restrictions on the entry of non-Europeans who fall into the newly-defined immigration categories. The result has represented on the one hand important progress away from racially restrictive legal barriers and on the other an increasingly explicit courtship of the professionals of the developing world by developed economies.

The reasons for these steps and for the new migration pattern which they have caused have been amply explained by the responsible authorities of the legislating states. The Minister of Immigration for Canada has put the matter forthrightly in his White Paper on Immigration. October 1966.[1]

"Since most of our country is still thinly populated [some people] think it possible for Canada in the latter part of the twentieth century to benefit from an immigration movement comparable to that which, in the nineteenth century, helped push forward the frontier and populate the great cities of the United States. The fact, however, is that economic conditions have changed ... Our people are moving off the land, not onto it ... Canada has become a highly complex industrialized and urbanized society. And such a society is increasingly demanding of the quality of its work force. If those entering the work

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homogeneous society". A "dictation test" in a European language was abolished in the Migration Act of 1958 and on 9 March 1966 the Government announced the provision "for the admission of non-Europeans capable of integration and of contributing to our progress". Additional non-Europeans became eligible for entry in regulations of July 1956: "distinguished and highly qualified non-Europeans should be admitted for indefinite stay". In 1957, non-Europeans admitted for temporary residence became qualified to apply for naturalization. The decisions of 1966 regarding non-European entry include consideration of "qualifications which are in fact positively useful to Australia", including "technical skills" and high attainment in the arts, sciences and other fields.
(Hon. Hubert Opperman, Minister for Immigration, Paper delivered to Student Seminar, Canberra, 28 May 1966). Consultation with governments regarding depriving of "under-developed countries of skills and talents which they need" is stated to be an immigration policy.

1/ The Hon. Jean Marchand, Minister of Manpower and Immigration, White Paper on Immigration, Canada, October 1966, p. 8 and 11.

force, whether native-born or immigrants, do not have the ability and training to do the jobs available, they will be burdens rather than assets. Today, Canada's expanding industrial economy offers most of its employment opportunities to those with education, training, skill ... The high cost of training professional and skilled people - engineers, doctors, skilled technicians etc. - is a measure of the benefit derived upon /their/ arrival in Canada ... Other countries are in competition with us for immigrants".

The applicability of these words is only technically confined to Canada. Their force is increasingly international. At the Hearings on the 1965 United States immigration bill, for example, The Secretary of State, Mr. Rusk, said:

> "The significance of immigration for the United States now depends less on the number than on the quality of the immigrants. The explanation for the high professional and technical quality of present immigration lies in part in the non-quota and preference provisions ... that favor the admission of highly qualified migrants, but still more it depends on world conditions of post-war economic and social dislocations ... Under present circumstances, the US has a rare opportunity to draw migrants of high intelligence and ability from abroad; and immigration, if well administered, can be one of our greatest national resources ..." 1/ And again, "We are in the international market of brains". 2/

Such objectives are either explicit in the immigration legislation of most major developing countries or implicit in the manner in which foreigners have been given licenses to practise professions (or have otherwise remained and practised them) in France (Table V) and Germany (where many foreign physicians and nurses are known to be practising though precise statistics are not known). Migration is no longer an open invitation to any wishful migrant. It is an important and selective part of the serious policies of states, developed or developing, to build or to sustain economies which either are complex and modern or wish so to become. It is based on a respect, only recently become worldwide and intense, for the developmental power of trained men who, properly backed by the other tools of development, can exploit the intricate technical knowledge which dominates the civilization of the second half of the twentieth century. The needs of states - especially of developed ones - for scientists and technicians

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1/ Hearings of the Sub-committee on the Judiciary, House of Representatives, Part II, Serial No. 13, July-August, 1964, pp. 389-390.

2/ Ibid, p. 401.

have grown at increasingly rapid rates; education, while rapidly increasing, has often lagged behind demand, especially in the medical and in some engineering and scientific professions. Large investments lie behind these new technical needs, the stakes are high and the relative limitation of the supply has markedly raised competitiveness.

5. The Resulting Migration Changes

In an immediate sense, at least, the reasons behind the recent rise in the migration of talent do not have to be surmised. They are implicit in economic demands and explicit in the legislation or the administrative acts, hence the policies, of states. In addition to legislating the character of migration these policies add "pull" incentives to the existing emigration pressures of growing population, unemployment and limited opportunity. In reducing the older emigration of greater scale and lesser skills and, in several key instances, substituting educational preferences for what had, in essence, been racial discrimination, recent immigration legislation has greatly raised the educational incentive in migration possibly to the point where many individuals or groups may be given the motivation to use education, either at home or abroad, for emigration rather than for the development of their nations. This danger is especially great for former colonies which have looked to the former colonial power or former colonial standards for the consummation of certain careers of ambition, thus risking the continuation of the psychology of lack of professional self-sufficiency.

These immigration policies and the changes they bring to the pattern of an ancient and important phenomenon will be of long-range importance to the international community. They call for reappraisal of the effects of migration on economic growth and for the identification of distinctions between national and international advantage. Even from the humane and egalitarian point of view the new migration raises questions. In a world where millions of uneducated and hundreds of thousands of educated share the appetite to migrate, should the emigration of the lesser-educated be blocked because, amid universal quota ceilings, the educated, almost alone, are encouraged to move? The issues involved here have hardly begun to be seriously discussed.

B. The Statistics of Professional Migration

1. Introduction

The Appendices of this report give, for the more major receiving countries and for the main countries of origin during the last decade or two, the statistics of migration. The graphs portray certain major trends.

The field of "brain drain" has, up to the present, been characterized by a great deal of statistical discussion and effort to obtain sophisticated intellectual migration statistics.[1/] Nothing is more central to the study of professional migration and its presumed values than the determination of what the available statistics mean and what they do not mean. Agreement on this determination is not wide.

The available statistics on migration provide trends and indications of the approximate dimensions of professional migration. They are, however, subject to many reservations, described in detail in B. 3 below.

Migration is not static: men move into and away from it, but statistics often freeze it without recording movements such as return flows. Definitions of professional categories -- and the rigor with which these definitions are fitted by migration officials to individuals -- differ. Statistics are most unevenly available -- relatively abundant for the United States and Canada and, to a somewhat lesser extent, Australia; of less satisfactory quality for the United Kingdom; and, in general, lacking for France, Germany and most other countries. Statistics do not, therefore, express the exactitudes which they purport but indicate, rather, general orders of magnitude and trends. They suggest to both developed and developing countries where problems appear to lie and approximately where one country or region stands vis à vis others. Often, striking lacks of balance in supply and demand and in the rationality of systems of higher education are here statistically adumbrated.

There is even more which statistics cannot do. They cannot bring concensus as to the extent of the problem or, perhaps, even as to whether there is a problem at all. By the same token, though they can suggest areas of remedy,

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1/ An especially promising effort is planned in UNESCO's programme in science statistics on the number and current employment of scientists, engineers and technicians and on the expenditure for scientific and technological activities. See ECOSOC document E/CN.3/389,27 February 1968 "UNESCO Programme in Statistics of Science and Technology".

they cannot define the extent or nature of the [illegible]f needed. Greatness of number is not proportionate to greatness of hurt; damage may not exist at all. Data leads one only to the borders of differing views of development and different appraisals of the priorities or methods appropriate to it. These differences of priority 'brain drain' tends to heighten rather than resolve thus baring an uneasy range of disagreement on development and the measures needed to remedy national poverty.

In general, if one believes, as implicit in the United Nations' programmes, that development is something to which each present nation can lay rightful claim no matter how adverse its present conditions and if one further believes that development can be achieved through the more or less free operations of the laws of supply and demand, the new migration may appear both natural and tolerable. If one believes that development requires special initiatives and concerns justifying help and even controls on the part of both rich and poor nations for its attainment, then the polarizing effect of professional migration will seem to justify more measures and greater control. Statistics, of course, will not resolve these philosophical problems and their sense of priorities.

2. Immigration Statistics

The classification of entrants by visa category is an objective indicator of migration where countries use comparable systems. The United States has established two broad categories by statute: immigrants and non-immigrants. Those applying and admitted as immigrants have the privilege of permanent residence, may after a term of years obtain naturalization as citizens and may work. The non-immigrant category includes the following sub-categories of interest here: students, exchange visitors, industrial trainees and temporary workers of exceptional merit. Transfer from the non-immigrant to the immigrant categories is made by "adjustment" of visa status. Non-immigrants who do not obtain adjustment of their status or waivers of the requirement that they depart, must leave the United States on the expiration of the period for which their visas are valid.[1/]

1/ See Appendix on United States Visa Terminology.

Data concerning the number and status of entrants, adjustments and waivers, are published by the Immigration and Naturalization Service of the United States Department of Justice. The compilations and reports in which these figures appear show also the countries of origin or last permanent residence and the occupations of those entering as immigrants. In response to requests from committees of the United States Congress, the Immigration and Naturalization Service and the Department of State furnished detailed breakdowns of the figures referred to above. These have been published in the printed records of the hearings held by the committees. In general, they cover the years 1956 and 1962-1967.

Canada publishes annual reports of immigration statistics showing entrants by country of origin or last permanent residence and by occupation.

Australia also issues regular reports of arrivals, categorized as "settler", "permanent and long-term". Nationality, country of birth, and country of last residence are tabulated separately. Occupations are also tabulated in considerable descriptive detail, classified further as skilled, semi-skilled and unskilled. Unfortunately, the reports do not relate the occupational breakdowns to those of nationality, country of birth or country of last residence though data from a census report which does this is given in the section on Australian immigration. Settlers are persons who, on arrival, declare their intention of settling in Australia; permanent and long-term arrivals; visitors for stays of twelve months or longer; and Australian residents returning after a stay abroad for twelve months or longer. There are also gross figures for permanent departures, and, by nationality, for persons granted Australian citizenship by naturalization.

Statistics of importance for migration tend to be concentrated in the above countries. The United Kingdom has statistics and studies of interest which, particularly in the dominant medical field, make the situation fairly clear. Its overall statistics, however, are deplored by British scholars.

3. Drawbacks and Limitations of Statistics

a. Lack of Statistics in Many Countries

The lack of regularly published statistics for other countries of reception and for almost all countries of origin make comprehensive study of their roles in the population movement impossible. Statistics from France and Germany are especially inadequate. The effect of this statistical mal-distribu-

tion is to inflate the already large weight of the United States and Canada as receiving countries and to make the statistics they produce for countries of origin the locus of study for movements out of all other countries. Information gathered in connexion with ad hoc official and unofficial investigations for special purposes helps to make up for some of this deficiency as do statistics from some smaller phenomena such as immigration to the Netherlands.

The dominance of the major receiving countries also puts in the shade a multiplicity of movement to other countries and between other areas which is of considerable interest. Migration to Socialist countries is small but warrants some policy study. Professionals do move considerably between developing countries, sometimes from the more to the less-developed, as when West Indian lawyers move to Africa, sometimes the reverse as when professionals from Latin American countries with slower rates of growth move to Mexico where growth has recently been faster or to fill specific personnel needs for which money is available, as when Egyptians, Jordanians and Lebanese fill positions in Kuwait and Saudi Arabia. These movements are an interesting and neglected study in themselves, though not often of significance for large numbers of highly-trained personnel. They warrant inquiry since they may demonstrate that professional emigration from developing countries could be made to yield benefits for other developing countries rather than simply for developed ones. In short, present statistics do not permit a really balanced or complete picture of the problem though they offer much insight into its gravity.

b. Reverse Flow

Statistics on migration tend to record those who enter a 'permanent' visa category or 'permanent' employment abroad. Whether the move will ultimately prove to be permanent or temporary cannot be known. It can only be surmised from the nature of the choice made - its relative difficulty or ease -, from empirical observation and from experience thus far. Satisfactory statistics on the return of those who once emigrated in a permanent status but later returned home or went elsewhere are almost entirely lacking.

On the whole, evidence so far suggests that such return flows affect the immigration picture between developing and developed countries in a more limited way than between developed countries. In general, persons (like British, Germans or Latin Americans to the United States) who formerly found it easy or convenient to enter on immigration visas because they were plentiful more often used such status for studying or other temporary purposes and then

returned. In most instances the right to permanent status by immigrants from developing countries has been restricted and not easily given. Such persons give this right up less easily.1/

Dr. Charles Kidd, who has closely studied emigration of Latin American experts, surmises that return flows of those on permanent status in the United States amounts to something like 25% of the inflow or, on occasions, even more.2/ A student of medical migration has found that returnees from Great Britain vary roughly in accordance with the excellence of internal health services: they are very high for Ceylon, fairly high for Pakistan and fairly low for India.3/ Another study finds that less than 10% of the Chilean professionals and technicians entering the United States on immigrant visas naturalize.4/ Still another study points out that Colombia classified as 'emigrants' all nationals or foreign residents who, on departing, express the intention of staying abroad for longer than one year.5/ While in both cases such 'emigrants' might remain abroad permanently, such facts arouse suspicion of the possibility of high return flows. Such returnees, of course, can be rich sources of techniques, ideas and experience, hence important for development. Where physical absence is regarded as crucial by a developing country, even a temporary absence over-

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1/ In its reply to a UNITAR questionnaire, the Republic of China has estimated the return flow of its students at 5% of those studying abroad. Recently numbers of returnees have increased though return rates remain low.

2/ "Migration of Health Personnel, Scientists and Engineers from Latin America", Pan American Health Organization, Washington, D.C., 1966.

3/ Oscar Gish, UNITAR conference, February 19, 1970.

4/ Sergio Gutierrez-Olivos and Jorge Riquelme Perez, "The Emigration of High-Level Manpower: the Case of Chile", Pan American Union, Washington, D.C., 1966.

5/ Gustavo R. Gonzales, "The Migration of Latin American High-Level Manpower", International Labour Review, Vol. 98, No. 6, December 1968, p. 10.

seas might well be regarded as "brain drain". In other instances, the man who acquires not only education but job experience overseas and then returns to an expanding profession back home is hardly a drain even if he has passed through a permanent status in a developed country. Such important variations are not captured statistically and are unlikely to be. They suggest that the measure of advantage or disadvantage of migration to a developing country is determinable mainly from its own economic and other parameters which will vary from place to place, from situation to situation and from time to time.

c. Problems in Fixing Immigration Origin

Fairly large numbers of persons who are citizens of or enter from many foreign countries do not appear in statistics relating to these countries, thus understating immigration from them. One reason for this lies in recording the immigrant under country of birth rather than of citizenship or of last residence. Thus a citizen of Israel born in Austria enters under the Austrian list. This factor is of some importance in recording flows from European countries and for Israel and may affect in minor ways a few Latin American and other developing countries. For most developing countries, however, its effect is negligible. In addition, Asians in Africa who have British citizenship and emigrate to the United Kingdom or former colonies of France who have French citizenship or rights of free circulation in France are not, or have not usually been, caught in statistics relating to flows from developing countries.

d. Distortions in Balance of Flow or Net Flows

Outflows of professionals to one developed country are sometimes balanced or outbalanced by inflows of professionals from the same or other developed countries. A study statistically limited to outflows from developing to developed countries will not catch this balance. This factor is perhaps particularly important for several Latin American countries which receive appreciable permanent professional inflow from Europe while having a considerable outflow, chiefly to the United States.[1/] Elsewhere, in general terms, the inflow of active professionals from developed to developing countries is on assignment and not permanent.

1/ G. Eusse-Hoyas notes in "The Outflow of Professional Manpower from Colombia", (report for UNITAR) that from 1955 to 1968 there was net

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e. Aid Personnel

Technicians, managers and teachers sent, publicly or privately from developed to developing countries or hired by the latter have, of course, great significance. The United Kingdom, for example, makes officially some 3,000 appointments yearly for service overseas and many more serve under other arrangements. The United States sent in 1967, 1,500 US technicians to work only in the chief developing countries receiving its aid with many more elsewhere and under private arrangements. France, relative to her population and resources makes the highest contribution of all, providing French teachers and technicians to her former dependencies. This is especially so in the instance of teachers of whom France sent 31,800 abroad while 15,000 United States' and 5,500 British teachers are teaching abroad - in all cases, most in developing countries.[1/] Algeria and Morocco alone are said to use 15,000 French teachers and francophone south Saharan African countries use 6,000. There are approximately 13,500 French technicians abroad, more than 6,000 (beside 6,000 teachers) in francophone south Saharan Africa, 3,100 in Algeria, 1,600 in Morocco, 700 in Tunisia, 150 in Brazil, 140 in Iran, 130 in Cambodia and 110 in Laos.[2/] When one adds to these those hired by foreign countries and engaged in industrial, commercial and financial operations in developing countries, the number of French teachers, researchers, doctors, engineers and technicians engaged in development in developing countries is probably over 50,000 which amounts to considerably more than any probable total of professionals from developing countries working in France. It is also true that such professionals are selected somewhat more rigorously for specific jobs than educational systems

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emigration of 79,803 of whom 21,470 were professionals and 4,482 intermediate personnel whereas in 1964 there was a total of 74,053 foreigners living in Colombia of whom only 4,728 were professionals and 33,139 were economically active. The inflow of professional manpower represents about 23% of the professional outflow. For Brazil, Mexico and Argentina, however, the balance may be more favorable.

1/ "Notes et Etudes Documentaires: L'exode des cerveaux", La documentation française, Secrétariat général du Gouvernement, Direction de la Documentation, Paris, 9 juin 1969, (redigée par Guy Hermet), p. 53.

2/ Idem, drawn from documents of the Ministère des Affaires étrangères and the Direction de la Coopération culturelle et technique, Paris, France.

in less-developed countries (LDC) have fitted their graduates for developmental tasks.

From what we know, however, France would seem an exceptional case, at least insofar as aid personnel provided by governments is concerned. The 3,000 experts provided by British aid may not balance the approximately 5,000 professionals England absorbs in each recent year on work permits, most of them professionals, Englishmen serving under other arrangements may be held to do so.[1/] Certainly, the United States is now absorbing many times as many medical doctors from developing countries as it is, in all forms, sending there and, for many countries, this is true of scientists and engineers as well. In addition to 3,514 doctors, surgeons and dentists immigrating from developing countries in 1968, 1,798 foreign scholars in the medical field were professors, scholars, researchers, faculty members or senior academic personnel at U.S. colleges and universities in 1967-68 while only 249 such U.S. personnel were in similar posts overseas.[2/] Nor are such imbalances confined to medicine. The overall figures in 1968 were 11,641 foreign scholars in the US compared to 4,775 scholars from the United States overseas. In the Physical and Life Sciences field the figures were 5,118 compared to 869. Exchanges at this level do not, of course, usually imply permament immigration and they are strongest from other developed countries like the United Kingdom (12.6% of such professional exchanges), Japan (9.7%) and West Germany (7.1%). Yet India supplied 12.1% and Chinese of various categories 5.1% of such exchanges. Some 4,589 scholars and professors in the above categories were in U.S. colleges and universities during the academic year 1967-68 compared to only 2,009 from the United States in these developing countries. Here again, however, India with 1,406 in the United States compared to only 223 from the United States in

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1/ The British Ministry of Overseas Development and the Crown Agents under the Overseas Service Aid provide about 3,000 appointments annually. ("The Supply of British Professional and Technical Staff to Lesser Developed Countries", a paper prepared by the British Ministry of Overseas Development for the Ditchley Hall Conference of 1968).

2/ The statistics in this paragraph are drawn from Open Doors, 1968, Table 4, pp. 32-33, with definitions and added material on pp. 8-9.

India accounts, by itself, for much of the difference with large imbalances from China, Korea and Israel addedly contributing.[1] With developing Africa, the balance is slightly favorable: 218-385. The proportion may run still more against developing countries in the cases of the Federal Republic of Germany and Austria the numbers of whose aid personnel are comparatively small; it certainly does so for Canada. Socialist countries thus far maintain a balance clearly favourable to developing countries: students studying in Socialist countries are closely bound by the terms of the agreements applying to them and very few professionals from developing countries remain in Socialist states to counterbalance the aid personnel supplied by several Socialist states in developing countries.

Even where experts publicly sent to a developed country are more numerous and better-trained than the indigenous experts who leave, "they are not a long-term substitute for a nation's own talented people."[2]

f. Variety in Evaluation

Finally, the technical and educational level of those described as engineers, scientists or medical personnel differs widely. The 8,501 medical personnel immigrating into the United States in 1967 includes 4,784 nurses. Physicians (3,326 in 1967) covers a few of the world's most highly skilled doctors but many more doctors who have received only undergraduate medical degrees in their own countries and who, in the United States, are used, in fact, as residents and interns in U.S. hospitals. Among 8,822 engineers entering in 1967, 3,476 fall in a category of 'Other' Engineers which in some cases covers highly technical fields but in more others appears to refer to engineers of less decisive qualifications or differing definition sometimes not much more than persons able to convince non-engineering consular officers of their qualifications. Statistics are also poor expressions of the value of talent, especially when the talent is great and the career context is one which affords it scope.

Despite these qualifications, there is evidence, in general, that immigrant professionals who migrate have higher average attainments than do professionals

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1/ Alain Murcier, "Brains for Sale", Bulletin of the Atomic Scientists, March 1968, p. 43.

2/ House Report No. 3, 28 March 1968, p. 15.

who stay home. Sixty percent of foreign-origin scientists in the U.S. National Register and 13% of foreign-born engineers reported holding doctoral degrees compared with 40% for National Registry scientists in general and 5% for engineers in general; 59% of foreign-origin scientists, were primarily engaged in research and development compared with 45% for native colleagues. The U.S. National Academy of Sciences counted among its members in 1961 24% of foreign birth and 18% trained abroad; even higher percentages of American Nobel laureates were foreign-born.[1/] Migrants appear to be achievement-oriented, tend to have a greater commitment to professional norms and professional accomplishment than to geographic location. Their migration may, in many cases, be rooted in a particular, more nomadic, type of personality.[2/]

4. Professional Migration in Key Countries

a. Canadian Immigration

The rapid increase in all varieties of immigration into Canada from 1962-67 is shown in Table VIII. There was a fair decline in overall immigration in 1968 and a slight decline in professional immigration. Canada maintains an additional rubric Managerial Personnel which adds to her intake of professionals. Canada's proportion of professional, technical and kindred workers to all immigrants with occupation has been even higher than that of the United States, though rising rates from the latter have brought them almost abreast: 28.3% for Canada and 27.2% for the United States in 1967, up from a Canadian average of 16.9% for 1946-65 and a U.S. average of 11.1% between 1947-65. The gap again widened in 1968: 30.6% for Canada, 21.5% for the United States. Professional and skilled labor was 67% of immigrant entry to Canada in 1965 while general unskilled laborers were only 9.5%; 5,737 unskilled laborers entered in 1964 as opposed to 11,965 professionals.

1/ Robert G. Myers, "Brain Drains and Brain Gains", International Development Review, December 1967, p. 6. Apparently, however, these higher levels are more common among professionals from developed countries, less common among those from developing countries.

2/ Thomas J. Mills, "Scientific Personnel and the Professions", The Annals of the American Academy, September 1966, pp. 35-41.

Immigration into Canada, as into Australia has traditionally come predominantly from Europe. The policy to broaden immigration has not yet run its full course in Canada and the tendency to absorb professionals from developing countries is still recent. Canada, as stressed in its annual reports on immigration, finds that "most of the traditional immigrant source countries, particularly in Europe, continued to enjoy prosperity in 1965. Skilled workers were much in demand and there was strong competition among immigration countries for a share of the declining numbers of skilled persons interested in migration."[1] Canada's answer to the increasing difficulty of getting skilled workers and professionals from Europe is in part to get them from the developing world. "Canadian employers have gone abroad to recruit persons possessing skills in short supply, particularly in technical fields".[2] The percentage of professionals immigrating to Canada from countries other than the United States, Britain and the chief European sources rose from 7.2% in 1946 to 27.6% in 1963; in 1967, 37% of Canadian professional immigrants came from outside the United States and Europe; this proportion apparently ebbed slightly to 27.3% in 1968. For skilled occupations the leap between 1946 and 1963 was 8.5% to 36.3%.[3]

Within these totals, contributions from certain nations stand out. Chinese immigration, which had numbered 8 persons from 1925-44, rose to 14,445 from 1946-55, 14,779 from 1955-62, and was over 4,000 in both 1965 and 1966 and 6,409 in 1967. East Indian immigrants who had numbered only 1,584 in the thirty years from 1925-54 were 3,491 in 1965 and 5,029 in 1967, up from 2,077 in 1964. "Negro' (sic) who had totalled 4,607 during the above thirty-year period, were 4,044 in 1964 alone and 4,408 in 1965, 3,095 coming from the West Indies and 417 from tropical Africa. Racial descriptions have been dropped in 1967 but immigrants from the West Indies steeply rose to 8,618, those from tropical Africa falling slightly to 341.[4] Professionals from India rose from

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1/ Annual Report for the fiscal year ending March 31, 1966, Department of Manpower and Immigration, Ottawa.

2/ Manpower Policy and Programmes in Canada, OECD, Paris, 1966, p. 53. Canada maintains recruiting offices abroad for immigrants.

3/ Louis Parai, Immigration and Immigration of Professional and Skilled Manpower During the Post-War Period, Ottawa, 1965. (Economic Council of Canada).

4/ Some African professionals are now coming to Canada from France though further study will have to reveal whether on French passports or those of Francophone African countries.

298 in 1964 to 631 in 1965 to 1,213 in 1967; and from China from a five year total of 1,075 from 1962-66 to 1,376 in 1967 alone. West Indian professional immigration jumped from 390 in 1964 to 534 in 1965 to 1,185 in 1967. Most of the remainder were skilled or clerical personnel, few being in the unskilled category (see below). Even for Algeria and Kenya the skill proportion is high: 45.5% and 57.1% respectively of all immigrants with occupations from these countries between 1964 and 1966 being specialists and technicians.[1] In proportion to her population, Canada's intake of professionals appears to be the most massive in the world; the trend toward an increasing reliance on the skilled from the developing countries has been strong; the tendency to accept from these countries high percentages of skilled personnel is clear. (See Tables III, IV, VIII and XI).

Canada is also an important way-station for professionals entering the United States. Of the more than 1,900 immigrant scientists and engineers to enter the United States from Canada in 1968, over 1,100 were born elsewhere.[2]

b. Australian Immigration

Since 1945, immigration to Australia has greatly increased. A tradition of "white Australia" immigration has firmly oriented Australian policies toward Europe for almost as long as the foundation of that state. From 1947-61, the origins of its immigrants were:[3]

United Kingdom and its Dominions	32%
North Europe	18%
East Europe	20%
South Europe	27%
The Rest of the World	3%

Out of 138,676 settler arrivals in the financial year 1966-67, for example, 76,496 came from the United Kingdom and Ireland and 75,514 were born there. Except for Greece (9,826) and Yugoslavia (5,664), developing countries have played a small role in Australia's total immigration. Those coming from South Europe, moreover, were mostly unskilled labor or craftsmen. Among professionals, also, 14,115 of the 29,568 overseas-born professionals in the 1966 census were

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1/ F. Karamanian, "L'exode des cereaux", Jeune Afrique, No. 427, 16 March 1969, p. 32.

2/ "Reviews of Data on Science Resources", National Science Foundation, Washington, November 1969.

3/ R.T. Appleyard, "The Contribution of Professionally-Trained Immigrants to Australia's Recent Economic Growth", in Education and World Affairs, The International Migration of High-Level Manpower: Its Impact on the Development Process, New York, Praeger Publishers, October 1970.

born in the United Kingdom; and 22% of Australia's male professional manpower was born overseas.

Exclusive reliance on 'white' developed countries is slowly changing. In 1956 an immigration category for "distinguished and highly-qualified Asians" was introduced. Recent years have seen gradual relaxations of restrictions against non-Europeans; by 1966, regulations permitting immigration of skilled or professional non-European labor on terms allowing naturalization in five years were issued. A trend of gradually-increasing immigration from Asia, especially from India, Pakistan and from among ethnic Chinese from several Asian countries has established itself. The following figures show overseas-born professional workers residing in Australia in 1966 by birthplace and occupation:

	Birthplace: India	Indonesia	Malaysia	Philippines	Singapore	Pakistan	Ceylon	China	Hong Kong
Architects, Engineers & Surveyors	201	97	173	10	53	18	40	213	94
Chemists, Physicists, Geologists & Natural Scientists	87	36	47	4	13	18	18	51	22
Biologists, Vets, Agron. & Scientists	27	32	12	1	7	1	8	8	3
Medical Practitioneers & Dentists	85	26	118	5	47	7	41	76	65
Nurses	16	7	19	5	4	1	3	17	11
Other Professional Medical Workers	9	8	16	2	8	3	1	27	13
Teachers	272	83	82	7	23	19	68	79	38
All Professionals	681	289	467	34	155	67	179	471	246
All Occupations	6669	2729	1727	270	894	505	2097	7952	1373
% Professionals to Total	10.2	10.6	27.0	12.6	17.3	13.3	8.5	5.9	17.9
Female Professionals	596	182	306	81	113	29	147	94	94
Female All Occupations	2818	1015	654	206	371	148	1002	415	415
% Professional Females to Total	21.2	17.9	46.8	39.3	30.5	19.6	14.7	22.7	22.7

Source: R.T. Appleyard, "The Contribution of Professionally-Trained Immigrants to Australia's Recent Economic Growth", Education and World Affairs report, op. cit.

912

Though Australian statistics do not, unfortunately, break down the occupations of her immigrants by nationality, recent access to the 1966 census figures show that the proportions of professionals among these Asian entrants with an occupation are high, for example, 10% in the case of persons born in India and Indonesia, 27% for settlers born in Malaysia.[1/]

Thus, as with Canada, a far higher proportion (12.3% in 1961) of those born outside Australia were professionals than those born inside (4%) or of those born in Europe (which ranged from .5-9.8%). Only one-third (34.7%) of the non-European foreign-born were craftsmen or operatives while from Europe nearly two-thirds were. Percentages of administrative personnel were also higher (11% from the non-European foreign-born than they were for Australian or European-born persons.[2/] In addition, it is known that at least 2,400 of Australia's 12,000 Asian students wish to remain in Australia.

Bearing the above percentages of professionals in mind, the increase in immigration into Australia in the last decade is indicated by the following figures for overall immigration from some of the developing countries:

	Total Settler Arrivals, Jan.'59-Dec.'68	Av. Yrly Arr. '59-'68	Settler Arrivals Calendar Year 1968
Ceylon	4,149	415	838
India	5,002	500	2,100
Malaysia	850	85	230
Pakistan	238	24	87
Singapore	468	47	148
Burmese	1,007	101	272
Chinese	1,451	145	480
Filipino	614	61	127
Indonesian	139	14	41
Turkish	1,679	168	641
Total:	11,497	1,560	4,944

1/ For this access to the Commonwealth of Australia Census 1966, I am grateful to Mr. Appleyard, ibid. A less full breakdown giving, however, overall figures for professional, technical and related workers and administrative, executive and management workers can be found in Australian Immigration: Consolidated Statistics, No. 2, Department of Immigration, Canberra, 1968, pp. 71-73.

2/ United Nations, World Population Conference, 1965, p. 195.
For other sources on Australian immigration, see the Quarterly Statistical

Continued

On the average, therefore, new arrivals from the above developing countries into Australia were about three times as numerous in 1968 than they were during the average of the decade ending 31 December 1968. Since 1947, permanent residents of Asian descent have more than quadrupled, from under 25,000 to 101,387 at the 1966 census while the total Australian population increased 62.5%.[1/]

Professional immigration to Australia from developing nations, mostly from developing Asian nations, remains fairly modest. Since its start in 1958-59, it has increased considerably, however, the demand for services is there and the rates of professional immigration among Asians is high - in some cases, the highest among all nations whose nationals enter Australia. It seems likely that the present trend will increase as Australia's 12 million population climbs, partly through swelling immigration, toward the 20 million economists say are needed for proper expansion and development of that continent.

c. The Netherlands

The Netherlands is an interesting vignette of immigration to a former colonial country. There is very little general immigration problem, for domestic employment is high and, except in the medical field, generally in balance and labor permits for 'foreigners' are difficult to obtain. Present Dutch colonials, however, are not 'foreigners' and Indonesians also require no labor permits.

From these areas, there is some brain drain into Holland and there is more through it, although the latter is not statistically determinable. Non-return among 126 recent graduates from developing countries of the Phillips Institute (electrical equipment) was 32% and some 60-65% of the very good students did not return. Non-return has been something of a problem among the 200-300 Indonesian, 800 Surinamese and 200 Antillian students present in recent years in Dutch universities.

Brain drain has been especially marked in medical areas. Of 37 medical graduates in 1968 from developing countries in the Netherlands, only one, a Surinamer, returned home. At the end of 1966, 160 Surinam physicians were

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Continued from preceding page

Summaries of the Australian Department of Immigration; Jerzy Zubrycki "Some Aspects of Structural Assimilation of Immigrants in Australia", International Migration, Vol. VI, No. 3, 1968, p. 106 and Broom, Jones and Zubrycki in the Australian and New Zealand Journal of Sociology, Oct. 1965.

1/ New York Times, 22 February 1970. Collier's Encyclopedia (1965) estimates a 50% population increase from 1945 to 1963-64.

practising in the Netherlands; Surinam itself in 1965 had only 144 physicians for a population of 320,000 (one physician for 2,222 inhabitants vs. 1 for 900 in the Netherlands). One hundred and ninety five Surinam nurses were working in the Netherlands at the end of 1966; this loss, plus that of analysts and technicians, hurt more. There has been a net immigration of some 99 physicians to the Netherlands from Indonesia from 1960-65.[1/]

While inevitably small in scale, the Netherlands example shows that even a nation unusually concerned with development is not immune from brain drain to it, minor as this problem is compared to that in larger countries.

d. United Kingdom Immigration

The United Kingdom has, from the eighteenth century, been a center of attraction for migrating professionals and men of talent and likewise an outstanding exporter of talent, especially to the many places which were long her colonies.[2/] The end of the colonial era has brought an end to neither of these roles. England has seen mounting numbers (26,800 from 1961-66) of her new supply of engineers and scientists emigrate,[3/] while receiving in permanent work positions substantial numbers of professional and skilled persons, 19,000 from 1[illegible]-66, very largely from developing parts of the Commonwealth.[4/]

1/ For the above, Wicky L. Meynen, "The Netherlands" in EWA, op. cit., the forthcoming EWA report which is gratefully acknowledged.

2/ "The Brain Drain", Report of the Working Group on Migration, Committee on Manpower Resources for Science and Technology, London, 1967, p. 3.

3/ For engineers, mounting from 24% in 1961 of the new supply three years earlier to 42% in 1966, for scientists varying between 20-23% in those years, ibid., Table 1, p. 8. A small minority of these are persons born in the Commonwealth who were educated in the U.K. In addition, it should be cautioned that these "losses" are not necessarily permanent: some go on emigration visa and then return. They are the best measure available of a situation regarded as serious. Emigration is mostly to the United States, Canada and Australia.

4/ These are sometimes regarded as 'replacements' for emigration although in some large import categories such as nurses this interpretation has little truth. Of the 30,000 Nigerians estimated to be studying or working abroad at senior or intermediate levels, the Nigerian government believes that some 18,000 are in the United Kingdom; (T.M. Yesufu, "Loss of Trained Personnel by Migration from Nigeria", unpublished paper, University of Lagos, November 1966, p. 5).

Significant immigration into the United Kingdom has long been chiefly confined to Commonwealth countries. From 1952 until 1962, such immigration was unlimited and the overwhelming percentage of it was of unskilled labor, mostly from India, Pakistan, the West Indies and - the centuries-old supplier of unskilled labor - Ireland. The sharp increase in West Indian immigration began in the same year that the U.S. McCarron-Walter Act of 1952 effectively cut off West Indian immigration to the United States which had been a tradition of decades.[1/] The unintentional diversion of this flow to Britain eventually brought about the Commonwealth Immigrants Act of 1962 by which Commonwealth citizens wishing to come for long periods to the United Kingdom must obtain a voucher issued by the Ministry of Labour to those who either (Voucher A) have a specific job offer from a United Kingdom employer, or (Voucher B) possess certain specific qualifications or skills of graduate or near graduate status, or (Voucher C) all others (including unskilled labor). Voucher C dropped from 17,494 in the first year to 2,221 in the third year and was discontinued after 1964 by which time it had accumulated a waiting list of hundreds of thousands. In that same year, 3,300 teachers, 1,600 engineers, 1,300 nurses and 800 doctors emigrated from developing Commonwealth countries to the United Kingdom. In August 1965, a White Paper on Commonwealth Immigration did away with Vouchers under Clause C entirely. At the same time, it defined more sharply the skills needed in Category B to include doctors, dentists and trained nurses, qualified teachers, graduates in science and technology with at least two years' experience since graduation and non graduates with certain professional qualifications and two years' experience. Medical doctors are currently receiving over 70% of Category B vouchers which are roughly two-thirds of all issued work vouchers.[2/]

A vouchers had fallen from 8,644 in 1965 to 2,875 or 35% of the total in 1966 while B vouchers rose to 5,424 or 65%, of whom 5,141 or all but 321 came from developing countries within the Commonwealth.[3/] Of the 4,600 work vouchers actually issued between June and December, 1967, more than half were issued to medical staff. Recent United Kingdom experience thus graphically illustrates a

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1/ Science Policy United, University of Sussex, "Colour and Skill: Commonwealth Immigration 1955-67".

2/ Oscar Gish, Research Report, Social Science and Medicine 1970, Vol. 3, pp. 397-400, London, 1969.

3/ Science Policy Unit paper above. Of the total of 8,300 vouchers issued, many were unused, slightly under 5,000 being used. In 1967, 8,409 vouchers were issued, 3,039 in Category A and 5,370 in Category B; of the total, 4,600 were used.

trend which has cut unskilled immigration almost to nothing (except for dependents) while maintaining a level of skilled and professional immigration at a rate at least as high relative to Britain's population as the United States' rate in recent years. British reliance on medical manpower from developing countries has been somewhat greater than that of the U.S. but may now be about the same: the U.K. relies on imported health personnel for between one quarter and one third of its medical staff needs. One quarter of the doctors working in the National Health Service were born outside the British isles.[1/] Forty-four percent of the Junior Medical staff in the British National Health Service comes from overseas, mainly from India and Pakistan and 36% of all Indian scientists studying or working abroad in 1964 were in Great Britain. In the same year, 3,300 teachers (not counting primary-school teachers) and professors, 1,600 engineers, 1,300 nurses and 800 physicians are said to have immigrated into Great Britain from developing countries.[2/] One thousand five hundred and twenty-six medical doctors were added to medical rolls in England, Scotland and Wales in 1966 from the Commonwealth. One thousand and nine hundred medical graduates entered Britain in 1967 excluding the Irish. There were 14,000 foreigh-born doctors in Britain in 1967.[3/] Twenty-five to forty of all hospital nurses are foreign-born, some English hospitals never seeing an English-born nurse. Forty-six percent of all hospital registrars were born (and most were trained) outside the U.K. and Ireland. Upwards of 10% of Britain's medical personnel enter or leave Britain in any given year.[4/]

Statistics in other areas are unsatisfactory. It appears, however, that British permanent importation of scientific and engineering personnel is far less than of medical. In these fields, Britain absorbs very few professionals compared

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1/ O. Gish, "Nursing and Midwifery Migration in Britain", Nursing Times, 1 May 1969. See also L. Hockey, "Feeling the Pulse: A survey of district nursing in six areas". Queens Institute of District Nursing, 1966, pp. 105-107.

2/ S. Watanabe, "The Brain Drain from Developing to Developed Countries", International Labour Review, Vol. 99, No. 4, April 1969, pp. 403-406, citing the International Herald Tribune, August 1967; Stevan Dedijer, "Migration of scientists: a world-wide phenomenon and problem". Nature, London, Vol. 201, No. 4923, 7 March 1964, p. 966, and Ehsan Naraghi, "L'exode des compétences: un obstacle majeur au développement", Politique étrangère, Paris, Vol. 32, No. 3, July 1967, p. 271.

3/ John Roper, "Immigrant Doctors Meet Dire Need", The Times, London, 6 June 1967.

4/ Oscar Gish, UNITAR Conference, 19 February 1970.

to the United States and Canada, even from countries which were former dependencies and today continue special bonds. A study of Trinidad and Tobago, for example, has shown that emigration of professionals from those islands to the United Kingdom was, from 1962-68 only 682 in contrast to 6,216 to the United States and 2,004 to Canada. Even in proportion to the population, Britain is here absorbing fewer professionals than do the newer immigration channels to North America.[1]

e. Immigration into the United States

(i) The Recent Record

Immigration into the United States is characterized by a large and rapid increase in the immigration of professionals, in general, and an especially steep rise in the immigration of professionals from developing countries in particular. (See Graphs 1-3 and Tables I, II, IX and XI).

In 1947 only 2,382 Natural Scientists, Engineers, Physicians or Surgeons immigrated. Though the national origins of these are not available in presently existing records, it can be assumed from Europe-dominated immigration patterns then prevailing that only a few hundred, at the most, came from developing countries. By 1965, 'Immigrants with Occupations' had doubled over 1947, but professional, technical and kindred workers had nearly tripled (10,891 to 28,790) moving from 16% to 22% of all 'immigrants with occupations'; by 1968, they had nearly quintupled, to 48,753 and 23% of all immigrants with occupations; in 1969 they for the first time in recent years declined in numbers to 39,980. Among these, engineers, scientists and medical personnel had gone to 11,749, or almost quintupled by 1965. From this level, these categories rose to 11,449 in 1966, to 20,760 in 1967 and to 25,317 in the year ending 30 June 1968.[2]

These rates of increase are high; they are, however, greatly exceeded by the rise in immigration of professionals from developing countries. From the 300-400 level assumed in the previous paragraph for 1947, such immigration rose to 2,231 in 1956 (circa 25% of all 8,539 engineers, scientists and medical personnel entering in that year) to 3,604 in 1965 (circa one-third), to 5,540 in 1966 (about

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1/ Statistical Office, Trinidad and Tobago, report for UNITAR, 1969.

2/ For 1968 figures, see "Annual Indicator of the In-migration into the United States of Aliens in Professional and Related Occupations", fiscal year 1968, Immigration and Naturalization Service, Washington, D.C., 1969. The 25,317 includes 6,942 nurses and 2,692 'other medical and related fields'. The 16,101 engineers, scientists and physicians (including surgeons but not dentists) immigrating in 1968 dropped to 13,011 in 1969.

40%), to 10,254 in 1967 (50%), to 13,221 in 1968 (52%) numerically over thirty-three times the putative number in 1947 and nearly six times the entrants of 1956.[1] Though complete figures for 1969 are not available, it is evident that this trend continued. The number of immigrating scientists and engineers born in Europe declined almost half while those born in Asia rose from 4,400 to 5,300. Those born in Africa increased by 56% over 1968. Of 2,756 physicians, 1,600 came from Asia alone. The proportion of engineers, scientists and medical personnel immigrating from the developing work in 1969 seems likely to be about 60% or more. Entry of 'professional, technical and kindred' personnel from developing countries ran in 1968 at approximately twice the rate of such entries during the seven preceding years. Science-engineer-medical personnel immigrants from developing countries in 1967 and 1968 totalled more than half the 40,000 fellowships granted since World War II by the UNDP and its predecessors to nationals of low-income countries to study abroad for essential occupations at home and more than those who have been trained at home during an average year of that period.[2]

Within these overall percentages, the immigration of scientists from developing countries rose nearly ten times and that of engineers nearly six times between 1956 and 1967 with further increases by 1968.[3] A number of individual countries showed still more striking rise, immigration of engineers, scientists and medical personnel from China rising from 47 in 1956 to 1,321 in 1967; India from 100 to 1,415; and the Philippines from 90 to 1,066 in 1967 and 3,153 in 1968. As a region, Africa has begun to rise strikingly - in 1969 it for the first time surpassed South America in professional migration and did so almost two to one.[4]

In sum, scientists from developing countries make up an increasing part of the United States total, constituting about 13% of the added Unites States

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1/ Sources: US Immigration Statistics. The Annals of the American Academy of Politics and Social Sciences, September 1966, and the House Report of 23 January 1968. It should be observed that the above totals include nurses and other medical personnel who are omitted by the House Committee in its totalling of 'scientists'. Since the resolution refers to trained personnel without specifying scientific level, the larger totals are used here.

2/ Statement of Paul G. Hoffman, Administrator of the UNDP to the 23rd Session of the General Assembly Second Committee, 11 November 1968, p. 7.

3/ See footnote 1.

4/ The United Arab Republic provided, however, a large majority of all professional migrants from Africa.

production of scientists in 1967.[1] Engineer imports from developing countries constitute recently about 8% of the annual additions to United States engineering supply, total import of engineers from developing countries was at 4,229, 28% larger in number than the increase in U.S. engineer production of 3,305 in 1967.[2] Professional immigration forms a significant part of the relationship between the United States and other nations of the present world.

(ii) The Special Medical Case

The medical situation is a particularly striking one. Though the immigration of physicians from developing countries rose only a little over three times between 1956 and 1967 due to the higher rate at which physicians are required to leave the country because of their possession of the restrictive J visa[3], physician immigrants from developing countries contribute nearly 21% of recent additions to United States medical supply equivalent in number to the output of 15-20 United States medical schools.

In the eight years following 1959, U.S. medical school graduates have increased by 36,260 physicians; in the same period, almost as high a number, 32,372 graduates of foreign medical schools, became included among U.S. physicians.[4]

On 31 December 1967, there were 46,347 physicians in the United States who graduated from foreign medical schools according to the statistics and definitions of the American Medical Association.[5] Of these, 49% were graduates of medical schools in Europe, 32% from schools in Asia, 17% from schools in Latin America, and 1.4% from medical schools in Africa. Breakdowns of these graduates

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1/ House Report, 28 March, p. 4.

2/ House Report, 28 March 1968, p. 3. 4,289 engineers from developing countries entered in 1968.

3/ The J visa requires departure for two years prior to readmission under a different status. The approximately 6,600 who now leave annually presumably constitute a great educational contribution to the countries from which they came, though lack of re-entry statistics makes it uncertain how many of these who leave the United States actually do so to return home. It is known that rather substantial numbers simply move to Canada or to other hospitable places for migration purposes known as 'parking lots' before, in many cases, reapplying after two years, for readmission to the U.S.

4/ C.N. Theodore, G.E. Sutter and J.N. Haug, American Medical Association, Medical School Alumni 1967, Special Statistical Series, Chicago, 1968. The U.S. statistics which follow are drawn from this report, especially Table A, p.7.

5/ Ibid.

are available.[1] According to these and using the OECD definition of a developing country (which includes in that category Spain, Portugal, Yugoslavia, Turkey, Greece and Israel), there were 26,515 graduates of medical schools in developing countries and 19,832 graduates of medical schools in developed countries included among the 309,483 physicians in the United States. Far in the lead of all contributing countries was the Philippines, 5,927 of whose graduates are in the U.S., followed by Germany (East and West), 4,102; Italy, 2,966; Switzerland, 2,460; the United Kingdom, 2,418; Cuba, 2.352; India, 2,345; Austria, 1,780; Mexico, 1,587; South Korea, 1,349; Spain, 1,314; Iran, 1,162; Argentina, 1,071.

On the whole, these statistics are among the best available in the brain drain field. They must, however, be regarded with the following qualifications and explanations:

(1) Graduates of Canadian medical schools are not included by the American Medical Association among 'foreign graduates' since Canadian medical schools "have adopted educational standards similar to comparable to those of the U.S."[2] The 6,600 graduates of Canadian medical schools in the U.S. would have to be added to the above 46,347 foreign physicians making 52,947.

(2) Approximately 2,000 among the above 52,947 were Americans who attended and graduated from medical schools outside the United States. While most of these attended Canadian and European medical schools, some also contribute to the high figure of 1,587 from Mexico. These should be subtracted from the 52,947, leaving 50,947 graduates of foreign medical schools who were foreigners when they graduated. The 26,654 figure would be reduced by, perhaps, a very few hundred for this reason. Thus, nearly one in six U.S. physicians is a foreign graduate of a foreign medical school.

(3) Several of the figures for graduates of developed countries include doctors coming from developing countries and receiving their medical education abroad. Graduates of U.S. medical schools include a small number of foreigners. Canada's 6,600 includes some. The United Kingdom's apparently includes more, as may the French and German figures. Most interesting are the cases of Switzerland and Austria whose foreign student enrollment, largely from developing countries,

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1/ House Report, 28 March 1968, p. 4. (See appendix I). See also letter from Harold Margulies, Secretary, Council on Health Manpower, American Medical Association, 9 April 1969.

2/ Medical School Alumni 1967, p. 20.

amounts to almost one-third of their entire student bodies. Places in their hospitals go primarily to their own nationals so that the many foreigners they train include many who migrate onward. Hence, the 26,515 figure is probably understated by an amount at which one can only guess, but which must certainly amount to a number of hundred; the 19,832 figure is overstated by a similar amount. Counting this reduction and that in (2) above, in fact, it seems unlikely that many over 18,000 Foreign Medical Graduates (FMGs) from developed countries are in the U.S. physician population whereas it seems likely that over 27,000 FMGs from developing countries are. There are thus probably 50% more physicians from developing countries in the U.S. than there are from developed countries and upwards of 60% of doctors in the United States who graduated from foreign medical schools are natives of developing countries.[1/]

(4) While break-downs by age are not combined with break-downs for country for foreign medical graduates, there is a high probability of a significantly higher age level for doctors of European origin than for doctors from developing countries. The high figures from Germany, in part for Austria, and the relatively substantial figures from the USSR (893), Poland (540) and Czechoslovakia (541) would appear to reflect the political and military events affecting Europe from 1932 until shortly after World War II. The especially high figure for Hungary (869) reflects these events as well as those of 1956. The latter four countries are no longer significant sources of medical emigration. Medical doctors from developing countries, on the other hand, have come in more recent years and are relatively young. This fact is likely to add in the future to the sharply rising increase of physicians from developing countries within the U.S. medical population as doctors from central Europe retire and die and are replaced, largely, by imports from developing countries.

(5) The American Medical Association Tables on major professional activity reveal that, of the 309,483 physicians in the U.S., 89.2% are engaged in patient care activities, 6.6% are engaged in other professional activities and 4.2% are

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1/ There are thus more physicians from developing countries in the United States than there are medical doctors of all kinds serving the over 300 million persons in 40 developing countries of Africa (given as 22,543 in WHO, World Health Statistics, Vol. 3, 1966). Note, however, that only approximately 650 of the foreign doctors in the United States were graduates of African medical schools - some others may, of course, have been African graduates of medical schools in Europe or elsewhere.

inactive.[1] For reasons given in (4), those inactive (largely retired) among FMGs are very likely to include a far larger proportion of doctors graduating in developed and a far smaller proportion of doctors graduating from developing countries.

Hence, not only is the present percentage of foreign FMGs from developing countries high but it is presently becoming higher. Developing countries have increasingly replaced countries as sources of new physicians and developing countries like Cuba have become the historical replacements for developed countries like Germany, Austria and Poland as crisis-impelled sources of medical emigration. (Two hundred and thirty-eight physicians, surgeons and dentists and 161 nurses immigrated from Cuba alone in 1968).[2]

Within the above totals are, as of 31 December 1967, 2,696 foreign interns and 12,311 foreign residents and fellows. These constitute an overall total of 32% of all such categories in the United States. On 31 December 1966, AMA data showed that about 75% of the foreign medical graduate trainees (residents, interns and fellows) came from developing countries.[3] On the whole, such percentage has increased constantly, especially over the last decade and the present proportion is more likely to be slightly above than below 75%. It is known that of all FMG graduate trainees as of 31 December 1967, 56% came from eleven developing countries: Philippines, India, Korea, Iran, Thailand, Formosa, Argentina, Cuba, Mexico, Colombia and Pakistan. This group contributed 10,333 of 14,828 interns and residents.[4]

In addition to the approximately 28,000 medical school graduates from developing countries in the United States, there are some 8,000-10,000 physicians from developing countries in the United Kingdom. A total of 5,869 physicians and surgeons immigrated to Canada from non-United States and European sources from 1946-63 with many more added since.[5] The lack of balance between import and export of physicians to and from the United States is indicated by the fact

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1/ Medical School Alumni, p. 12.

2/ The crises of demand, salary and immigration law changes were still more effective in fiscal year 1968 for Turkey and the Philippines: the former was the source of 195 physicians and dentists and 1,120 nurses; from the latter came 846 physicians and dentists and 891 nurses.

3/ Margulies letter, ibid.

4/ Dr. Margulies, idem.

5/ Louis Parai, (Economic Council of Canada), op. cit. Table A-25.

that while the U.S. has imported over 50,000 foreign graduates of foreign medical colleges, only 2,627 of all medical graduates in the U.S. census are listed as residing abroad (besides 5,664 in U.S. possessions and with U.S. military overseas).[1]

No one seems to know how many doctors who are natives of developing countries but graduate from medical schools in the United States or Canada and are therefore not listed under Foreign Medical Graduates are included in the total of U.S. physicians. Open Doors for 1967 breaks down students studying in the various medical sciences in the United States by country of origin (Table 2, pp. 20-25). From this list we can derive the information that, in academic year 1966-67, there were 754 students from developing countries studying medicine, 272 studying dentistry, 666 studying pre-medicine and 1,015 studying 'Other', a category which included pre-veterinary medicine and veterinary medicine. In 1968-69, these figures had risen to 951 for medicine, 346 for dentistry and 991 studying pre-medicine.[2] Nursing and Pharmacy are separately listed and not included in the above figures. These figures include those enrolled in four years of medical classes, they do not include Canada and they do not tell us how many of the above students stay on following graduation. The report, therefore, comes to no conclusion on this matter. Since medical courses expose the foreign student to especially long periods of U.S. study (a theory addedly supported by the high figures for pre-medical study) and since large numbers of the above students come from the same countries whose indigenous medical systems train large numbers of doctors for the United States, it is a valid inference that stay-on rates among U.S. medical graduates from such countries are likely to be high. Total numbers from this source, however, are obviously small compared to the influx of foreign doctors who are foreign medical graduates.

The statistical record is only substantially, not entirely, complete, 1956 being the first year of adequate statistical breakdown. Assuming a gradual rise from zero in 1945 to the known figure of 2,231 in 1956 and adding this number to those immigrating since, one arrives at the probability that from the entire world some 170,000 and from the developing world alone on the order of 75,000 scientists, engineers and medical personnel have immigrated into the United States

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1/ Medical School Alumni, ibid, p. 17.

2/ Open Doors, 1969, p. 31.

from the end of World War II, through June 1969.[1] Even for the United States, which accounts for about a third of the world's stock of scientific manpower, this is well over a year's average growth in her supply since World War II of scientists, engineers and physicians.[2]

Such figures constitute a striking dimension of the extreme gaps between developed and developing countries. A comparison of such figure and others of professional immigrants provided in the Appendix - with the statistics of educational output appended in Table XIV, is striking. More detailed evaluation of such statistics, however, will be explored in Section VII.

f. Other Developed Receiving Countries

(i) France

No countries beside the foregoing combine large-scale professional immigration from developing countries with adequate statistics.

France is a significant example. Of her 50 million population, 6 million are foreign of whom one quarter comes from the developing countries of the French Union. The foreign population rose 40% from 1962-67 while that for France as a whole rose 6%. This foreign population is mostly unskilled. Still, among senior professionals, 3.6% or 27,320 are foreigners and of these nationals of former African colonies, Departments and Mandated Territories (Algeria, Morocco, Tunisia, Africa and the Malagasy states, etc.) numbered 2,280 or 8.3% of the foreign total. In addition, in 1962, 1,060 foreigners are recorded as occupying inter-

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1/ See p. 36, Note 1.

2/ In 1966, the Bureau of Labor Statistics estimated that there were 399,000 natural scientists in the United States, based on a sample survey of employing establishments. Milton Levine, National Science Foundation, "National Register of Scientific and Technical Personnel: A Data Source for Mobility Analysis", Cornell Conference on Human Mobility, 31 October-2 November 1968, Ithaca, N.Y. pp. 7-10. The National Register estimated a similar number by 1968. Dr. William J. Gibbons of Fordham has calculated (House Report 28 March 1968, p. 3) that some 1,850,000 persons in the United States are scientists, engineers and physicians. Assuming this stock to be built up over 30 years, average annual growth can be calculated at less than 62,000 persons. Immigration in 1967 of 7,913 scientists, engineers and physicians from developing countries is immigration at the rate of nearly 13% of this annual growth and 1968 immigration of 8,299 is 13.4%. All such estimates are, however, rather rough and subject to definitional questions.

mediate medical and social services posts.[1] There also appear to be several thousand Vietnamese graduates in France and fair numbers of Latin Americans.[2]

Unfortunately, almost all formal French statistics are known to be severe understatements since large proportions of professionals from France's former colonies are not considered 'foreigners' for formal statistical purposes, enjoy free movement in France and thus evade being caught in statistics. Statistics from individual organizations like the National Centre for Scientific Research, 42% of whose 631 foreign researchers come from developing countries, show something of what the size of the actual movement may portend. The figures given in Table V are, for the above reason, a considerable understantement.

As with other major receiving countries, students in France are important source of brain drain when they drop out or graduate and then remain employed in France. There were about 40,000 foreign students in France of whom close to 30,000 come from developing countries. This is by far the largest student population on the European continent - Germany has only about 20,000. Unfortunately, no statistics on non-return are presently available. A recent French researcher has noted, however, that it is generally known to be a considerable problem, that 62% of students from Africa, Asia and the Antilles study science, medicine, dentistry or pharmacy which are occupations most susceptible to brain drain while those students coming from more industrialized countries prepare themselves mostly to teach French literature and culture in their own countries.[3] He also notes that, among 80 students interviewed at the Faculté des Sciences in Paris in 1967, 69% of Vietnamese wished to remain in France after finishing their studies with another 25% undecided, 50% of North Africans wished to remain and 50% to return, while 15% of African students wished to remain, 52% to return and 33% were undecided.[4] In another survey conducted by an African among African students in France, 61% declared that they would have wished to study in France even if their

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1/ Michel Bouvier and Marie-France Desbruyères, "Immigration of Scientific and Medical Personnel: France", EWA study.

2/ 7.8% of Colombians emigrating after finishing their training programmes went to France between 1953 and 1968. Their total number appears to be 1,674. (G. Eusse Hoyos, op. cit.).

3/ Hermet, op. cit. p. 54.

4/ Hermet, op. cit. p. 55.

courses had been fully available in Africa. Such desire is not brain drain but it is part of an attitude frequently leading to it.[1]

On the other hand, strict rules limiting the practice of medicine in France to French citizens and nationals of the French Union apparently make the French medical brain drain numerically less than that to other major Western developed countries, though there are certainly five hundred or more medical doctors of north African origin. There are said to be few foreign interns in French hospitals. Even so, 50 of the 62 Cameroonian medical doctors working outside Cameroon are practising in France. There were 164 doctors practising in Cameroon in 1965-66 of whom 113 were expatriates. There were hence more Cameroonian physicians working outside Cameroon than inside and as many working in France as in Cameroon. Analogous situations exist for Algeria, some 300 of whose physicians are practising in France, Morocco and Togo.[2]

It takes little acquaintance with French life to be aware that the human imports from developing francophone countries is in fact quite considerable; indeed, France probably receives a larger share of African élite than any other developed country. French culture penetrated the colonies principally through the educational system, the deracinating influences of that system were powerful, the opportunities in many of the countries for professionals poor. A recent study shows that the non-return of Cameroonians educated abroad, especially in France, now reaches each year since 1960 some 30% of the total of those Cameroonians ending their education abroad, having risen from rates of 5-15% in the periods before Cameroonian independence. Eight hundred and eighty-five qualified Cameroonian workers, 130 agents de maîtrises (an expert foreman), 67 technicians and 75 cadres are working in France, in addition to 20 adjoints administrateurs. In all these fields there are Frenchmen sent to work in Cameroon. More specialized studies would probably uncover similar conditions. A private survey of 1965, for example, claims that 12,000 sub-Saharan African students have remained in France with their families against 11,000 who were then still pursuing their studies.[3] Many apparently escape recording in professional or semi-

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1/ N'Diaye, J.P. "Enquête sur les étudiants noirs en France", "Réalités Africaines", Paris, 1962, pp. 305-306, cited by Hermet, p. 56.

2/ The Cameroonian statistics are drawn from Paul Bourget Sack, "Formation et Evasion des Cadres au Cameroun", memoire presente a L'Ecole pratique des Hautes Etudes, 1967-68, p. 60. For other figures and remarks, see Hermet, p. 59.

3/ Perspectives, 944, September 1965.

professional jobs. A few go on to French Canada or elsewhere. There are also, apparently, many drop-outs or eternal students who have gone far enough up the ladder to be intellectuals at home but not far enough to qualify for professional employment in France. Yet they prefer humble jobs abroad to admission back home of their failure to obtain the degrees sought.

Francophone countries have become gradually more concerned with brain drain to France. Perhaps no other situation calls for better statistical clarification.

(ii) The Federal Republic of Germany

The situation in the Federal Republic of Germany is, if anything, even more unclear than that of France. Germany has become a major trainer of students from developing countries (Section V) and it is known that many of these students have attempted to remain in Germany, some with success. Various figures of foreign physicians and nurses practising in Germany have been publicised but without much claim to accuracy. Judging by the fact that some 962 of the 2,600 Turkish doctors working abroad are in Germany, however, such numbers may be large.[1/] Numbers of former students from Near Eastern countries, of whom there are many in Germany, have gone into private business. A few foreign doctors and other professional personnel are believed also to be employed in the German Democratic Republic, mostly from other Socialist countries. Again, the above situation badly needs study and statistical clarification.[2/]

(iii) Others

Professional immigration from developing countries to countries other than the aforementioned seems not to take place in significant quantity. Latin American students study in Spain in considerable numbers and some are reported to remain there for extensive periods.[3/] Some students from Taiwan and a few Koreans stay on or become employed in Japan. There is little taking of employment in New Zealand by former students from island territories in that area. So far as can be determined, however, immigration of professionals to small developed countries from developing countries is thus far insignificant. Language and difficulty of obtaining work permits may play roles here but it would be interesting

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1/ Peter G. Frank, "Brain Drain from Turkey", (see below, p. 46).

2/ According to "Education in Germany", Inter Nationes, August 1970, since 1966 an annual average of about 21,700 foreign students pursued their studies in the Federal Republic of Germany, out of whom 13,372 came from developing countries.

3/ Two thousand five hundred and forty-six or 13.4% of 19,003 Colombian students pursuing their studies abroad under the auspices of ICETEX between 1955 and 1968, studied in Spain, and 10.8% of the Colombian graduate emigrants went to Spain. (G. Eusse Hoyos, report for UNITAR).

to know whether there may also be other reasons related to the larger opportunities of more extensive economies. There is little brain drain to Sweden despite considerable economic opportunities there. Professional migration is not really to developed countries in general, but to a few larger Western ones. It seems that there is a special attraction in the open societies of larger states, of greater professional aggregates.

g. Developing Countries

(i) An example: Turkey and the Middle East

Few reliable statistics on brain drain have been compiled by, or even in, developing countries. Most statistics having come from developed countries, give only partial pictures of developing communities. Recently, two excellent studies of professional migration have emerged from the Near East; these studies must be consulted for details but certain overall results can be summarized here.[1]

As in many other countries, higher educational institutions have greatly increased throughout the Middle East. As a result, the proportion of total university graduates draining to foreign countries is, in general, low. For the Arab Middle East in general there are some 400,000 Arab students enrolled in Arab national institutions and some 40,000 Arab students in U.S., European and U.S.S.R. universities and brain drain under 5% or 10-20% of those studying abroad and 1% of those studying at home.[2]

This overall figure includes majorities in law and arts which are less developmental and do not lead to much migration. When one looks at the more developmental professions, however, the proportions rise, in some cases steeply:

Percentage of University Graduates Emigrating from the Middle East 1962-66:[3]

Country	Engineers	Nat. Scientists	Soc. Sci.	Nurses	Physicians
Turkey	7	16	1.1	3	15
Greece	27	12	1.5	8	8
Iran	52	14	neg.	4	10
Iraq	9	-	1.1	-	10
Israel	16	19	-	11	54

Continued

1/ Peter Goswyn Frank, "Brain Drain from Turkey", in the forthcoming EWA study Modernization and the Migration of Talent, New York, 1970; and A.B. Zahlan, "The Brain Drain (Lebanon and Middle Eastern Countries)", report for UNITAR.

2/ Zahlan, op. cit.

3/ Frank, idem. These numbers do not include Middle Eastern graduates of foreign universities who do not return to the Middle East.

Continued from preceding page

Country	Engineers	Nat. Scientists	Soc. Sci.	Nurses	Physicians
Lebanon	36	10	1.2	-	25
UAR	2	5	neg.	1	4

The loss ratio for medical doctors was 17%.[1] Thus, a typical class of 540 graduates from a Near Eastern medical school can expect to lose 90 to emigration. Two thousand and six hundred Turkish doctors were working abroad in 1968, about 20% of Turkey's total stock of 11,600 doctors working in Turkey.[2] Thirty-seven percent of these are estimated to be in Germany, 27% in the United States, all but 13% of the latter being naturalized or on permanent visas. Of 7,400 Turkish doctors asked by a John Hopkins team in 1964 whether they had plans to go abroad, 1,600 or 22% answered affirmatively, half hoping to go to Germany. Meanwhile, 50% of medical faculty demands are unmet and there are 588 vacant but budgeted positions in Turkey's medical and health institutions.

Similarly in Lebanon, reckoning the doctors produced, the needs of instruction in new medical schools to raise health standards and the quality of the emigration involved, an expert calls the drain to the U.S. of 89 Lebanese physicians and surgeons, 12 dentists and 62 nurses in five years "a calamity."[3]

Counting both emigration of working engineers and architects and those trained abroad who do not return, it is believed that losses equivalent to 60% of the graduates produced in these fields in Turkey may have been attained annually from 1951-64, equivalent to 16% of the total national supply in the 1950s and 11% in the last four years of the 1960s.[4]

Among Middle Eastern scientists produced in the West, 70% are estimated to drain and "this drain has essentially frozen now for ten years the development of all national universities in the area."[5] The situation is especially grave for PhDs. Rates of increase of science PhDs are infinitesimal and, in the instances of Iraq and Syria, may actually be negative. Jordan is also

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1/ For figures in this paragraph, see Frank, op. cit. For another source on Turkey see Carl E. Taylor and associates, Health Manpower Planning in Turkey, Baltimore, John Hopkins Press, 1968. Turkey has only 1 physician for each 3,140 persons.

2/ Frank, ibid.

3/ Zahlan, op. cit.

4/ Frank, ibid.

5/ Zahlan, ibid.

unable to make progress in her professional manpower. Such losses mean that faculties cannot augment - or sometimes start - offerings in the fields of science, medicine and engineering. This in turn means that students continue to go locally into the less developmental fields of law and the humane arts and, when they study the above fields abroad, emigrate in significant quantity. A vicious circle is thus generated which is difficult and costly to break; an added burden to development.

(ii) Colombia

Colombia has, during the decade and a half of the operation of its Institute for Advanced Training Abroad, developed perhaps the most sophisticated statistics among all developing countries. These and the analysis thereto connected appear in a forthcoming UNITAR report where they deserve detailed examination.[1/]

In brief summary, the study shows that there was a net total emigration of 21,470 Colombian professionals from 1955-68 plus 4,482 middle level personnel. Approximately 47% go to the United States, 10.8% to Spain, 7.8% to France, 7.8% to Venezuela, 4.5% to Mexico and 3.4% to Canada. Of the outflow, 29% are engineers, 20% are administrative or economics, 12% are educators, 10% are in medicine and 8% are in fine arts and architecture. A little under 5% each are in natural and exact sciences, in social sciences and in law. Over 36% of Colombian professional emigrants to the United States are medical doctors. Emigration spurted in 1964-65 but may now have markedly decreased as economic conditions and educational flexibility in Colombia have improved. Fairly elaborate estimates of the cost to Colombia of this emigration are a part of the section below dealing with such costs.

Though Argentina is a considerably more developed country, impressive figures of emigration are also available for it. Eight thousand four hundred and twenty-five Argentine professionals emigrated to the United States from 1950-64 at an almost constantly ascending rate: only 119 came in 1950, and in 1964, 1,495 came.[2/]

1/ G. Eusse Hoyos, op. cit.

2/ E. Oteiza, "The Emigration of Argentinian Engineers: a Case of Latin American Brain Drain", International Labor Review, December 1965, p. 492.

(iii) Trinidad and Tobago

The special study on brain drain from Trinidad and Tobago prepared by the Statistical Office of that government for UNITAR, must be consulted for the full details it gives. A summary indicates some of the problems indicative of small nations subject to strong economic pulls from large ones.

Like most Caribbean nations, Trinidad and Tobago has a considerable brain drain. Its tradition of emigration was to the United Kingdom, though its flow there was not only of the less-educated but was smaller in size than many other Caribbean areas like Jamaica. With restrictions blocking immigration there after 1962, the flow turned to the United States and Canada but was, responsive to laws there, a flow heavy with educated manpower, especially of non-returning students, 45% of whom go to the United States, 45% to Canada and 10% to the United Kingdom.[1/] Student non-return from 1962-68 is estimated at 30-40% among those going abroad (who now number about 2,000). The higher education system is only recently developed and small and has its own emigration rate of over 20%. Such emigration is increasing steadily and rapidly and attracts many converts.

Total professional and technical workers in Trinidad and Tobago number about 18,000. From 1962-68, 6,216 professional and managerial personnel emigrated to the United States, 3,004 to Canada, 682 to Britain, and 570 to other countries. Of these about 84% were skilled technicians, 16% university-trained professionals.

Though 14% of the labor force is unemployed, the emigrants do not come from this group. They are almost all employed, at middle-higher salary levels, very productive and with high home ownership ratios. Similarly the arts fields which have more unemployment have fewer emigrants: most migrants are doctors, engineers, nurses and technicians who can find employment in the labor market. Salary levels and career opportunities are important in the flow as is the widespread knowledge of the islanders about comparative conditions and opportunities elsewhere and the fact that even at home they must work largely for foreign-owned companies.

It is the general feeling of the report that, whereas present emigrants from Trinidad and Tobago, 63% of whom from 1962-68 are professional or middle-level personnel, may be even more productive elsewhere than back home, that their productivity back home was and would be considerable and that its loss for Trinidad and Tobago is real.

1/ All statistics here given are drawn from Statistical Office, Trinidad and Tobago, "Brain Drain", Study for UNITAR.

(iv) Jamaica

Jamaica provides another specific example of the immediate results of recent immigration legislation shifts from racial to educational discrimination. More, even, than Trinidad and Tobago, Jamaica has, in the last fifteen years experienced both unrestricted emigration to the United Kingdom and, until 1952, the United States, followed by more recent years of immigration restricted by the last decade of legislation by the United States, the United Kingdom and Canada.

From 1945 until 1962, hundreds of thousands of migrants left the West Indies and immigrated into the United Kingdom (259,500 from 1955-1962 alone). Such emigration, however, removed relatively few skills from the Caribbean. From Jamaica, the largest single contributor and representative of Caribbean conditions, only .3 per cent of emigrants had above school certificates and only 1.4% were secondary graduates with school certificates. Seventy-five percent of Jamaican male immigrants and 81% of Jamaican female immigrants had 4-6 years of elementary school only. Census figures indicate that in nearly every year net migration siphoned off from the West Indies some 30% of the natural increase in population that occurred between 1946 and 1962: for Jamaica the proportion was 35%. Economists have held that, under circumstances in which 12% of the Jamaican (and comparable percentages elsewhere of the Caribbean) labour force was unemployed, such migration contributed substantially to the rapid rates of increase in per capita production attained by Jamaica and some other Caribbean countries in this period. Apart from relieving unemployment, between 1953 and 1962 total net remittances from the United Kingdom to Jamaica amounted to £28.6 million and the 1962 amount of £6.3 million equalled 40% of Jamaica's visible trade deficit in that year.

After 1962, the Commonwealth Immigrants Act drastically reduced the number of new workers from the West Indies who could immigrate to the United Kingdom except as relatives of those already there. A noticeable slowing in economic productivity per capita occurred in the West Indies beginning in 1962. Unemployment rose, that in Jamaica reportedly soon affecting 18-20% of the labour force and officially 14% in Trinidad and Tobago. West Indians sought other channels of emigration, notably to Canada and the United States. At just the time that the Commonwealth Immigrants Act took effect, new Canadian immigration regulations were passed in 1962 which eliminated a previous racial bias. In 1965, 2,345 West Indians immigrated to Canada but of these 561, or nearly a quarter were professionals, 618 were clerical personnel and many of the others were electricians, carpenters,

skilled building workers and 112 mechanical repairmen. The professionals included 168 school teachers, 112 nurses, 67 doctors, 41 professional engineers, 36 accountants, 18 draughtsmen. All of these are developmental personnel which the Caribbean produced and possesses in substantially smaller proportion than Canada does.

In 1965 as in earlier years, unskilled workers from Italy came to Canada in large numbers. The West Indies' 25% ratio of professionals among immigrant workers was higher than for any European supplier except the United Kingdom.[1] For Trinidad and Tobago, the proportions of professional and middle level emigrants to Canada from 1962-68 was just under 70%. Thus, it was more necessary for a West Indian - an immigrant from developing countries - to have higher skills than if he came from a developed one. The Canadian policy change in 1967 made immigration regulations completely universal so that, in 1967, of 3,459 immigrant Jamaicans, 403 were professionals and in 1968, 291 professionals of total immigrants numbering 2,886 came but the problem remains and these modifications have required extended negotiation. Much the same holds true for immigration from the West Indies to the United States. In fiscal year 1967, 1,712 West Indian engineers, scientists and medical personnel immigrated into the United States; in 1956, the same figure had stood at exactly 100. Within the Caribbean, Jamaica lost many of these professionals. She has a rapidly-developing economy, expanding demands for services and jobs at medium and high levels which cannot be filled. A recent study judges that Jamaica's development "has been impeded by migration."[2] In 1968, 2,652 'professional, technical and kindred' entered from the West Indies (minus Cuba); in 1969, this figure rose to 3,677 - almost half in each case were provided by Jamaica.

Jamaica and the Caribbean illustrate the effects which legislation itself may have on the character of migration. Since countries are small, distance to developed North America close, population dense and immigration pressures great, the illustration is extreme. It demonstrates that brain drain migration is not presently a 'natural' portion of total migration. Left unrestricted, world flows

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1/ The statistics above are drawn largely from Karl Levitt and Alistair McIntyre, Canada-West Indies Economic Relations, Center for Development Studies, McGill University. Much the same is true for the United States, only 9.6% of whose immigrants from Europe in 1966 were professionals but 14.9% of those from Asia and 19% from Africa. "Some facts and Figures on the Migration of Talent and Skills", Dept. of State, Washington, p. 73, 1967. For graphic illustration of the effect referred to see Graphs 1 and 3.

2/ "Modernization and the Migration of Talent", a Report from Education and World Affairs, New York, 1970, p. 18.

might continue to be dominated by unskilled labor, as Jamaica's was until 1962, and as that between India and Pakistan and the U.K. would also have been if sufficient C Vouchers had been issued to satisfy demands. Canalized by legislation, a flow of educated people takes the place of 'natural' larger flows of unskilled labour. Migration itself is not the root of present problems; the root appears to lie in response by professionals under-utilized in developing countries to opportunity in developed countries reinforced by the inducement for the educated and restraint for the unqualified which are the incentives of current immigration legislation.

5. Future Trends

Predictions of future trends in migration contain, like all predictions, some uncertainties. Cutbacks in research and development expenditures in the United States or in other developed countries could conceivably slow or even reverse recent rates of increase.

It seems more probable, however, that the long-run level of migration of professionals from developing to developed countries will remain high and may, after the current (1969-70) period of economic adjustments and research cut-backs, tend further to increase. The reasons for this lie both in the greater rapidity of educational over economic growth in developing countries and in the probabilities of rising demands in developed countries.

In fact, though manpower shortage are often acute, the ability of most developing countries to absorb specific high-level skills is limited; often the actual numbers required are relatively small and a small rise in supply may quickly reverse a need recently acute. As a UNESCO study points out, "given the normal capacity of modern educational institutions and adequate inputs from the lower echelons of the educational system, the saturation of the labour market in developing countries with 'hard' specialized skills seems to be only a matter of time."[1/] The process of upgrading the educational qualifications for many job classifications in developing countries will accelerate and absorb some of the increased applicants. For the rest, however, either the performance of jobs below the educational qualifications of many future graduates or movement to better jobs overseas would seem the alternatives. Under such circumstances, 'push' factors behind the brain drain seem likely to increase.

1/ "Manpower Aspects of Educational Planning", UNESCO, International Institute for Educational Planning, Paris, 1968, p. 36.

These factors are likely to be augmented by the effect of recent immigration legislation. New immigration legislation or regulations in the United States, Canada, the United Kingdom and, to a lesser extent, Australia has increased both the numbers and the proportions of professionals from poorer countries, most sharply in very recent years. Numerically, such intake nearly doubled (from 5,540 to 10,254) in the United States between fiscal year 1966 and fiscal year 1967. From 1964-69, migration from advanced countries increased only 20% while that from developing countries more than doubled; physicians from Asia quadrupled while those migrating from developed countries rose only 50%; engineers migrating from developing countries in 1968 had quintupled in the same period in which engineer migrants from developed countries doubled.[1/] Similar trends have marked Canadian immigration. Increases of this order of magnitude heighten the concern over the effects and raise still further question of professional migration.

On 1 July 1968, the new U.S. immigration legislation of 1965 came into full effect for the first time. The backlog of immigrants waiting to be admitted under the 3rd preference quota (professionals) of this legislation was then approximately 50,000.[2/] Such backlogs mean that the inflow of highly educated persons from developing countries are almost certain to continue at high levels until at least 30 June 1971 and probably beyond. Inflow of 22,590 'professionals, technical and kindred' from developing countries infiscal year 1968 has more than confirmed the high level of such entrants. Such levels have already raised questions for the immigration policy of the United States. The Committee on Government Operations of the U.S. House of Representatives, noting that the United States spent $75 million "toward providing some 5,400 trained (including U.S.) persons to the very countries engaged in 'exporting' some 5,200 of their scientific professionals" to the U.S., the Committee recommended to the U.S.

1/ EWA Report, "Modernization and the Migration of Talent", New York, 1970, pp. 28-29.

2/ U.S. Department of State, "Report of the Visa Office, 1967", p. 11, lists a backlog of 48,000. The House Report, 28 March 1968, gives 50,000 on the basis of past under-estimates by the Bureau of Security and Consular Affairs.

Congress revision of the current Immigration and Nationality Act,[1] along lines which would apparently return U.S. intakes of professionals from the developing countries to something like the proportions prevailing during 1967. No further action has, however, been taken on this legislation.

It seems likely that the immigration of professionals from developing countries may tend to stabilize somewhere around, possibly just under, the levels now achieved: at about 20,000 per year with some greater obstacles to the inflow of professionals from Latin America in view of the limitation of 120,000 on immigration from the Western Hemisphere now imposed from 1 July 1968 on. Such levels would, in fact, correspond with some exactitude to estimates of U.S. needs for professional manpower made by the U.S. Department of Labor. This Department estimates that professional ranks in the United States will increase by almost 50% between 1965 and 1975, from 8.9 to 13.2 million workers; that one of every 11 of the additional professional workers will be an immigrant and one of 10 for the 3.4 million needed clerical and the 2.2 million needed craftsmen and foremen.[2] Thus, almost 4,000 professionals immigrants annually will be needed to supply estimated needs of nearly 400,000 professionals during this decade. At present immigration rates, an annual intake of 20,000 professionals from the developing countries would then be necessary. There is no present sign of a lack of supply to meet this demand. Similarly, it is estimated that the United Kingdom would by 1970 be short of nearly 100,000 people with advanced training.[3] The probability

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1/ "Scientific Brain Drain from Developing Countries", Twenty-third report of the Committee on Government Operations, 28 March 1968, pp. 16-18. The countries concerned are India, Korea, Turkey, China, Brazil, Pakistan, Philippines, Iran, Chile, Israel and Colombia which account for most of the countries outside Europe which have received $1 billion or more in U.S. aid in the post-World War II period. (Colombia received just under $1 billion). Such countries provided two-thirds of scientists entering the United States from the developing world. The 5,400 trained persons provided included 1,500 U.S. technicians working in all these eleven countries (except Israel where none worked) and 3,900 nationals of these countries whose study and training in the U.S., and occasionally third countries, was financed by the American Aid Program. AID-financed training was, in general, at a substantially lower scientific level and for far shorter time periods than was the training received by the migrating professionals.

2/ Frank Mott, "The Immigrant Worker", Annals of the American Academy, September 1966, p. 31.

3/ "The Supply of British Professional and Technical Staff to the Less Developed Countries", a paper prepared by the British Ministry of Overseas Development for the foregoing conference. The above figures omit those overseas in private capacities whose numbers are unknown. Determination of quality components of the balance is not possible.

that several other rapidly advancing economies like those of Canada, Australia and, perhaps, South Africa, will generate similarly increased demands for professionals which neither their own educational systems nor Europe will be able to supply adumbrates the escalating character of competition in this field which may, unless economic conditions radically change, mark the coming decade.

The above assumes that these predictions will be fulfilled. They may not be. As noted, the considerable reduction in U.S. government funding for research has made for a much tighter supply-demand situation among American engineers and scientists. Should this continue, the intake of professionals from developing countries could, temporarily at least, diminish. The supply would appear, however, essentially to be entirely subject to the demands of the United States and other major receiving countries.

III. THE MIGRATION OF MIDDLE-LEVEL PERSONNEL

A. The General Problem

There is general agreement that middle-level skills are "nearly everywhere in critically short supply" and that existing secondary and vocational education still produces such skills inadequately.[1] The Secretary-General's First Report on the Development and Utilization of Human Resources pointed out the crucial role of intermediate-level personnel in developing countries and the cumulatively retarding effect on development of the shortage of such personnel.[2]

The migration of middle-level or sub-professional personnel - technicians of all kinds, nurses, etc. - has thus far attracted far less attention, interest and study than has high-level personnel. It is not possible, therefore, to cover the subject with the thoroughness of professional migration despite its clear inclusion within the category of "trained personnel" of interest to the United Nations and students of migration.

The reasons for inattention are more obvious than they are well-founded. The skills given middle-level personnel are, to be sure, less expensive to produce, the training shorter than for professionals. In terms of developed economies, the productivity of middle-level personnel cannot be compared with that of a full professional scientist.

On the other hand, the middle-level professional of developing countries does not exist in the context of a fully-developed milieu. Middle-level skills cover a wide range and are vitally needed for any industrializing or institutionalizing initiative. Quite often, they are in scarcer supply relative to demand than are high-level skills. Developed countries appear to require about 50% more middle-level than high-level skills. In developing countries, however, there are often more doctors than nurses, more engineers than draughtsmen.[3]

Numbers and proportions of middle-level personnel are also unevenly divided between developing and developed states. Non-manual workers account for some 50% of the working population of Canada and the United States, 30-45% in other developed countries, 27% in the Soviet Union (1959), 20-25% in many less advanced

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1/ "Manpower Aspects of Educational Planning", UNESCO, International Institute for Educational Planning, Paris, 1968, p. 31.

2/ E/4353/Add. 1, Chapter IX, C.1

3/ Robert E. Asher, "Brain Drain to Brain Gain?", Ceres, FAO Review, Vol. 2, No. 1, January-February 1969, p. 23.

countries and about 10% in India, Pakistan and Thailand.[1] Ironically, some of these skills are often relatively rare. An India overflowing with civil engineers is still seriously short of ordinary electricians. Where higher education is heavily subsidized and social systems reflect a more ancient unbridged dichotomy between ruling class and ruled, educational systems frequently mirror the gap, tending to carry the educated to the university level while leaving middle-levels, in which many traditional societies were weak, unfilled. Expressions of concern at lacks of middle-level personnel are beginning to be heard with greater frequency.[2] A rough idea of the order of need for middle-level personnel can be derived from the Manpower survey and report of the Colombo Plan Bureau of 1963 in which the staffing pyramid recommended for Ceylon was based on the ratio of 1 engineer, 5 technicians and 25 craftsmen, with worries about possible over-production of engineers and of under-production of the other categories.[3]

Middle-level skill covers an enormous and diverse range. The ILO, in describing non-manual workers, includes, in addition to the 'professional, technical and related workers' (see above Chapter 1), administrative and managerial workers, clerical and related workers; sales workers; and service workers.[4]

1/ ILO, Report of the Director-General, Part I: Non-Manual Workers Problems and Prospects, Geneva, 1967, p. 6.

2/ For another expression of this concern, see the Inaugural Address of H.E. Mr. Pote Sarasin, Minister for National Development, Royal Thai Government, "Colloquium on Inter-Regional Technician Training", Colombo Plan Bureau, 1967, p. 3: "For (economic) development to be achieved, middle-level manpower is needed. It is the group of skilled workers that can make the greater contribution towards increasing productivity. Through their experience and intimate knowledge of day-to-day operating problems and manufacturing processes, they can exert a strong influence on quantity and quality of production. In our region, we are faced with the problems of lack of skilled technicians to fill the gap between the professional engineers and the unskilled labourers which brings about ineffective communication between these two levels."

3/ "Seminar on Approaches to Co-operation between Industries and Institutions in Technical Training", Colombo Plan Bureau, April, 1965, p. 33. In the Arab Republic, for example, the Institute of National Planning estimates that there will be a shortage of 213,000 technicians or 41.5% of estimated requirements. (Manpower Planning in the UAR, Cairo, Institute of National Planning, November 1966. At the same time, many Egyptian university-level professionals emigrate. Similar imbalances can be found in India, Iran, the Philippines and elsewhere.)

4/ International Standard Classification of Occupation, ILO, Geneva, 1958, and ILO Report of the Director-General, above, pp. 7-8.

Service and, in some cases, sales workers often do not represent much skill.[1] On the other hand, much high skill is represented among manual workers, including all manner of craftsmen, foremen, electricians, mechanics, machinists, tool and die makers; some in the operatives rubric, as in photography operatives, textile weavers and miners also possess valuable and widely-needed skills.

B. National Instances: 1. United States

Here again, as with higher skills, developed countries have more of them and require more at a faster rate than developing countries. Non-manual workers were only 25% of the labour force in the United States and Canada at the beginning of the century; between 1921 and 1961 the proportion rose by over 50% and by 25% in England. Such trends are continuing. The United States expects its non-manual workers to increase four times faster than its other workers from 1960 to 1975 by which time they will occupy three-fifth of total employment.[2] These needs have been reflected in the immigration of middle-level skills to the United States, although not as dramatically or as consistently as in the case of professional personnel, and, from what evidence can be gathered, far less dramatically for those coming from developing countries. Craftsmen, foremen and kindred immigrants to the United States have risen from 15,396 in 1954 to 17,510 in 1965 to 18,921 in 1967 - far more modestly than professionals. In fiscal year 1968, however, the total spurted to 28,926 and remained high at 26,678 in fiscal year 1969.[3] Clerical, sales and kindred workers would appear to have risen and, recently, declined: 16,018 in 1954, 30,015 in 1964, 29,779 in 1965, 19,783 in 1967, 23,876 in 1968 and 17,692 in fiscaly year 1969. Operatives and kindred workers (semi-skilled) have remained fairly level in recent years at 14-15,000 until they, too, spurted to 27,893 in 1968, returning to 16,588 in fiscal year 1969.[4] The percentage of immigrants in such categories have been close to the same as the percentage such skills occupy among employed persons in the United States as a

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1/ So with salesmen and sales clerks; advertising agents and salesmen, insurance agents and brokers and real estate agents and brokers fall under this category and include skills.

2/ ILO, Report ibid., p. 8. Non-manual includes professional but has a large majority of non-professionals.

3/ For some statistics, see Table XVI. 1969 figures are taken from advance Tables of the 1969 U.S. Immigration Report.

4/ These spurts are accounted for by the exceptionally high entry in fiscal year 1968 of Cuban refugees who provided 12,998 of the operatives and kindred, 7,409 clerical and 5,113 craftsmen, foremen and kindred. (1968 Annual Report, U.S. Immigration and Naturalization Service.)

whole (clerical 20.1% of total employed, 18% of immigrants; craftsmen 13.3% of total employed, 15.3% of immigrants) while professionals, technical and kindred were 9.9% of the total employed but 16.9% of the immigrants.[1] While immigrants among biologists, chemists, nurses, physicians, physicists and teachers have shown consistent advances from 1956 to 1967, machinists declined from 1,393 in 1957 to 971 in 1965, then turned upward to 1,328 in 1967, 2,381 in 1968 and again downward to 1,551 in 1969. Tool and die makers followed a similar pattern. In contrast to the 9,979 immigrating under the third (professional) preference in 1967 of whom 85% came from Asia, most of whom adjusted from student status, only 4,875 entered under the sub-professional sixth preference quota in 1967. This was seven times the 694 who had entered in this category the previous year but a strikingly smaller proportion came from developing countries. 3,315 of the 4,875 came from Europe and only 1,153 from developing countries of Asia and Africa.[2] This also is changing. 7,940 sixth preference immigrants were admitted in 1968 but of these, 4,271 now came from developing countries, 3,189 from developing Asian countries alone.[3]

For the future, the United States Department of Labour estimates that the craft and service occupations will make "significant gains" in immigration and that, between 1965-75, 230,000 craftsmen, foremen and kindred will enter (vs 380,000 professionals) and 330,000 clerical and kindred. If these estimates are realized, one of every additional ten clerical workers and craftsmen in the United States labour force will be an immigrant (vs one to every eleven professionals). It will be interesting to see whether the new U.S. immigration legislation will result in increasing the proportions of such categories who come from developing countries and whether future statistical breakdowns will make this clear. The sharp rises in the 1968 admissions of middle-level personnel may be the threshold to these changes if they are not solely hinged to the Cuban refugee

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1/ Frank L. Mott, "The Immigrant Worker", Annals of the American Academy, September 1966, p. 26. The figures are from 1947-65. Mr. Mott is a labour economist with the United States Department of Labour. The material following to the end of the next paragraph is drawn from pp. 30-32 of this article.

2/ Annual Report, U.S. immigration, 1967, p. 45 and p. 10. A comparison with the figures in Table IX make it clear that many skilled workers enter who do not receive sixth preference quota numbers. Many of these are from the Western Hemisphere which does not fall under the quota system; some are refugees, others from the U.K. and other countries which fall under stricter quotas only on 1 July 1968.

3/ Annual Indicator, Fiscal Year 1968, U.S. Immigration and Naturalization Service, pp. 32-35.

phenomenon. The figures for 1969 have fallen somewhat, showing that 1968 was significantly a Cuban-dominated year, but that level remain above those of 1967.

2. Canada

In the instance of Canada, more direct and continuous reliance on immigration skills is evidenced. In the postwar years until 1965, 110,000 of the 280,000 skilled workers added to Canada's labour force were immigrants.[1/] The size and steadiness of the immigration increases for middle-level groups is shown in recent years in Table XVI. Between 1963 and 1967, increases in key middle-level skill immigration were on the order of 275%. The numbers are also significant. Despite some difference in category description, it is clear that Canada relies several times as much on immigrant skills relative to her economy as does the United States. In this respect the pattern is similar to that for professionals. A survey of the Acquisition of Skills in Canada in 1956, before the vastly enlarged programme of technical and vocational training began, showed that, in five skilled trades, about 35% of those interviewed were immigrants. "Within the group of five trades (floor moulders, tool and die makers, senior draughtsmen, electronic technicians, sheetmetal workers), the percentage of immigrants increased with skill level - over half of those in draughting were immigrants."[2/]

In the case of the mix of immigrants from developing countries, however, the two countries are almost the reverse. Of professional immigrants to Canada from 1950-63, only 3.8% came from outside Europe or the United States; for sub-professional skilled workers, the percentage was 11.6,[3/] many of these coming from the Caribbean (see below).

3. Australia

Australia, here as among professionals, does not break down middle-level skill immigrants by nationality. Outstanding is her percentage of 'craftsmen and production process workers' to all workers and dependents which she maintains at over 30%. The great majority of these, however, are believed to come from Europe or developed Commonwealth countries.

1/ Manpower Policy and Programmes in Canada, OECD, Paris, 1966, p. 53.

2/ Ibid., p. 64.

3/ Louis Parai, Immigration and Emigration of Professional and Skilled Manpower during the Post-War Period, Economic Council of Canada, 1965, pp. 27 and 33.

4. France

In France, though exact statistics are unavailable, it appears that importation of workers from Africa who either are or become skilled is somewhat greater than it is for most developed countries. Foreign workers and their families resident in France number on the order of 2,500,000, a large proportion of whom are from Africa. There are at least 25,000 black African workers in the Seine area alone. It does not seem to be known how many are - or become - either skilled or permanently immigrant but many of the above are illiterate and apparently most are unskilled.[1/] Even small percentages of skill in so large a body of workers, however, would be statistically impressive among world totals.

5. Latin America

Between Latin America and the United States the migration of skilled workers is also a noteworthy phenomenon. In 1965, according to ECLA estimates, there were about 2.2 million "intermediate level professionals" or sub-professionals in Latin America.[2/] At least a third of them were primary school teachers (mostly with secondary education or lower) and a third or so were bookkeepers and accounting assistants. About 20% of the total were technicians in agriculture, industry, construction, transport and communications, 1 to 2 percent of them were paramedical technicians and graduate nurses. The over-all number of sub-professionals in sectors closely related to production was about 600,000, in medical services, 30,000. In these two groups, there was substantial emigration. The emigration to the United States from Latin America was around 0.7 - 0.9 percent of the continental stock of sub-professionals annually in the period between 1961 and 1966. Recently, middle-level emigration from Cuba has been unprecedented.

Trinidad and Tobago had an emigration rate of, so far, about 15% of graduates of its technical schools for the years 1966-68. Nearly 8,800 craftsmen, technicians and other well-trained personnel were counted among the 10,472 Trinidadian and Tobagoan higher-level personnel emigrating between 1962-68. This emigration of well-employed persons is believed greatly to have reduced the multiplier

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1/ See ESNA, Hommes et Migrations, numero special: "Approche des problemes de la migration noire en France", pp. 59, 69. In 1964 alone, counting Algerians, some 190,000 new workers came on the French market, most from developing countries which were formerly colonies of France.

2/ Economic Commission for Latin America, Education, human resources and development in Latin America, 1968.

effect of the professionals provided Trinidad and Tobago by bilateral and multilateral aid programmes.[1]

A recent study of Colombia has shown that 11,302 Colombians of intermediate level - especially industrial and mechanical technologists, accountants and clerks left Colombia between 1955 and 1968. Of these, 4,482 returned, leaving a net outflow of 6,820. Outflow of intermediate personnel was 9% of Colombia's total outflow during these years.[2]

6. Africa

A recent Nigerian report underlines the need for intermediate skills in Nigeria and states that in 1959 the Federal Ministry of Labour estimated that there were about 5,000 Nigerians with such skills working in the United Kingdom.[3] When efforts were made in 1959 to have them placed on a register, however, only 103 completed the registry forms with some others added later. Many skills such as machinists, mechanics, foundry moulders, railway operating staff, clerks etc. were represented, many believed to be drop-outs from educational courses.

In regard to Africa and France, it is apparent that the absorption by the former colonial country of intermediate African skills is considerable. One recent author has also noted that much of it is illegal and done without visa or other knowledge of the authorities. Even so he finds that Cameroon, whose 5-year plan for 1966-71 requires 1,343 'qualified workers', who have mastered certain working specialities, has 527 in this category working outside her borders, mostly in France, emigrant workers in this category constituting some 10% of such workers employed in Cameroon.[4]

7. General Effects

If serious problems are raised by the migration of middle-level personnel by and large they will have to be clarified by further research. Complaints in this regard emanating from developing countries are, recently, only beginning to be heard.[5] Some developed countries appear to be relying on the import of skills

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1/ Trinidad and Tobago, report for UNITAR, op. cit.

2/ G. Eusse Hoyos, op. cit.

3/ T.M. Yesufu, "Loss of Trained Personnel by Migration from Nigeria", unpublished, University of Lagos, November 1966, pp. 6-7.

4/ M. Paul Sack, "Formation et Evasion des Cadres au Caméroun," mémoire présenté a l'Ecole pratique des Hautes Etudes, Paris, 1967-68,pp. 41, 47.

5/ See the Trinidad and Tobago, Cameroon and Nigerian reports cited.

which they could, perhaps, train from among their own unemployed. On the whole, however, except as noted below, evidence of damage to development is as yet evidenced only for parts of the Caribbean and Africa. Totals of middle-level migration seem a good deal lower relative to the length of the training involved and to world employment in these categories than they appear to be for professional migration. The exceptions to this seem largely Canadian: 8,954 machinists, 4,754 mechanics, 2,244 electricians plus 2,200 electrical and electronics workers.[1/] However, Canada, which alone has published satisfactory breakdowns of these services by nationality, absorbs the great majority of her middle-level personnel from Europe or developed Commonwealth countries. The chief exceptions to this are rising imports from the Caribbean of clerical personnel (555 from Jamaica - vs 403 professionals - 239 from Barbados, 392 from Trinidad and Tobago, 162 from Guyana) and of manufacturing and mechanical (391 from Jamaica, 136 from Barbados, 309 from Trinidad and Tobago). For other developing countries the figures appear inconsequential and are especially small percentages of the professionals from Canada imports from the same places: 366 Chinese clerks and 231 manufacturing and mechanical vs 1,376 professionals; 144 Indian clerks and 163 manufacturing and mechanical vs 1,213 Indian professionals.[2/] The United States breaks down the above occupations by nationality only in the instance of persons naturalized - a far smaller group than those admitted for permanent residence. Here again, with the exceptions of Cuba, the Philippines and Israel, the totals of nationals from developing countries who naturalize and practise middle-level skills seem inconsequential.[3/] What more often occurs, to cite Iran's Under-Secretary for Vocational and Technical Training, is that "We have been sending our students with great hope to highly industrialized countries to make them middle-level technicians. But unfortunately even these boys return with PhD. degrees which they cannot use."[4/] It would be interesting to have the same breakdowns among immigrants for middle-level skills which the U.S. House of Representatives has made available for higher skills.

1/ 1967 Immigration Statistics, Canada Immigration Division, 1967, pp. 9, 18.

2/ Figures are all for calendar year 1967, Canadian statistics, op.cit. pp. 14 and 15. Though evidence is fragmentary, it appears that U.S. patterns in this regard are similar.

3/ U.S. Annual Report, op. cit. p. 106.

4/ Habib Naficy, "Colloquium on Intra-Regional Technical Training 1967", op. cit., p. 23.

C. A Special Case: Nurses

The migration of nurses appears to be exception to the preceding. In most statistics, nurses are handled under the professional rubric. It seems more appropriate for present purposes to handle them as middle-level personnel.

The Pan American Health Organization study has indicated that nurses in Latin America "are in a difficult economic and social position, and this is the primary cause of migration."[1] It is evident from high statistics of nurse movement from the Philippines, Korea, parts of South Asia and even the Near East and Africa that probably much the same can be said for other developing areas. Salaries are low, working conditions unpleasant and chances for advancement poor. While in most Latin American (and other) countries, the proportions of nurses migrating to those graduating are not high, in others they are a cause for concern. Of the 464 graduates of the principal nursing schools of Bolivia, 114 or 24% have migrated. About 160 or 12% of Colombia's nurses have left Colombia, 19% of Ecuador's and 20% of Honduras'. Jamaica has the most drastic problem of all. About 130 nurses graduate annually but some 200 nurses trained in Jamaica apply for work abroad each year while other Jamaicans trained as nurses abroad remain abroad.[2] Two hundred and sixty nine of Trinidad and Tobago's 1960-64 graduate nurses, 57% of those graduating in those years emigrated, 197 (73%) to the United States.[3]

In order to show the effect of nurse emigration and the potential which the migration of sub-professionals may hold for the future, a specific example of the emigration of such skills is instructive. It concerns the case of the Commonwealth midwives in Britain, less specifically of nursing students.[4]

Between 25-40% of all 256,000 nurses working in the British National Health Service were born outside the British Isles, almost 75% in developing Commonwealth countries. Foreign-born nursing students in the United Kingdom rose from

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1/ "Migration of Health Personnel, Scientists and Engineers from Latin America", Pan American Health Organization, WHO, Washington, 1966, p. 18.

2/ Ibid., p. 19.

3/ Trinidad and Tobago, report for UNITAR.

4/ For reportage on this example, we are most grateful to Oscar Gish, Research Fellow, Science Policy Research Unit, University of Sussex, "Foreign-Born Midwives in the United Kingdom: A Case of Skill Drain". March 1968. Also by O. Gish "Nursing and Midwifery Migration in Britain", Nursing Times, 1 May 1969, p. 69.

5,850 in 1959-1960 to 16,745 in 1966-67 or almost three times in seven years. Almost all of these come from Commonwealth countries and the overwhelming majority from developing parts of the Commonwealth. For example, 7,137 of the above alone came from the West Indies and 2,654 from Africa (mostly West Africa). Return and non-return statistics for this large body of nurses is not precisely known but a paper presented by the Government of the United Kingdom to the 1965 Commonwealth Medical Conference referred to "the students from overseas on whom the British nursing services rely in no small measure"[1/], and it is generally known that relatively few of these girls find their way home after training, even though a number of Caribbean countries, including Jamaica, have made efforts to obtain their return.[2/] Many, apparently, marry male migrants.

Within this group, it is known what happened to midwives from 1962 to 1965. Of the 1,216 foreign-born registrants - 25% of total registrants in 1964 and 1965 were foreign-born - who completed their studies on midwifery in the United Kingdom in those years, 301 or 25% went home, 2% went to a developed country besides England, 2% went to a developing country besides their own and 71% remained in England and Wales. The percentage of return fell from 27% in 1962 to 24% in 1965. Of the 10% who were sponsored, all returned. Of the 865 foreign-born midwives who remained in the United Kingdom, 41% were still active in their profession four years later whereas the over-all average for combined foreign and domestic-born midwifery graduates was 25%. Of the 1,252 Commonwealth midwives registering, all except 34 came from developing countries, including 619 from the West Indies, 360 from Commonwealth Africa (including 218 from Nigeria alone and 49 from Ghana) and 233 from Asia. Commonwealth West Africa, with 65 million people is producing less than 500 qualified midwives annually; another 58 returned from the United Kingdom at the same time as 182 stayed on. Thus, one in four new Commonwealth West African midwives was in the United Kingdom. The West Indies as a whole produced about 200 midwives per year in the early 1960's. Another 74 came back from training in the United Kingdom while 418 stayed on in that country.

1/ Record of Proceedings at the Commonwealth Medical Conference, 1965, Ministry of Overseas Development, London, 1965, p. 88.

2/ The nurses have claimed that Jamaica was not willing to provide the training England gave them. Notices of discontent arising when promises of employment were not made good have appeared in Caribbean newspapers. When, as quite frequently, however, nurses emigrate after training from the Caribbean, the training loss is quite high: the quality of such training is far higher than it is in most other developing areas. (Charles Kidd at UNITAR Conference, 19 February 1970).

Therefore, out of seven new West Indian midwives, three were in the islands and four were in the United Kingdom. Meanwhile, about 43% of the midwives practising in England and Wales were born outside the U.K. The number of U.K. midwives practising in Africa and the West Indies is inconsequential. Nursing skills are needed in both the Caribbean and West Africa and are also in demand.[1/] Jamaica and Trinidad have made some attempts to attract nurses home, but not, so far, to much avail.

D. Conclusions

No single profession can of course, yield results conclusive for any of all others. Many more studies of specific professions of the kind made in the reference study are clearly needed. On the other hand, the above example is sufficiently specific and of enough numerical significance to modify a number of assumptions about the brain drain.

There is evidence that portions of the emigration of middle-level skills will probably be or become as legitimate a matter for concern as the migration of higher skills, especially in view of the fact that less question arises over their utilization within developing countries; midwifery gives evidence that a universally applicable skill requiring comparatively little equipment can be equally migratory as a higher one.

Though political factors and education little directed at priority needs are frequently cited - often convincingly - as important contributors to the migration of skill, the example of midwives shows that such migration can take place in very significant percentages even where there is no reason to suspect that either inapplicability or political factors are appreciably present.

Convincing figures of non-return for African intellectuals have not been evidenced thus far except, possibly, in the instance of France. The sizeable drain of midwives from parts of Africa extremely lacking in this skill tends to show that Africa may not be exempt in the future from increasing migrations of trained men and women.

Except for nurses, study has not yet revealed a sizeable general problem in regard to middle-level skill migration; it is rather one just beginning to be

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1/ T.M. Yesufu (University of Lagos) lists "nurses and midwives" fifth in the list of Nigeria's major occupational shortages. ("Loss of Trained Personnel by Migration from Nigeria", unpublished paper, University of Lagos, November 1966, p. 4.)

noticed. In general terms, brain drain is not so much of middle-level skills but from them. Crucial lacks of middle-level technicians which are, in developing countries, world-wide are caused less by migration than by "the single academic stream of education that at present directs most students towards the "white collar" occupations without regard for fitness, occupational interests or prospects."[1] In this sense, the magnets of vastly increased opportunities for study overseas add their weight to this 'academic stream' which is, of course, predominately national. Production of middle-level technicians also suffers from lack of instructors which lack may, in a few instances, be related to brain drain.[2] From whatever combinations of causes, lack of middle-level technicians is widely held to be one of the major constraints on development.[3]

1/ Handbook of Training Facilities at the Technician Level in South and South-east Asia. Colombo Plan Bureau, 1964, p. 4, citing difficulties encountered by the Burmese government in developing Burma. The same difficulties are reiterated in this volume for Ceylon and elsewhere.

2/ Benito H. Enriquez, "Employer's Responsibility for developing middle-level Manpower", Colloquium on Intra-regional Technician Training, 1967, Colombo Plan Bureau, p. 37; "There is a tremendous drain of ... engineers, scientists, etc. and we cannot carry on our training programmes due to this shortage of teachers."

3/ See the Colombo Plan Bureau's Colloquium, op. cit., 1967.

IV. DIFFERENCES AMONG NATIONS IN RESPECT TO PROFESSIONAL MIGRATION

A. General Problem

As preceding descriptions have begun to make clear, the migration of the skilled and the educated is a very uneven process within the community of developing nations.

Some very poor countries have no means of training people at any high level and rely largely on training abroad and, for the present, importantly on foreign experts. Such countries either have no brain drain problem or have one which is statistically minute. Even here, however, a past legacy of lacks in planning or information brings problems to some.[1/] Other newly-emerging nations are substituting their own citizens for foreign experts. Such countries in the "first generation" employment stage have, for the present, enough prestige jobs for all trained citizens and either have no brain drain problem or have a statistically small and little felt one. Others have the "second generation" problem in which all or most good government jobs are filled and few places are available for new graduates. Others have university systems which turn out more highly trained or well trained people in certain fields than they can foreseeably absorb economically; these nations lose trained men and, since such nations tend to be large, so also can become migration from them. Political changes in others lead to emigration. A few Caribbean and Asian nations appear to train people continuously at a higher level than they can employ despite the knowledge that many leave the country for employment.

1/ For example, the Somali Ministry of Health and Labour, The Manpower Situation in Somalia, Mogadiscio, 1965, p. 83: "In a country where higher educational situations are non-existent, the main source of supply of high level manpower is the students training abroad, who assume crucial importance for the economic, social and cultural development of the country. While Somalia has been fortunate in receiving large number of scholarships from friendly countries ..., the assistance does not appear to have been utilized in a planned manner so as to meet the deficiencies in different sectors. Complete information on the number of students studying abroad and/or the subjects they are studying is also not available anywhere." So far as is known, 684 Somali students were studying abroad as of February 1965 for degree courses and 477 for non-degree courses. About 45% were in humanities and liberal arts. The number of jobs in short supply requiring a university degree were about 312, those requiring at least a secondary school education were 2,729. Even Somalia, therefore, may have an excess of positions over jobs in its future. Somalia does not, however, hire many expatriates.

B. Large Contributors

India, China, the Philippines, Hong Kong, Iran (at least formerly), Korea, Pakistan, Egypt, Greece and Turkey, account, partly because of exceptionally large populations or large population density and relatively advanced educational systems, for disporportionately large shares of the "brain drain". (See Tables I, II, III and XI). In general, such countries contribute the majority of the engineers and medical doctors emigrating to the largest receiving countries and substantial numbers of scientists. Such proportions continue to rise in fiscal year 1969. Within North America, Caribbean nations contribute heavily, within South America, Argentina and Colombia, within Africa, Egypt now contributes far more to the United States than all other African countries combined (in 1969, 576 scientists and engineers out of 686 from all Africa, double the previous year.)[1/] Of the 14,828 foreign medical graduate trainees (residents and interns) in the United States at the close of 1967, four-fifths came from fifteen countries and 56% came from six developing Asian nations: Philippines (25.5%), India (11.9%), Korea (6.8%), Iran (4.4%), Thailand (4.4%) and Taiwan (3.1%). The above countries had contributed less than 35% of such trainees five years before.[2/] For Korea, a private survey by an experienced American doctor of many years' service in Korea has shown that of 1,914 Korean doctors who came to the United States between 1962-68, only 49 had returned by early 1969; of the 13,401 medical doctors licensed in the Republic of Korea since 1948 only 8,700 remain in Korea today; and 45-60% of the graduates of the eleven medical schools in Korea find employment abroad.[3/] Meanwhile, only 1,000 doctors are practising in rural areas where about half (some 15 million) of the south Korean population lives or, by including some towns and a slightly different definition of doctor, 5,400 doctors for a population of 20 million. Several other of the above countries could show records not dissimilar.

As with medical doctors, so also in general did the above totals show substantial gains in 1967 and 1968 over immigration in the previous year, Asia's rising from 2,820 to 6,391 and the West Indies' almost doubling from 900 to 1,712.

1/ By 1969, this situation appeared almost reversed. Only 353 scientists and engineers immigrated from South America while 686 immigrated from Africa (of whom 576 came from the United Arab Republic.) (Figures for physicians not yet available).

2/ "Medical Education in the United States, 1967-68", Journal of the American Medical Association, Vol. 206, No. 9, 25 November 1968, p. 2074.

3/ Paul Crane, Director of the Chonju Presbyterian Hospital, in Korea Week, 30 April 1969.

In addition, Greece is the source of many professional migrants to northern Europe, Canada and Australia; Iran to Germany and India; Pakistan and the Caribbean to the United Kingdom and Canada; and India to all anglophone developed countries including Australia.

Such unevenness of immigration shows up even more clearly in the United States immigration figures for adjustment of status: 9,374 persons from developing countries adjusted their status from temporary (mostly student) to permanent resident during the year ending 30 June 1967. Of these, however, 8,520 or over 90% came from Asia, largely from Taiwan, Hong Kong, India and Korea.

C. Small Contributors and Recipients

While a few nations dominate, many hardly contribute to professional migration at all and some contribute less than could be expected.

Tables XI, XII and XIII, for example lack mention of about half of existing developing countries. These states are, in general, those which have too few trained men and students studying abroad to fall seriously into the orbit of the brain drain. Such status is, however, no permanent one. Even small, very new states with very low per capita income like Lesotho now has over 800 students studying abroad since 1962[1/] and may well soon suffer significantly from loss of a portion of these.

In addition, there are countries from which there appears to be far less professional migration than might be expected when one compares them with other nations. A prominent example has been Japan, not only until recently, but also during the last century for much of which she was still a developing nation. Even today, Japan's salary level for professionals is usually - as it long has been - far below what they could command in other developed countries. Until recently, at least, her rate of professional emigration has been low except in certain limited fields like mathematics, though she has acknowledged some emigration problem in the basic sciences. Language would not appear to be a satisfactory explanation for non-migration since language difficulty would apply equally to China, Korea, and Iran, where professional emigration is relatively higher. Even Japan's status as a developed, industrialized nation with organizational and career

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1/ Answer to UNITAR questionnaire, 1967.

opportunity cannot explain this non-migration either in respect to Japan's less-developed past or in comparison with "brain drain" from other developed nations with lower salary structures to those with higher. Japan's case warrants further study to determine the cause of this phenomenon which may offer some lessons for other nations.[1/]

While any single conclusion now would be premature, it seems possible that the explanation has to do with the nature of Japanese society whose feudal structure, lasting almost intact until a century ago, created much cohesiveness of social grouping in classes and occupations between village and throne. The firm social structure and strong systems of inter-communication characterizing these groups provided unusually satisfying social vehicles for its members to return to as they also provided good organizational frameworks for modern industrial progress. It would be interesting to determine whether similar factors operate, under quite different developmental conditions, in the case of Afghanistan, which also seems to have especially low rates of non-return, or whether the explanation in this case is simply related to the continued presence of prestige government job opportunity. In any case, it is clear that human beings are not economic automatons and their decisions to break with their societies may in part relate to the nature of these societies, particularly to their cohesiveness. Such factors may long have played some role in the variety present in the migration experiences of nations.

In addition, while this report could not examine immigration into all developed countries, it appears that professional immigration is generally less, even on a relative basis, to smaller developed countries such as Holland or the Scandinavian nations, than to larger ones even though standards of living in some smaller developed countries are equally high if not higher than those of their larger neighbours and their soical welfare systems might offer more comprehensive protection to shield the newcomer. Professional immigration to the Soviet Union seems likewise to be very little heard of despite its tremendous developed economy. There is little professional migration, likewise, to other socialist countries despite the need of some for professional manpower. Here, too, further investigation is needed to determine the causes, surface and underlying, of these discre-

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1/ Ho ever, statistics attributed to the Japanese Ministry of Education indicate that 4,453 Japanese scholars and experts quit their university posts from 1959-63 to go abroad for periods of over six months. ("Brain Drain, An Arab View"), Elias Zein, Mid East, January-February, 1969, p. 4.

pancies. Such investigation should be conducted to shed light on the problems of manpower utilization by the states concerned and of the effect on development of policies emphasizing professional self-sufficiency.

D. Conclusion

There is evidence that outflow of professionals is spreading among developing countries. Yet the problem is not yet convincingly global. There are nearly one hundred developing countries; they differ in degree of development, length of independent life, contribution to the movement of population of concern here, and in their knowledge or even awareness of the phenomenon concerned and their means of influencing it. By reason of these differences alone, conclusions concerning the impact of the movement of skills on their present condition or future prospects from global description of the movement can be attempted at best, only with many reservations. More than improved statistics we need better knowledge of the current requirements which are specifically affected by the outflow taking place.

All that can be said is that

(1) A migration into a few of the larger developed countries of professionals from many developing countries exists in large numbers.

(2) This migration would exist on far less spectacular levels were it not for the presence of China, India, the Philippines, Korea and Iran and a few other countries in all of which apparently serious dislocations in educational structure relative to economic needs have appeared, through the effect of emigration on their economic and social development is not easy to generalize.[1/]

(3) There are both developing countries with less than average professional emigration rates, developed countries with little professional immigration and many developing countries which either have no problem or no knowledge of it.

1/ A survey by the Institute of Applied Manpower Research, New Delhi, recently showed that 15.6% of the graduates of the ITTs, the best engineering institutions in the country, are abroad of whom 84.6% passed in the first division. Thus there may be a quality brain drain even where a quantitative one is arguable. (Hindustan Times, 22 January 1968).

(4) The problem appears to be connected with a spreading world communication system, with rising expectations and with educational systems responsive more to popular demands than to immediate needs. These phenomena seem likely to continue to spread. As part of an increasingly widespread educational revolution, the outflow of professionals from developing countries might become within the next twenty years the general phenomenon which it has not yet become today.[1/]

1/ For somewhat similar views, see EWA, op. cit., p. 54 and passim.

V. EDUCATION AND MIGRATION

A. Introduction

Education is intertwined with the migration of professionals in one of the most profound, complex and controversial of relationships in the field of development. In essence, the questions of education's relationship to migration and to development remain unresolved. They resist solution, perhaps permanently so.

The dilemma lies in the fact that, while education is regarded as a prime, perhaps the chief, requisite for development, it is almost equally obvious that education as presently conducted has generally been an exceedingly inefficient instrument for developmental purpose when not even a hindrance thereto.[1/] One of the important functions of brain drain and its study is as a measure of the inefficiency and irrelevance for development of much education as presently conducted in both developing and developed countries.

There is clearly an important philosophical issue here. Some would deny that education should be developmental; many would feel that it has other obligations and priorities beside the developmental; some would feel that its function for developing individual talent should claim priority over its value for the society as a whole. Most persons, especially in developing countries who are concerned with development probably stress education's primary developmental and social value. Other values, however, clearly linger on in present systems, contributing to the intellectual unemployment, irrelevance and dissatisfaction which migration relieves.[2/]

Fears have long been expressed that, rather than serving development, education as presently conducted, serves as an avenue of escape from development. The truth seems to be that it increasingly does both. For fundamental to the picture of intellectual migration is the tremendous growth of higher education throughout

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1/ The recent study by the Economic Commission for Latin America entitled Education, human resources and development in Latin America, (E/CN.12/800, May 1968) is forthright in its attribution of the failure of education to response to the needs of development and to provide critical stimulus if not leadership vis-à-vis the stratification of society which it preserves and strengthens in the face of professed liberal-democratic principles.

2/ Students actively and primarily engaged in the educational process are, of course, not considered migrants. A student from a developing country becomes a migrant under the definitions here used when he is fully employed in a developed country following the end of his education and, generally, when he has taken some formal action to change his status - acquisition of permanent residence status in the United States, work permits in the United Kingdom, etc.

the developed and through much of the developing world: in many developing countries, university output has increased 5-15% per year and stocks of university graduates at rates of around 10% per year.

Education may contribute to migration in the following major respects:

(1) By educating far too many people for local demand.

(2) By educating people in the wrong subjects or in the wrong proportions to accord with local demand.

(3) By educating people in systems which accord better with the professional requirements of developed countries than they do with the developmental requirements of developing countries.

(4) By encouraging education abroad on a large with little supervision or communication, either because the home country lacks a sufficient university system to fit its secondary system, because of a colonial attitude toward the prestige of foreign institutions; or for other reasons connected with the expectational, the attitudinal, the political or the communication systems of developing countries.

Internal systems of education contribute as much, perhaps more, to intellectual migration than external systems: indeed, the tendencies of one are frequently continued or strengthened by the tendencies of the other. Internal systems are too numerous to be surveyed here; observations about their role will be made in the sections dealing with causes of migration.[1/] Education abroad is also pertinent enough to warrant special attention. Pertinent because the statistics of migration generated from it are persuasive to most, disturbing to many. It is also pertinent because the education it gives is not limited to books but extends importantly to a way of life different from the foreign student's own. It is an education in which his profession becomes intermingled with his life style, thus affecting his capacity to pursue his profession in a place where the life style he connects with it differs radically from his environmental training abroad.[2/]

1/ Table XIV illustrates the extremely uneven distribution of education both in size relative to population and in the subjects covered. Such unevenness contributes both to education abroad and to emigration.

2/ See Arye Perlberg and Gil Shaal, "An inter-disciplinary approach to manpower planning and development", International Labour Review, Vol. 99, No. 4, April 1969, pp. 363-380. This article, though dealing with other things, suggested such an approach.

In any case, education appears to be one of the most fruitful theatres for action of a kind both positive and helpful for the problem of development and of intellectual migration.[1]

B. Growth of Education Abroad

The growth of education of students in countries other than their own since World War II has been at least as precipitous as the growth of many national educational systems. In 1938-39 there were in all colleges and universities in the United States 6,004 foreign students of whom approximately 3,195 were from developing countries and 195 were studying under exchange programmes. Such totals had been reasonably stable for many years, varying generally between 5,500 and 9,500 since the early 1920's.

Immediately after the end of World War II, the numbers of foreign students studying in developed countries started multiplying annually. By 1967, the Institute of International Education's census reported 100,262 foreign students enrolled in United States institutions of higher learning for 1966-67 of whom some 60,000 were receiving total or partial support mostly involving exchange programmes of one sort or another. By the 1969 census, the number of foreign students has risen to 121,362.[2] This census does not distinguish between students from developing and developed countries but addition of the statistics given for each country make it clear that, in each recent year, approximately 70% or 70,000 for 1967 and over 85,000 in 1969 were from developing countries. In 1962-63, 37,000 new foreign students, mostly from developing countries entered institutions in the United States.

1/ Education, as used in this chapter deals mostly with students regularly enrolled in institutions of higher learning. Except where noted, it does not refer to training by which is meant instruction limited to the needs of a particular job and usually shorter in duration. Those whose training for a particular job is obtained through regular enrollment at institutions of higher learning would, however, fall within education statistics. Defined as above, 'training' plays a markedly less important role as a prelude to migration than does education. An exception is the training of nurses, especially in the United Kingdom, exceptionally large numbers of whom have in recent years remained abroad in employment following the end of training.

2/ Open Doors, 1967 and 1969, Institute of International Education, New York. IIE's annual reports, while understating the totals somewhat since not all colleges are reached or reached equally well, are basic sources in this field. In addition to 121,362 students, some 12,000 visiting foreign teachers, researchers and scholars were in the United States in 1969.

Percentagewise the increase in foreign students has been even more startling for Britain. Before 1939, the British Council records hardly more than 500-600 foreign students studying in Britain. This number doubled by 1945 and quadrupled by 1946. In 1967-68, the total declined slightly to 69,831.[1/] In 1967 it had climbed to 73,000 of whom 54,000 came from developing countries. Between the 1959-60 and the 1962-63 academic years, students from new Commonwealth countries in Britain increased 40.6%; the following year, the United Kingdom received 15,000 new students from East and West Africa alone. France had 30,259 foreign students enrolled in university faculties as of 31 March 1968 and had nearly two hundred more the previous year. In a statistical survey of 24,410 of the latter, over 72% came from developing countries. On this basis, there might be some 21,800 students from developing countries in France. Included were especially large numbers from the following countries with non-returning student problems: Tunisia, 2,307; Morocco, 1,732; Vietnam, 1,660; Algeria, 990; Lebanon, 882; Iran, 752; Cameroon, 643; and Greece, 553.[2/]

C. The Orientation of Education Abroad

Education abroad for students of developing countries has increased hugely. So also has the benefit derived from it. It is estimated that the number of foreign students who have been returning to their own countries has been increasing at a

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1/ "Overseas Students in Britain, 1967-69", Statistical Supplement, London, December 1968, p. 3.

2/ "Recensement des effectifs Universitaires au 30 Juin 1967 et analyse demographique des étudiants pour l'année 1966-67", pp. 36-42; "Effectifs Universitaires au 31 mars 1968", 1 bis, Ministère de l'Education Nationale, Service central des statistiques et de la conjoncture, Paris, France. In view of the fact that French student statistics have been less widely available than those of the United States and the United Kingdom, statistical tables for foreign students in France are attached. Though the population of foreign students in France has grown from 16,127 in 1955-56 to 30,259 in 1967-68, it has grown more slowly both than foreign students population in the United Kingdom and the United States and it has grown little more than half as fast as the growth of French students at the university level who increased from 136,119 in 1955-56 to 402,773 in 1966-67. In 1955-56, foreign students were 11.8% of French students in universities; in 1966-67, they were under 6.8%. Since OECD countries contributed 66,623 experts to Africa (1963) Africa would remain a heavy net importer of skills even if brain drain among Africa's students in France is extremely serious. (Angus Maddison, Foreign Skills and Technical Assistance in Economic Development, OECD, Paris, 1965, pp. 20-25, 51-57.

compound rate of 20% per year.[1] This includes all countries. Since returns to developed countries are far higher, returns to developing countries are lower than this. Yet undoubtedly, such education is one of the present world's greatest forces for the spread of understanding and learning.

There is not yet much agreement on exactly what development is, still less on what education for development should be. It is, thus, understandable that higher education still gropes to fit itself for such purpose. At best, education abroad must fit many requirements, some conflicting. The educational systems of developed countries are keyed to their own further development, not to that of LDCs. Education abroad must supplement, especially in highly specialized areas, higher education which it would not be economic for small nations to provide for themselves.[2] Technical education also will not suffice by itself; leadership needs probably require continuance of policies of providing some students with broad, general education. Some feel that, in some circumstances, a stock of those qualified in general science should be built up even when it cannot be immediately used.[3] Finally, private initiative should not be discouraged and individual freedom must be respected. Each of these varying demands brings its own pressures, sometimes toward, sometimes away from development.

The result of these quandaries and of the push and pull factors involved is that students remaining permanently or semi-permanently abroad following the end of their studies have also been increasing at a compound rate of 20% per annum and, in the case of LDC students, at a rate still higher.

The origin of this large 'leakage', as many call it, lies less often in the smaller, officially-sponsored programmes, more usually in so-called 'private' exchange. Education abroad is tapping a very large and growing body of students who see their futures in terms of a primarily individual mobility whose upper ambitions are concerned with the professional systems of developed economies, who

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1/ George B. Baldwin, "Brain Drain of Overflow?", Foreign Affairs, January 1970, p. 362.

2/ Luxembourg, for example, despite one of the highest per capita incomes in the world and many needs for technical education has never had a university of its own but has had a policy of relying on the higher educational facilities of neighboring countries.

3/ Unfortunately, techniques of storage of maintaining reservoirs of talent outside developing countries which can then be used for development where and when needed have yet to be successfully worked out: skills decay and people, living long abroad, either become alienated or acquire obligations they cannot quickly abandon.

are answering in the negative the question "Do you intend to return to your country?" and who, statistically are not so returning. The statistics for this phenomenon demonstrate considerable contrast between private intention and public purpose in the education of students abroad and will be of interest to those who believe that the development of countries in early stages of that process calls for sacrifice and is unlikely to be accomplished without special initiatives.[1/] The Institute of International Education has recently commented that "student exchange is a fairly significant avenue of immigration."[2/]

The statistical growth of foreign students from developing countries implies much about the nature of the problem. This growth and the rates at which it has proceeded have been so rapid as to cast prima facie doubt as to the proportion of the students from developing countries whose education abroad is expected - even within the above tolerance - to serve development. While the usefulness - indeed the necessity - of numbers of persons of broad general education needed for leadership roles is acknowledged, service to development ordinarily demands careful selection either by private committees with knowledge of public needs or by government ones well-directed to such purposes, careful programming of education overseas to fit the student either for general or specific services and the best possible preliminary manpower planning so that the trained student can be fittingly employed on his return. Such processes are time-consuming and, given present world facilities in both developing and developed countries cannot cope with rates of expansion similar to those above.[3/]

1/ The Institute of International Education (IIE) (US), the largest organization in the world which is concerned with foreign students has "traditionally defined a foreign student as a person who comes to the United States expressly for an education and states his intention of returning home afterwards." Until 1966, few students expressed intention in IIE questionnaires of staying in the United States. In 1965, however, the number rose to 6,000, in 1966 to 11,000 and in 1967, 13,000 (13%). (Open Doors 1966, 1967.) In 1969, the number rose to 18,270 or 23% of those students who answered the question (Open Doors, 1969). Seventy-two percent or 69,109 said they did not intend to remain in the United States. The cited question is taken from IIE questionnaires.

2/ Open Doors, 1969. Among other expressions of concern, see UNESCO, "Manpower Aspects of Educational Planning", op. cit. and "The U.N. and Social Development", OPI, November 1966.

3/ An instance in which high rates of education, unaccompanied by high rates of capital formation may be dysfunctional for development has been documented for the State of Kerala by Koilpillai J. Charles and P.G.K. Panikar, "Kerala: A Cautionary Tale", Development Digest, Vol. VI, No. 1, January 1968.

It is, in fact, evident that careful procedures have not, on any over-all basis, been pursued. Small proportions only of the above students are sponsored by the governments of either the country of origin or of the training country. Less than 5% of students from developing countries (out of about 70,000 present) were publicly-supported by the United States in 1966,[1] and only 5,774 or 5.8% of total students were so sponsored in 1967.[2] Even among the almost two-thirds of the foreign undergraduates and the one-third of foreign graduate students in United States institutions listed as 'self-supporting', direct student costs are estimated at only 37% of total undergraduate education costs and 28% of total graduate education costs.[3] Other governments sponsored even fewer, only 4,722 or 7.7% of the U.S. totals.[4] Of the 15,866 foreign students at universities in the United Kingdom, 8,022 were known to hold an award, fellowship, scholarship or grant of some kind in 1967-68.[5] Only 4,115 students from developing Commonwealth countries were publicly sponsored by the United Kingdom. The governments of several major sending countries such as the Republics of China and Korea support almost no students abroad and most others support only very minor fractions of their

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1/ OECD, 1967 Review.

2/ Open Doors, 1967, p. 7. About 3,500 others had a mixture of official and private support.

3/ Herb G. Grubel and Anthony D. Scott, "The Cost of U.S. College Student Exchange Programs", The Journal of Human Resources, Vol. 1 (Fall 1966) p. 87. Also Alan E. Bayer, op. cit., p. 10.

4/ Within the prominent Indian student group, a separate survey found results consistent with these for the financial support Indian students receive within the United States. (Keshav Dev Sharma, "Indian Students in the United States", International Educational and Cultural Exchange, Spring, 1969, p. 48).

5/ "Overseas Students in Britain 1967-68", op. cit., pp. 3-4. In the case of France, scholarship holders appear to constitute a larger proportion - in recent Universite de Toulouse study, 58% of foreign students had scholarships, mostly official and 74% of all African students located in Toulouse. In a sample survey among these foreign students, 27% said they felt that their education programmes were not adapted to their needs. Marie-Claire Viguier, "La Vie Sociale des Etudiants Etrangers a Toulouse", Thèse pour le Doctorat de Troisième Cycle de sociologie presenté a la Faculté des Lettres et Sciences Humaines de l'Universite de Toulouse, 1966, pp. 53, 66, 88.

nationals studying abroad.[1/] A few students are supported by foundations or agencies which select and programme their scholarship recipients carefully for developmental purposes. The great majority - many tens of thousands - of foreign students from developing countries, however, make their own educational arrangements abroad, including receiving help from foreign colleges or universities whose aid is channelled toward individual ability rather than developmental purpose and who know little of employment opportunities in the student's home

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1/ Of Chinese students in the U.S., 1.1% receive total financial support from the U.S. Government and only 1.3% receive total support from the Republic of China. For the Republic of Korea, the corresponding figures are 3.8% and 1.5%; for Japan, 5.3% and 1.6%; for India, 3.9% and 1.4%. (Open Doors, p. 18). The Government of the Republic of China reports that 90% of its students abroad are supported by "personal resources within our country" and that the return rate from all its students abroad is 5%. (Answer to UNITAR questionnaire). The return from officially-sponsored or Foundation-sponsored programmes are, in general, high and, though statistics on their utilization are less certain, most appear to be working in the fields in which they were trained. Thus, so far as is known, only very minor percentages of fellows under programmes sponsored by the United Nations and its agencies - in the area of 1-3% - have failed to return home and percentages almost as small characterize reported non-utilization in the field of training. The International Atomic Energy Agency has reported that 78% of its 1,488 Agency Fellows answered a questionnaire on return and utilization as of 30 June 1965, that 95% of these replied that they had returned home and 94% that their present work was related to their fellowship training. (IAEA, General Conference, 10th regular session, GC(X) INF/87, 29 July 1966, p. 28). It observed, however, that there was some possibility that non-return might have been one factor bearing on the fact that 22% did not reply. The U.S. Department of State reported in 1967 that less than 1% of government-sponsored Exchange Visitors had received waivers from their requirement of return for two years and, while the doubling of the number of J-visa waivers since that time may have raised this percentage and the question of re-immigration has not been studied, real non-return is undoubtedly small. (U.S. Department of State, "Some Facts and Figures on the Migration of Talent and Skills", March 1967, p. 4). The United Kingdom reports that, "in the last five years, only 61 (0.5%) of the 12,000 students who have come to Britain under the Ministry of Overseas Development programmes of technical assistance have failed to return home", only 5 out of 1,000 Bursars trained, only 0.5% of British Council trainees and 7.5% (57 out of 766) of Commonwealth Scholarship holders. Paper prepared by the Ministry of Labour, January 1968, for the Ditchley Conference on the International Developing Countries pp. 4-6. Clearly, such programmes are carefully planned to fill known needs, most holders are already employed and few study abroad for very extended periods. It is not known how many of such officially-sponsored persons need to have been selected in the first place if private students trained in these areas had been located, returned and employed.

country.[1] In the United States alone, 50,000-70,000 foreign private students select their courses individually and with what both educators, administrators and embassy officials consider to be largely inadequate counselling either in the country of origin or in that of training. Thousands of students from developing countries come from societies marked in recent times by great social mobility as education has broken down more ancient barriers of caste, tribe, class or economic deprivation. Education abroad of students from developing countries thus seems only in part to have a serious concern for development; it appears to be equally or more concerned with the quite different and more private objective of preparing the individual for a better job or career regardless of where that better job or career are located.[2]

If the above education is to be regarded as a resource for development, the above situation raises serious questions as to the purposefulness with which this resource has been committed.

Despite these prima facie doubts, no comprehensive attempt to co-ordinate officially-sponsored programmes with far larger private study abroad with a view toward maximum developmental effect is traceable in any major training country; in general, where done in developing countries at all, it is confined to ones with rather small totals of students abroad. Certain smaller, newly-emerging countries, especially in Africa, are able to effect some control through selection processes applying to both the public and private areas and do inform departing students of national needs. Most nations, including most of those from which very numerous students go abroad, have evolved few overall strategies for the use of any except government-supported students after graduation. Most countries, at least until very recently, have taken few steps to review the academic programmes of their private departing students with an eye to the relevance of these programmes for national needs or to acquaint or counsel them with priorities in national development. (Recommendation IX.B.1.c below).

Considerable philosophical argument arises in this area where the legitimate aims of the private individual may conflict with the priorities of his nation and

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1/ Twenty-two thousand foreign students receive such private academic help in the United States alone (Open Doors, 1967, p. 6). Where as, for example, with Northwestern University's graduate programmes in Business Administration, consideration of potential return opportunities was a factor in initial admission policy, non-return rates were almost nil while they were 22.8% for such programmes generally. ("Study Project on the Migration of Scientists and Physicians: Summary of Fourth Meeting of the Study Group, Adlai Stevenson Institute, 20 June 1968).

2/ See next page.

hence with the possibilities of choice by his fellow citizens. Different and conflicting views exist as to whether the use of private funds entitles students from developing countries to treatment quite different from that given those publicly financed. Private people make private choices, but these choices, made now in growing numbers and in fields which science has armed with great strength, have marked public consequence. The effect is especially direct in health. If private as well as public concern cannot be engaged in the development process, development will suffer. From the viewpoint of his potential contributions to development, the private student can be as useful as the publicly-sponsored one; indeed, his training is, on average, longer, and his background may facilitate effective public service. The contributions to development of such private students studying abroad as Mahatma Gandhi and Prime Minister Nehru - among many others - speak eloquently for the public gain achievable from private study and return.

That education abroad, as presently conducted, is producing a high incidence of education little applicable to the home needs of students from developing countries is, however, coming to the attention of educational authorities in both developing and developed nations. One major South American nation whose critical needs were stated in an important survey of the subject to be for veterinarians and agronomists had, in a recent year, 221 graduate students in the United States, many of them sponsored by the U.S. Government, only one of whom was in veterinary medicine and only six in agronomy.[1/] It is perhaps no accident that expressions of deep concern about brain drain have flowed from responsible quarters in this same country. Many further such instances could be cited within educational circles of most major training countries. Despite the presence of many carefully supervised governmentally or foundation-supported exchange programmes and some instances of concerted national effort, the education within developed countries of students from developing countries is not as a whole carefully related to developmental needs.

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For striking recent evidence, based on questionnaire responses, that the motivation of such students is primarily a personal one, see Charles Susskind and Lynn Scholl, Exporting Technical Education, I.I.E. New York, July 1968, pp. 38-41.

1/ Hearing on Brain Drain before the Subcommittee of the Committee on Government Operations, U.S. House of Representatives, 23 January 1968, p. 18.

D. Study Abroad and Talent Migration

Lack of careful co-ordination between development needs and student training abroad partly explains why education of these students in developed countries has turned into a broad avenue for permanent migration or for the pursuing of professional careers outside development.[1] Statistically, 3,772 or 48% of the large immigration of 7,913 scientists, engineers and physicians into the United States from developing countries in fiscal year 1967 were professional immigrants who originally entered the United States as students with the declared intention of obtaining education or training and then returning.[2] Ninety percent of these entered on student visas. Most of the remainder were from among 1,051 persons "possessing outstanding qualifications ... including a clearly demonstrated capacity to make original and significant contributions" who were given waivers of the requirements of the U.S. exchange visitor programme in 1967. In 1965, such waivers had been only 184.[3] The percentage of adjustment for developed countries in the same year was only 3.8%. The overall non-return rate among foreign

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1/ Even when such co-ordination takes place, however, there can still be migration. One-third or more of a group of thirty Koreans in the electrical or mechanical engineering, chemical, health and other fields, selected in 1949, failed to return to jobs they held in these fields in Korea.

2/ House Report, 28 March 1968, p. 7. The figures of adjustors have remained high in 1968 and 1969.

3/ "Scientific Brain Drain from Developing Countries", House Report No. 12.5, 28 March 1968. The average ratio of student adjustment to total scientific immigration was 89% for the Republic of China, 80% for Korea, 78% for India, 71 % for Iran and over 55% for Israel. (Also U.S. Immigration Service worksheets.) The quotation is from the policy statement on waivers of the U.S. Department of Health, Education and Welfare. The J-visa requirement in question is that the student, following the end of his educational programme (normally not over five years) should depart for two years prior to re-applying for another status. In the case of a few countries, more students adjusted to permanent status than entered the United States in the same year; in a few countries, the proportion of adjustments was exceptionally heavy. The following figures show the most striking of the proportions:

	Students starting their study in the U.S. - 1966-67	Adjustments to permanent residence from temporary educational or training status - 1966-67
Republic of China	1,721	2,751
(plus China Unspecified)	284	
Republic of Korea	854	931

Continued

students in the U.S. is estimated at 15-25%.[1] One study which actually asked the question of return or non-return of a reasonable sample found that 24.5% of those answering wished to stay in the U.S.[2] In the academic year 1968-69, 18,270 foreign students openly declared their intention of remaining in the United States,

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Continued from preceding page

	Students starting their study in the U.S. - 1966-67	Adjustments to permanent residence from temporary educational or training status - 1966-67
Iraq	141	151
India	2,208	1,926
Philippines	852	695
Iran	753	465
Israel	395	273

Since those adjusting status in fiscal year 1967 are not the same persons as those entering and are drawn from entrants of many previous years such figures can only be cited in the context of the large and steadily-rising adjustments of such students which, in fact, have taken place through the years. (Israel is a more recent phenomenon.) It is, in fact, somewhat more meaningful to take adjustments and compare them with entrants four years earlier, four years being the median and mean period for adjustment of status from that of student to that of permanent resident. On the basis of such comparisons, Ritterband concludes, in his special study of the subject, that the rate of non-return for Israel F visa recipients is probably 25% ± 5%. Paul Ritterband, "The Non-returning Foreign Student: The Israeli Case", Columbia University, 1969, pp. 195-197. The above cases are also exceptional. Far more typical would be such a case as Thailand which has 62 adjustments in 1967 in all educational categories while having 733 students who began studies in that year, Peru with, respectively 14 and 332 or Ghana, 19 and 117. Many countries had better proportions of return even than these. On balance, however, enough evidence exists to demonstrate that non-return among students of developing countries studying in developed countries can, fairly easily, result in a loss to the developing country of all or part of the professional careers of significant proportions of those studying abroad and, given more extreme imbalance between supply and demand of home, can mount until it eliminates virtually the entire fruit of study abroad. Such losses, furthermore, constitute a problem not always recognized by the developing countries who have not always been aware of these professional assets abroad before they find them suddenly withdrawn.

1/ A recent competent study believes that this non-return rate (counting those who re-enter the United States) will be still higher: "It is estimated that between one-third and one-half of all foreign students currently being trained in the U.S. will eventually enter the U.S. labor force." (Alan E. Bayer, op.cit., p. 15.) This could, of course, become less if current cuts in U.S. research grants continue.

2/ Richard T. Morris, "National Status in Foreign Student Adjustment". The Two Way Mirror, Minneapolis, University of Minnesota Press, 1960.

this figure having constantly risen in recent years.[1] That, among these, the proportion of intended non-returnees among students from developing countries is far higher is indicated by the fact that it was 30% for Asian respondents (who constitute one-third of all foreign students in the United States.) In the year ending 30 June 1966, U.S. colleges and universities graduates about 6,000 students from developing countries in science, engineering and medicine. In the same year, 4,390 scientists, engineers and physicians migrated to the U.S. giving a net gain to developing countries of only three in ten. In fiscal year 1967, emigrants in these fields from developing countries rose to 7,913. Both graduates and non-returnees have continued since to rise rapidly.[2]

For Africa, the situation is also becoming more serious - though numbers are small. During 1964-65, 85 Nigerians graduated under the African Scholarship Programme sponsored by the African-American Institute. Although the training agreement required that they should then return home, only 18 did so. This return rate of 20% was, however, double that of the previous year. Comparable figures are not available in most other countries but the phenomenon seems not unshared. From some dozens in 1946 and some hundreds in 1948, the number of black students from francophone Africa and French possessions elsewhere reached over 15,000 by 1964.[3] One French survey of 1965 found 12,000 former sub-Saharan African students remaining in France with their families compared to 11,000 students and lycéens still pursuing their studies. Some of these have been described in French statistics as "étudiants à perpetuité". Such fragmentary information does not give rise to expectations of a much larger proportion of return from other major training countries.[4] The Australian Minister for Immigration referred in 1966 to estimates

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1/ Open Doors, Institute of International Education, New York, 1967, p. 1. (See also p. 43 n. 2).

2/ House Reports of July 1967 and 23 January 1968.

3/ Louis-Paul Aujoulat "Invasion noire on présence africaine?", Hommes et Migrations, ESNA, Paris, numéro special, p. 111.

4/ Perspectives 944, September 1965. Such former students are, of course, the products of entry in many prior years. According to another survey conducted in connection with a doctoral dissertation, 50% of students from the Maghreb studying at the faculté des sciences in Paris wished to work in France at the conclusion of their studies, 70% of Vietnamese and 15% of other Africans. The percentages of these undecided were 0% for North Africans, 52% for other Africans and 25% for Vietnamese.

that 20% of 12,000 foreign students in Australia wished to remain there.[1] In Canada, the problem is similar. Numbers of student from developing countries are known to stay in Germany as medical doctors. Israel which has made probably more concerted efforts to relate training closely to development than any other training country has been rewarded with apparently greater return percentages; even it has had to acknowledge problems of the migration to Europe and the United States of those from developing countries whom it has trained.

E. The Doctorate and Migration

In general, the higher the level of education reached in the developed country, the greater the ease of obtaining employment within a complex economic system and the higher the rate of permanent migration. In addition, the proportion of foreign students receiving doctoral degrees or their equivalent is higher every year; indeed, it is substantially higher, frequently, than the doctoral percentage among indigenous students of developed countries. Thus, 45% of all foreign students in the United States in 1969 are graduate students and 63% of all students from the F Far East are.[2] One-seventh of all persons receiving U.S. doctorates are foreign citizens and, for 1960-66, citizens of developing countries constituted 65% of this group compared with about 49% for the period 1920-59. Such graduate students sometimes comprise major components of the intellectual resources of whole areas: there are 25,000 Arab graduate students in universities in the United States, Europe and the USSR. It is doubtful whether such a number of graduate school products could be found within all Middle Eastern countries.[3] The phenomenon has now spread to a comparatively new category - post-doctoral students, half of the 16,000 of whom now studying in the United States are reported to be foreign.[4] The degrees obtained by these advanced students are particularly concerntrated in the physical sciences and engineering (42%), biological sciences (25%) and social sciences (15%) which contain much pertinence for development. The percentage of doctorate recipients of foreign citizenship who intend to remain in the United

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1/ Hon. Hubert Oppenheim, "Australia's Immigration Policy", 28 March 1966, p. 18. The 12,000 students are later (p. 19) identified as Asian students, 11,000 of whom are private.

2/ Open Doors, 1969, p. 11.

3/ A.B. Zahlan, Mid East, op. cit.

4/ The Invisible University: Post-doctoral Education in the United States, National Research Council, Office of Scientific Research, Washington, D.C. 1969.

States for their first post-doctoral employment has risen steadily in recent years and, for 1964-66, is 51%. An intensive investigation with a sub-group has revealed that 55% intended to remain in the United States - two to three times the percentage for foreign students as a whole.[1] Korea has disclosed that only 64 of 325 Koreans who obtained doctorates in the United States have returned to Korea.[2] Another competent source claims that "only about 6% of the Koreans enrolled over a fourteen-year period" in U.S. graduate schools returned to Korea.[3] A study by the Institute of International Affairs has found that a non-return rate of 49% for foreign students who have earned masters' degree in nuclear engineering rose to 73% when students in this field obtained doctorates.[4] A recent Egyptian government report states that 70% of the Egyptian specialists who migrated were studying for their doctor's degree, only 17.5% for their master's.[5] In other cases, often in France, Germany or England, it has been reported that students from developing countries take 9-15 years to complete courses requiring at most 5-6 years, the excess years being a dead loss to their countries.[6] In the key fields of science, engineering and medicine, the longer a person from a developing country remains within a foreign educational system and the more complex the knowledge he acquires there, the more difficult tends to become the application of this knowledge at home, and the greater his value abroad.[7]

Despite possible needs to "store" certain advanced skills in the basic sciences, such considerations raise serious questions as to the level of graduate education applicable, especially in some technical fields, to development needs and the commitments to which such education appears to lead.

1/ National Academy of Sciences, "Doctorate Recipients from United States Universities 1958-66", (Washington, D.C.: National Academy of Sciences Publication 1489, 1967).

2/ Answer to UNITAR questionnaire, 1968.

3/ Lydia Arlene Sitler, "An Investigation of the Need for Increased Support and Improvement of Indigenous Graduate Education in Korea", unpublished doctoral dissertation, School of Education, Indiana University, July 1968, p. 315.

4/ House Reports, 23 January and 28 March 1968.

5/ Cited UNESCO SC/WS/7, p. 15.

6/ Report on a Survey of Africans Studying and Training Abroad, Mordecai M. Levy, UNECA, 1967.

7/ The above appears to apply more to scientific and technical personnel. Paul Ritterband, "The Non-returning Foreign Student: The Israeli Case", Columbia

Continued

F. Internal Educational Factors

Lack of educational relevance for development neither begins nor ends in the foreign developed country, it is only continued there. The student, in almost all cases, comes from an educational system at home modelled not only on that of the former developed country but all too frequently on an outmoded nineteenth century version thereof. In most cases, this system is not only irrelevant for his own development, it was even largely irrelevant for the development of the developed country from which it was imported, all too often being concerned with making gentlemen and avoiding the manufacture of technicians. The widely influential British educational system, for example, did not and, many British educators feel, perhaps still does not fully encourage the kind of technical and scientific training in the amounts needed by the British economy. Britain had to place significant reliance on German chemists in the 19th century to develop the British chemical industry. Until the development of land grant colleges a century ago, much the same might have been said of the system in the United States which filled rural churches with educated clergy and populated cities with lawyers while America had to import chemists and engineers from Germany and France. This initial dysfunctionality for development is greatly increased when such systems are deposited in totally different climates, developmental conditions and social settings. If education is to be employed for development, it has been remarked that "only if schooling increases future productivity and earnings do the contributions of schooling become a source of economic growth."1/

A striking aspect of dysfunctionality lies in the vastly overblown proportion of students in many developing countries majoring in fields little related to development with tiny percentages specializing in agriculture, medical, natural or social sciences or engineering. A recent study has graphically shown such disproportionate distributions by field of study: Ghana, Sierra Leone, Tunisia have 93-96% of their university graduates in arts, law, etc., Mexico has 76%, and

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University, pp. 76-78 shows strikingly that the earlier the time of arrival the less the likelihood of return. Even more striking is the correlation with expected time of remaining in the United States - 90% of those expecting to remain less than one year ultimately returned but none did who expected to remain seven years or more.

1/ Theodore W. Schultz, The Economic Value of Education, Columbia University Press, New York, 1963, p. 39.

Ceylon 74% with many others in poor balance.[1] In Table XIV, UNESCO shows inordinately high concentration in humanities for Dahomey, Ghana, Lesotho, Liberia, Malawi, Sierra Leone, Togo, British Honduras, Costa Rica, Surinam, Cyprus, India, Jordan, Malaysia, Malta, Scotland, and Jamaica.

Such educational systems have long outlasted colonialism and have demonstrated marvelous resistance to local needs. Of the 600,000 professionals at "university level" in Latin America, for example, only 3% were employed in the agricultural field which employed 46% of the total labour force and only 25% were employed in production; only 350,000 were in the scientific, engineering, medical or allied fields.[2] Many of even those trained in medical or technical fields go into politics. In India, according to the National Sample Survey of 1960-61, there were 1,192,000 professionals on or above graduate level of whom 90% had diplomas in law, arts, and commerce, 4.9% in engineering and technology, 3.4% in medicine, 1.2% in agriculture and 1.7% in other technical subjects.[3] A Nigerian authority emphasizes "a noticeable occupational imbalance in the manpower out-turn. For example the (Nigerian) Register indicates a general bias towards the arts and humanities and the social sciences (63%), whereas national requirements demand not more than 40% in these fields."[4] From education thus disoriented to development at home, the student enters a developed country's educational system also disoriented to development since such system naturally serves the needs of the advanced economy in which it is located. Thus, students from tropical developing countries study the agriculture and medicine of temperate developed countries. Even when students then enter the sciences and engineering, as many do, it is apparent that they enter in part with the motivation of obtaining jobs in developed countries and "a startingly disproportionate number" of them work on general basic problems of interest to the entire community of scholars rather than on applied

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1/ Philip H. Coombs, The World Educational Crisis, Oxford University Press, New York, 1968, p. 78. Figures differ somewhat but it is clear that many developing countries, especially small ones, either do not choose to or, more probably, cannot afford to have indigenous educational systems in engineering and the sciences and rely on foreign nations therefore.

2/ "In Argentina, education has not been integrated into economic development..." (Enrique Oteiza cited in UNESCO SC/WS/7, p. 24).

3/ Cf. E.K. Ramaswami, "Problem of Unemployed Engineers", The Hindu Weekly Review, 19 February 1968, "The education system is so badly oriented that there is no correlation to need."

4/ T.M. Yesufu, "Loss of Trained Personnel by Migration from Nigeria", unpublished paper of the Dean of Social Studies, Lagos University, November 1966, p. 5.

problems whose solution is quite specific to the home country.[1] It is the latter applied problems whose solution is crucial for alleviating development gaps.[2]

Far graver numerically for wastage of educational potential for development are the low enrolment and high drop-out rates still characteristic, despite much recent improvement, of the educational systems of many developing areas, especially Africa and Latin America. Of all Latin American students, only about 2% enter university and perhaps 1% complete it. Forty-one percent of Latin American primary enrolment in 1957 was concentrated in the first grade. In countless cases, the higher educational system is completely inadequate to care for the needs, much less the desires for such education on the part of its citizens; Iran, Greece and Jamaica are only random examples; in the latter, the Minister of Finance and Planning has noted that there are 5,700 Jamaican college and university students overseas, a much larger number than study at the University of the West Indies, the only University located in Jamaica. The same is true of Trinidad and Tobago. An especially common condition is lack of graduate facilities to handle those in colleges in developing countries. As recently as 1965, no full-fledged graduate school existed throughout the entire Middle East with 60 million people while in the United States there is one for every million inhabitants. In most other developing regions, severe lacks of this ilk can be cited.[3] The lack of educated men willing and able to expand such educational systems at a cost which developing countries can afford may be, in part, one price of the brain drain.

The grave questions of education as a whole clearly lie beyond the scope of this report; just as clearly, talent migration cannot be understood and placed in perspective without some reference to them. Development requires far more <u>training</u> than it has had in developing countries; the specific preparation for specifically existing or planned jobs. Education is also required for leadership purposes, but not in the quantity that is now going abroad to receive it. It seems, in general, questionable whether it is reasonable to hope that the products of any educational system will prove either more fitted or more devoted to the development process than was the system itself which trained them. It seems clear that the lack of

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1/ William C. Thiesenhusen, House Report, above, pp. 31-32.

2/ Such application will, of course, require organizational, administrative and managerial talent beside the use - indeed to ensure the proper use - of scientists.

3/ A.B. Zahlan, "Wanted, a Great University", <u>Mid East</u>, Washington, D.C. January-February 1969, p. 12.

clear relevance of much education in general and of international education in particular constitute "major obstacles in the way of the optimum employment and utilization of technical and professional personnel."[1]

Increased investment in education, like rapid population growth and the establishment of capital-intensive industries appear thus to have aggravated instead of relieving the unemployment problem in many places. Surplus manpower has been created with little or no regard to manpower requirements defined as "clearly evident needs for persons with particular education, training and experience", or to absorptive capacity, defined as "the maximum number of persons who can be employed without encountering redundancy or serious under-utilization of skill." Whether described as unemployment tout court, disguised unemployment, or under-employment, the existence of surplus trained manpower implies a distorted or unbalanced system for the generation of skills.

The cause of this distortion does not ultimately lie with bureaucracies or poor manpower planning. It lies in enormous socio-political pressures on the part of aspiring populations - often post-colonial populations - which view education as a consumer good valued for improved status, prestige, human satisfaction and the future good of children. Manpower planners accept adverse measurements of the result; popular opinion eschews adverse measurement. As an international agency has recently put it, "No people is so poor that it will be prepared to do only the things it can afford according to utilitarian scheme of priorities, and a systematic attempt by planners to apply such principles, even if practicable, might well involve an impoverishment of culture and initiative that would frustrate healthy development more than the apparent waste of resources."[2]

An important cause of brain drain is thus rooted in popular attitudes and expectations regarding education, at home and abroad, which are not primarily rational in respect to employment and productivity at home and which, as important political pressures, are not easy to control.

1/ General Assembly resolution 2320.

2/ Economic Commission for Latin America, Education, human resources and development in Latin America, 1968, p. 203.

VI. ECONOMIC AND SOCIAL FACTORS AFFECTING OUTFLOW: PUSH AND PULL EFFECTS

A. Introduction

More basic even than education as a cause for outflow are the conditions inducing men to move from one place to another.

These causes are usually described in terms of 'push' and 'pull' factors. The former, such as unemployment, poverty of opportunity, low salaries, political instability, etc. tend to 'push' the professional from his environment; the latter, high salaries, and career and research opportunities and easier material conditions, etc. tend to "pull" the professional to developed countries.

Such factors are, however, not identical in all situations nor do they exert identical pulls over the whole world. They are affected by comparative considerations depending on the level of development of the country concerned, certain aspects in its institutional and social culture and the perception of the individual making the decision. In general, "it is the comparison of the potential migrant's situation in his country of origin with the situation of persons of similar qualifications in the country of destination that enters into his decision.[1/] Thus, the "push" and "pull" factors intertwine. Conditions at home which might be accepted by the individual as inevitable become intolerable because conditions in the same field of a quite contrastingly better kind co-exist in the world and do so in a world environment of rapidly improving communication, transportation and awareness. As one expert puts it: "Often an unfortunate discrepancy exists between the marginal social product of a skilled worker's labour and the rewards it can command. In the developing countries, the marginal social product is great but the rewards are often low; in the advanced countries, the marginal social product is relatively small but the rewards are great. - - - Migration flow is - -- - towards countries where individual rewards are greatest rather than to countries where needs are most acute."[2/]

With the reservation that these factors are not uniform, do not occur in each situation in the same order and, since they involve in important part subjective reactions, cannot be statistically demonstrated, the following causes of professional outflow are cited:

1/ Enrique Oteiza, "A Differential Push-Pull Approach", The Brain Drain, (ed. Walter Adams), New York, 1968, p. 126. UNITAR's current long-range research project on the brain drain seeks to apply systematic methodology to the background of motivations and conditions relating to the brain drain and how individuals perceive them, thus adding much-needed objective data to studies of these causes.

2/ U.N. World Population Conference, 1965 (W.M. Besterman), p. 198.

B. Salaries

1. Salary Gap Between Developing and Developed Countries

Even where the professional from a developing country has a salary level as good or better, relative to the price-wage structure of his own country, than he might receive in a developed country, there usually is a great absolute difference between his salary at home and that abroad in a developed country, particularly the United States. Not infrequently, the latter is a high multiplier of the former. By 1964, for example, average income had become "six times lower in Latin America than in the United States and Canada, taken together."[1/] In India, for example, medical and engineering graduates were the highest paid scientists at Rs. 677 ($90.00) and Rs. 540 ($72.00) respectively a month while those trained in geology, mathematics, statistics and zoology were paid Rs. 420 or $56.00 a month with chemists and other scientists in between.[2/] In Turkey (and many, perhaps most, developing countries), university salaries are determined by the government not the market. The university monthly salary scale is $66-83 for Teaching Assistants up to $250-333 for Senior Professor.[3/] In the United States, the median annual salary for chemists and mathematicians was just over $900.00 per month, for physicists, economists and statisticians, $1,000 a month and for professional medical personnel $1,250.00 a month.[4/]

Men will take lower salaries in order to remain at home. Yet even considering substantial differences in purchasing power, the strong desire of many to remain home and the fact that India and Turkey may have exceptionally low salary levels, the above differentials are too great not to encourage substantial emigration. In addition to the higher material life which salary differentials of this kind can bring, salary not infrequently becomes in itself a status symbol.[5/] (See IX, B, 4.a.).

1/ Report of the Secretary-General: Social Development in the Americas, ILO, Geneva, 1966, p. 5.

2/ A. Rahman, Scientist-in-charge, Research Survey and Planning Organization, CSIR, in paper submitted to International Conference on Comparative Research on Social change and Regional Disparity within and between Nations.

3/ Frank, "Brain Drain from Turkey", EWA report, op. cit.

4/ National Science Foundation, March 1966.

5/ Salary is an inducement at least as powerful for migration between developed countries, salaries for certain professionals in the United States being two to five times those in, for example, the United Kingdom. For junior staff of

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2. Internal Salary Maladjustments

Certain categories of professionals in many developing countries receive a poorer salary relative to the upper wage level of their own country than they expect, than they are worth to the economy or than is usually the case in developed countries. Though generalizations are almost impossible, private medical doctors tend usually to be relatively well-rewarded in terms of each economy. The same cannot be said for researchers, for teachers at universities or schools or, in many developing areas including Latin America, for badly-needed veterinary and agronomy skills. In many developing countries, skilled government officials are paid higher multipliers of local unskilled labour than they are in developed countries; in others they are underpaid, either because inflation outstrips bureaucratic raises or because of traditions such as those in countries of Confucian background which for centuries have encouraged the production of generalists and of more educated men than the bureaucracy could employ; or for other reasons. Frequently, the rewards for training less directly beneficial to development, like law in countries colonized by Europeans, are far greater than for technical skills of immediate developmental benefit such as agronomy or geology. Numerous countries including many in Africa, have, in the view of R.K.A. Gardiner, Executive Secretary of ECA, distorted income structures which place a premium on occupations in terms of traditions, family status and political connections rather than on the relative importance of jobs for the needs of development.[1/] Sensitivity to internal wage inequity has grown with the ability to compare with structures elsewhere. Resulting dissatisfactions can be exploited by the preference categories of the major developed countries. Experts from developing countries thus not only have felt needs, they know where these needs can be satisfied and they have recently been given the mobility to move to developed economies. Review of salary structures in developing countries is called for. (See Recommendation IX, B, 4, a.)

On the other hand, no constant correlation between either demand for services or salary and return can be assumed. A particularly rigorous recent study of Israeli students in the U.S. found, for example, that though demand for engineers

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British hospitals with typical take-home pays of $25.20 for up to 100 hours work per week, as for many professionals in developing countries, such a salary level is an obvious inducement. (W. Adams and J.B. Dirlam, in The Brain Drain, op. cit., p. 248).

1/ R.K.A. Gardiner, "Africa", Brain Drain, (ed. Adams, MacMillan, 1968, p. 199.

in Israel was higher than for natural scientists, the latter were more likely to return than the former.[1/]

C. Qualitative Under-employment

1. Unemployment

a. General

Unemployment or lack of professional employment possibilities plus lack of job content requisite for advanced training are frequent major characteristics of underdeveloped deeply affecting talent migration. The London Times found, for example, "that 40% of the engineers trained in Burma in 1961 had not found engineering employment eighteen months later; that graduates of Khartoum University were in near-riotous siege of their Government to provide them jobs; that a household survey in the Philippines a few years ago disclosed 35,000 college graduates without jobs; that in Thailand over 1,000 candidates, including university graduates, may appear for three clerical posts in governments."[2/] Indian engineer graduates, now unemployed by, reportedly, the tens of thousands, are said to have recently held riots in India; a 1961 census revealed that 10.4% of all scientific and technical personnel were unemployed and 18.6% were employed outside the occupation for which they have been trained. Some developing countries have very adverse employment conditions on all levels as, for example, Lesotho where "only about 5% of the country's male working force can find jobs within Lesotho itself; 62% of the remainder go to the Republic (of South Africa) and their remittances are the main support of those who stay behind."[3/]

b. Educational Surplus

Some developing countries, especially the Republics of China, Korea, India and the Philippines educate more people, and more high-level specialists, than they can employ at those levels. In some countries, educational systems have been more resistant to change than have economies, and have started--or continue--to graduate experts far in excess of demand.[4/] Meanwhile,

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1/ Paul Ritterband, op. cit., p. 98.

2/ 26 July 1965, cited W. Adams, The Brain Drain, p. 251.

3/ Noel Mostert, "Africa: New Nation and New Alignments", The Reporter, 28 June 1967.

4/ The Philippines, for example, besides producing thousands of medical graduates who either migrate or do not practise in the Philippines, is also estimated to be producing a surplus of 15,000 graduate engineers between 1963 and 1970. (A.S. Bhalla, "Manpower", International Labour Review, Geneva, Vol. 94, No. 6, December 1966. See also "Education and Training Programs for Industrialization", UNIDO, ID/CONF. 1/33, 10 May 1967). The word 'surplus' can here be taken to mean that suitable structures for using these skills outside Manila have not, apparently, been created.

however, attitudes awarding status to the inactive "gentleman scholar" have changed, population pressures and social change have undermined his economic position, and emigration offers relatively easy relief: he can become a "gentleman scholar" at the new research centres of developed countries, relieved from pressures, old or new, operating within his own society. (See IX, B, 4, b.).

The concept of 'surplus' or of 'excessive capacity at a certain level' must, however, be treated with great caution from several points of view.

Most essential of these is the point observed by such historians of science as D.S.L. Cardwell who suggest that a supply of trained scientists may be a precondition to the growth of industrial and university employment of scientists in a developing nation rather than a response to such growth.[1/] Industrial employers will find use for scientists only if the supply exists and only if such industrial demand is generated will universities enlarge science faculties. Examples of such phenomena can be located both in British and American industrial history. Cardwell finds that Britain began to employ scientists at higher levels because they existed in the secondary school system in the earlier nineteenth century and could be drawn upward. In 1900 there were nearly 9,000 chemists in the United States, thousands of whom had received their training in Germany or elsewhere overseas, but only 276 were employed in all chemical industries; most were in fairly poorly-paid secondary education.[2/] Had this labor force not existed and had it not existed in a world with comparatively few chances for the more profitable employment of British and, later, American chemists elsewhere, the industrial and scientific development of England and the United States would have been affected. Philippine doctors are surplus in the sense that the Philippine government and public does not employ them even though the Philippine rural health need is bottomless. Are they surplus in the Cardwellian sense?

A further, slightly less basic, qualification concerns the bias inserted into the discussion by the word 'employment', the ambiguity involved in the term 'employment opportunities'. Employment is commonly taken to mean work on hire for wages and salary. Yet in most developing countries, only a small portion of the labour force is employed in that sense. A glance at such figures as Socrates, Marx, Newton, Gibbon and many others for all or major portions of their careers reminds

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1/ Cardwell, D.S.L. The Organization of Science in England: A Retrospect, London, Heinemann, 1957, passim. Dr. Adiseshiah of UNESCO has made an analogous point regarding current production of scientists and engineers in developing countries.

2/ Forwarded on next page.

us that productive contributions to development are not necessarily associable with fixed employment. Prospects for self-employment must likewise be considered.[1/]

c. Planning Errors

In addition, countries with education systems over-developed relative to their economies operate their educational systems, when they plan at all, with little leeway between supply and demand, even in technical specialities. Miscalculations can produce unemployment and, among large populations, relatively small miscalculations can produce numerically impressive unemployment, as in India, where, between 1951 and 1965, facilities for engineering education increased at the degree level from 4,188 to 24,695 and at the diploma level from 6,216 to 48,048. This degree of expansion has proved at least temporarily excessive, not in relation to developmental tasks in India but in relation to India's capacity to employ engineers on these tasks and to direct its priorities to these ends. In relation to employment, an over-supply of engineers, calculated now at some 50,000 has been produced which has resulted in official pleas to Indian student engineers to find employment overseas and attempts by the Indian government to limit engineering enrollment.

The failure of planning in rural industry may also lead to emigration as when the World War I collapse of the Lebanese silk industry led to the end of social integration between many Shi'ite and Maronite communities and the emigration of many Maronites.[2/]

d. Over-centralization

The rapid urbanization of developing as well as developed countries appears to be associated with brain drain. Migration to national centres usually precedes emigration to world centres and it is in the former that initial culturalization to supernational professional values takes place.

Typically, cultural and professional patterns so closely equate education with the capital city or other major cities that when urban centres become saturated, the professional would prefer to migrate to centres abroad rather than to a more rural environment at home where some demand exists. In some extreme instances, this

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Warren O. Hagstrom and Lowell L. Hargens (University of Wisconsin), "Mobility Theory in the Sociology of Science", unpublished paper, Cornell Conference on Human Mobility, Ithaca, N.Y., 31 October 1968, p. 11.

1/ See "Manpower Aspects of Educational Planning", UNESCO, op. cit. p. 20.

2/ A.B. Zahlan, "The Brain Drain: Lebanon and the Middle East", Beirut, 1969, p. 23 (UNITAR).

factor is compounded by wide linguistic and cultural differences existing in countries of great diversity like India or Nigeria.

Thus, thousands of Indian physicians prefer to practise in the United Kingdom, Canada and the United States rather than accepting medical positions which lie vacant in Punjab and, indeed, at one time or another, throughout much of India. Two-thirds of Lebanon's doctors minister to Beirut, which has one quarter of Lebanon's population; other Lebanese badly need doctors and there is considerable brain drain.[1] Similar conditions pertain elsewhere in the Middle East and are common in many developing countries.

e. Job Content

Knowledge of science and specialties has so rapidly advanced that, increasingly, education therein is fully utilizable only in complex situations and often with expensive staffs and equipment and a sophisticated and expensive material environment. The better an education, especially in developed countries, the more it tends to produce expectations of this sophisticated ambience. Few developing countries are in a position to satisfy such expectations. Even where the task is of fundamental importance, the content may be simply giving the sophisticated engineer the feeling that "I have just come back to teach how to lay bricks" or, at least, that much of his education rusts in disuse. The fact that half of the world's scientific knowledge is estimated to be under fifteen or twenty years old in itself tends rapidly to widen gaps between major centres in developed countries and those in developing countries. The expectation of complex content in professional employment has greatly escalated over what it was in former generations and has become one of the most major of all factors bringing men to developed countries. (Recommendation IX, D, 3, a and b, and IX, D, 1, f and g below).

2. Career Expectation

The complexity of modern professional preparation gives rise also to strong feelings of permanent career attachments with the possibilities for stepped advances within the career sufficient for a satisfying life-time. Many developing countries have short career ladders and professionals from them were and are more accustomed to being deflected into politics or administration. Such deflection may have good results for policy-making and one or two generations ago, when the educational investment in sciences and technology was less intense, such versatility posed fewer problems. Now, a few years' removal from a specialty can permanently

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1/ Ibid. p. 40.

erode the specialists' standing therein. Younger specialists currently tend to regard ambidextrousness of career with more suspicion, they have more attachments to their professions as such and will sometimes give higher priority to their status in a professional peer group than to their relations with society in general. There may, in other words, be some tendency for professional values and objectives to erode devotion to social service as the societies of professionals become, in themselves, increasingly large and absorbing. These career expectations bring to younger specialists concomitant impulses to associate themselves with societies which can encourage such careers with conviction of their worth. (Recommendation IX, D.1, a).

D. Employment Procedures

Despite exceptions noted under Measures, below, (Chapter VIII), few developing countries have established satisfactory mechanisms for advertising existing openings to their students overseas and to employ them when they come home. Much too little information is given to students abroad about development at home, its trends, its challenges, its areas of need. There is, in this respect an undesirable gap between the sponsored student, who is often automatically placed, and the private student who may be equally or more valuable but is, in more cases than not, made to feel unwanted when he looks for a job at home. Not infrequently, the returning private student is given the impression that his home country does not view his training as an asset to be used for economic and social betterment but as a threat to those less well-educated but occupying choice positions. In countries still employing many expatriate officials, the returned indigenous expert may be viewed as a threat to the expatriate who may also be exceedingly unwilling to serve under an indigenous expert with education superior to the expatriate's own.[1/] Many developing countries have, among their overseas students, the reputation of keeping returnees waiting jobless and without support for many months, while time-consuming bureaucratic formalities are gone through and permissions obtained. When such returnees then re-emigrate permanently to the country of training, their personal tales ~~of~~ discouraging employment experience have a devastating effect on the return plans of fellow nationals studying abroad.

1/ See P.B. Sack, "Formation et Evasion", op.cit., p. 77. On p. 87, M. Sack also notes "le Caméroun a toujours tardé a employer ses cadres dès la fin de leur formation."

Additional problems appear to complicate the hiring of middle-level experts, especially those job-trained abroad. As the Nigerian Federal Ministry of Labour put it to the Nigeria High Commission in September 1961: "It is not doubted that many (job-trained employees) have acquired considerable skill in their present jobs but employers are reluctant to make specific offers to applicants who possess no recognized technical qualifications and whose practical skills could not be tested on the spot."[1] It should be stressed in this connection that the costs of poor placement in developing countries will from now on increase: new immigration legislation among several major receiving nations now makes re-emigration of foreign students from developing countries far easier than it previously was. (Recommendations IX, B, 1, a and c, vi; IX, D, 1, f).

E. Isolation and Institutional Settings

Isolation - separation from contact with the "state of the art" which the specialist practises - has been an important reason for movement both inside and outside national borders toward large centres of practise and learning of the specialty. The immense growth of technology, science and the professions has greatly increased the weight and importance of these centres, the distance between them and developing areas and the sense of isolation felt by the specialist when away from them. The increasing expense and complexity of the equipment needed by many kinds of modern research is an obvious factor; the breaking of constant ties with the specialists' growingly important peer group is an equally important one. Each year brings augmented needs for communication to the modern professional.

Some semi-developed countries have centres where considerable communication is possible, but these countries are a small minority of developing countries and their centres are few. The immense difficulties and expense involved in creating such centres, equipping and staffing them, so that they can achieve in size and quality the "critical mass" often held necessary for productive results is a crushing burden for small economies. It is also a crushing burden on the individual scientist.[2] A distinguished Arab physicist has pointed out that "An American physicist may never need to know anything about his university or institute. He certainly need not be concerned with coordinating university, scientific and technological groups with the productive structure and government".[3] Yet, on the

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1/ Cited in T.M. Yesufu, op. cit., p. 14.

2/ See E. Oteiza, op. cit. See also papers of the Advisory Commission on the Application of Science and Technology, March, 1968.

3/ A.B. Zahlan in Mid East, op. cit.

proper distribution of centres with these concerns will depend, in no small measure, any approach to a reasonable distribution of power throughout the world, any important long-range closing of wealth-poverty gaps. Smaller developing nations will almost certainly find associations with regional centres necessary if they are to attain long-range developmental aims. The recommendations hereafter contain many suggestions for the amelioration of this problem.[1]

F. Social Settings

Young students and professionals adapt quickly; their studies and professions open to them specific paths to new behaviour, judgements and values. No society can change with an individual's speed. Even if not overseas, the student may find sources of dissatisfaction in relationships around him which he would not have found without his profession. He expects his profession to protect him in career and social relationships and it may not do so; he may have few colleagues to stand with him. Appointments and promotion may be made on other bases than professional merit and men he judges to be of inferior qualification may rise high. If he has married a foreigner, acceptance of her may be difficult and threaten either his marriage or his career. Over-expansion of universities may threaten the traditional relationships between professor and student. Religious and social forms he might have accepted may suddenly become distasteful. If surrounded by societies whose closeness was founded on criteria which excluded - sometimes denigrated - specialisation, he may even find himself penalized by the very values he has come to esteem and feel a stranger in the house of his own culture. The tensions aroused, far from stimulating him, may impede what he judges to be the kind of rational thinking necessary for professional advancement. These emotions may also generate strong feelings that he owes his children an education abroad. A greater consciousness by developing nations of the rarity and value of their well-qualified professionals and a more exacting use and honoring of their abilities will be one of the only, partial, remedies for this dilemma. Yet developing nations must do this without jeopardizing the integration of their societies by the creation of excessive professional privilege and living standards which will be the subject of unaccepting envy.

1/ The cost of building, equipping and maintaining major centres of research and teaching in some of the professions would exceed the present yearly national income of many smaller developing countries.

G. Research

Until World War II, the part played by non-Socialist governments in financing scientific research was generally slight and the expenditures thereon relatively small. In the last twenty-five years and especially since 1950, the rise of such expenditures has been precipitous, especially in the United States. Total Research and Development expenditure by the U.S. Government rose from $74.1 million in 1940, to $854.8 million in 1948 to $1,816.2 million in 1952 to $4,461.9 million in 1957 to $10,373.3 million in 1962 to over $14 billion in 1964 and 1965.[1] United States expenditure on Research and Development from public and private sectors in industry rose from $7,731 million in 1957 to approximately $25 billion in 1967, more than the national income of most world nations. "The period 1950-66 witnessed an unprecedented growth in the nation's manpower engaged in scientific and engineering activities."[2] Rate of growth has since levelled off but total "Research and Development" expenditures were over $26 billion in 1969 and are expected to reach $27.2 billion in 1970. The number of Research and Development scientists and engineers in industry rose from 234,800 in January 1958 to 358,900 in January 1966 or by 47%. In this period, the expansion of employment of Research and Development scientists and engineers in electrical equipment and communication was 90% and it was 72% in aircraft and missiles, responsive in large part to increased defense and space programmes.[3] A more precise statistical table showing the awards of Ph.D's and Federal Funding for Basic Research, 1958-67, is given in Table XV. This chart shows the sharp rise in basic research funds accompanied by considerable, though far less sharp, rises in the numbers of Ph.D's produced in the same fields. The figures have clear implications for increases in demand for scientists: the American Institute of Physics in 1966 predicted that a deficit of at least 20,000 physicists is expected in the United States by 1970.[4] Such prediction has not yet been borne out. Support for research declined in 1969 and is still declining in 1970 leaving a threatened surplus of physicists. The importation of scientists may be affected in the short run by this development as it may be a threatened US. recession.

1/ Federal Funds for Research, Development and Other Scientific Activities, Vols. XII and XIII, National Science Foundation NSF 64-11 and 65-13, Washington, D.C.

2/ Employment of Scientists and Engineers in the United States 1950-66, U.S. National Science Foundation, NSF 68-30. September 1968, p. 2.

3/ Brinley Thomas, "Modern Migration", The Brain Drain, op. cit., pp. 40-42.

4/ "Physics Manpower 1966: Education and Employment Statistics", American Institute of Physics, 1967. More than half of the full-time physicists in the United States work in areas of research and development.

In contrast to this, only a comparatively small number of developing countries conduct research and devote funds to it. The Yugoslav scientist, Dr. Stevan Dedijer, observed that between fifteen and thirty countries of the world, with less than one-third of its population possess practically all its science, spending 95% of the world's research and development funds and reaping most of the benefits therefrom. The hundred or more other nations, with two-thirds of the world's population have virtually no scientific research at all.[1/] Even within the twenty or thirty nations who do research and among developed nations in that group, sharply different levels of expenditure, plant, equipment and professional opportunity cause both brain drain and concern relating to the accentuation of inequalities of wealth and power. In poorer developing countries the situation is more extreme. In many senses, developing countries are rich in possibilities for research. But unless the researcher is armed with funds from developed countries, he has little to support his research plans in most developing countries. He is, and is likely increasingly to be, reluctant to return home or to decline attractive offers abroad. The migration of the serious scientific researcher is symptomatic of one of the world's problems least presently accessible to solution. Research is a classic example of a pull which developed countries possess and an attraction which most developing countries are far from being able to exert on their scientific citizens.

At the same time, research is in itself a major cause for increasing wealth-poverty gaps, 18% (net) of the growth rate of the U.S. economy between 1929 and 1957 has been attributed to advance in knowledge. Payoff to agricultural research as a whole suggests a rate of return of at least 35% a year. One classic study has shown that investment in hybrid corn research was yielding U.S. economy as of 1955 a return of about 700% per year. Thus, research in general and the participation of scientists therein in developed countries contributes to the wealth-poverty gaps which themselves lie behind the brain drain.[2/] (See IX, B, 1, a, b, and d, and D, 3, a and b).

1/ Stevan Dedijer, "Why Did Daedalus Leave?", Science, No. 133, 30 June 1961. India and a small number of other developing nations are included among those "possessing science."

2/ Theodore W. Schultz, Economic Value of Education, Columbia University Press, New York, 1963, pp. 39-40. The studies here referred to are by Denison and by Griliches. Attempts are being accelerated to apply such knowledge in developing countries; but this requires more technicians on local levels than usually exist.

H. Perspective on Scale

Though important, the effect of these 'push' factors should be kept in perspective. Large as the statistics sometimes seem in isolation, they are small compared to the very large accumulation of millions of university graduates in developing countries.[1/] These graduates, including numbers in the hundreds of thousands who have returned from abroad have created tremendous development, especially in recent years, in their home countries. It is thus with the possibility of doing more with the frequently very gifted five percent which emigrates or does not return that brain drain study is concerned; it is not with the suffocation or extinction of development. Indeed, if more study of the successes of indigenous high-level manpower with development were publicized, still more non-returness might return.

1/ While the overall situation is hard to gauge, the case of the Middle East in which there are estimated to be around 700,000 university graduates in 1969 of whom some 35,000 were educated at foreign universities while there are some 35,000 Middle Easterners 5% who have not returned and are working abroad might not be far from a world norm. (A.B. Zahlan, The Brain Drain: Lebanon-Middle Eastern Countries, report for UNITAR).

I. Summary: A New World of Communication

It has been popular to interpret brain drain primarily from a point of view of push and pull factors. These have validity. It should also be observed that this interpretation contains many inconsistencies and some lack of a satisfactory overall pattern.[1]

The context in which 'push' and 'pull' operate is universal and carries its own great and independent force. Very rapidly - in developing countries, since World War II - an almost totally new process of communication has been developed in the world in a sense far beyond media alone. Death rates have declined, birth rates in developing countries have risen so that average age has fallen and approximately half the population of most developing countries is below the age of 20-21. Education has boomed and is increasingly permeating this younger half of the world's previously illiterate population. Contact and travel have vastly increased bringing Western soldiers in World War II and its aftermath, then business, expanded overseas government programmes and tourists which have given this population strong initial impressions associating the 'Westerner' with higher standards of living. From developing countries, education abroad proliferates at a compound rate of 5-15% a year. Transportation becomes universally available and relatively cheaper. Radio, newspapers and even TV spread information to millions never before reached. Through word of mouth, through experience first and second hand, through every media, knowledge of large and developed countries, their educational systems, their salary scales and opportunities has permeated developing societies in a manner confined, a generation ago, to a small elite. Meanwhile, international business from developed countries, large, complex and impressive beyond that known during the periods of formal colonial control, has spread technology widely and tended to make the economies of many developing countries extensions of developed metropoles [2] with a corresponding tendency to make their employment markets likewise coterminous therewith.

At the same time, and partly for associated reasons, new expectations have opened for millions in developing societies together with much social mobility and pressure for far more movement and 'progress' than the flexibility and openness of traditional societies is likely to satisfy. There is unprecedented turning from

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1/ See such foregoing illustrations as Ritterband, etc.

2/ See, for example, the study on Brain Drain from Trinidad and Tobago for UNITAR.

the old and, behind the facade of new nationalism, diminishing social cohesion or commitment to traditional values and loyalties. Into this vacuum comes new adherence to a more international and Western-oriented professionalism and materialism together with a newly-inborn assumption of right to rapid social, material and professional opportunity in a tempo freshly perceived.

The world is, in short, a new theatre; the specifics of 'push' and 'pull' are the furniture with which it is set. No intellectual is more than forty hours away from any other intellectual centre and knows it, however unavailing his purse. In this light, the technologist of earlier times, whether in Nürnberg, Aleppo or Hangchow, suddenly appears caught in his different milieu of sparse information, small movement and lesser development gaps, performing his work locally largely for lack of much alternative to do otherwise.[1/] Today, there is more than alternative: careers, standards of life, milieux, salaries, education, immigration laws all pile invitation on invitation. It is perhaps to be wondered at that there is not more migration. This there is, indeed, likely to be.

1/ Most of the "wandering scholars" of earlier periods were not technologists; many were philosophers. The wealth of early nation-states did not reside in them as it does, to a considerable extent, in the professionals and technicians of today.

VII. THE ADVANTAGES AND DISADVANTAGES OF MIGRATION OF SKILLED PERSONS

A. Introduction

A large part of this report has dealt with statistics of migration. The recording of these statistics may be hazardous if it is not made clear that they describe movement, not the value of that movement. They are, up to now, the description of a phenomenon in the modern world: a growing migration of professionals in certain directions. This phenomenon may only be, in effect, a description of a new dimension in the world system of communications, with new opportunities for use as such. The phenomenon is important and fairly large. But whether it is beneficial or harmful is quite another question. To answer this complex question, no concensus is presently obtainable. If, however, the use of statistics implies that valuation for development can be reduced to a body count, that use is both misleading and wrong. It is important to have an accurate notion of the orders of magnitude involved when making judgements of the importance of what is being measured. Too often, the activity of measurement becomes an end rather the means - limited and imperfect - of inquiry.

From a developmental point of view what counts is the process by which skills are diffused and the influences which favour or hinder this process. This is not a matter of totalling the number of bodies moving in a given direction, deducting those moving in the opposite direction, and striking a measure of gain or loss. The diffusion of skill involves human movement and communication in many directions including permanent or temporary removal from the point of origin, pemanent or temporary return to that point, and movements to and fro. We have not yet learned how to study migration as a vehicle for the diffusion of skills. Judgement that development is hurt by the emigration of skills depends on a wide variety of assumptions regarding the value or lack of value of professionals for development under widely different conditions. The answer depends very much on the precision with which the question: "value for what?" can be answered as well as on differing assessments of the creativity of talent in under-privileged settings. In general, such migration is of great net value to developed countries, who bid for this talent; it involves at least two kinds of costs or possible costs to the countries of origin - the educational costs of producing the skill and the social and economic values forfeited or presumed to be forfeited with the loss of the skilled migrant's career within a developing country - if loss that truly is. Emigration also has some advantages both material and social. There is also some cost to developed countries. The extent of such profit and loss varies as greatly from country to

country as it does in the conclusions variously derived from the relevant facts and theories. It is rarely possible to quantify the profits convincingly, still less the losses, but it is possible to distinguish the areas in which advantage and disadvantages to each side probably occur and to give these preliminary evaluation.

B. The Question of Damage to Development

1. Factors Involved

The possibility that damage to the development process may occur through the emigration of professionals on the scale now current is the core of "brain drain" anxieties. This anxiety has arisen, in large part because of the strong emphasis placed upon the value and the training of educated men in and for developing countries plus an equally widespread belief that educated human beings were a scarce resource, in short supply in developed and particularly in developing countries. Brain drain is, in a sense, point of departure for examining whether and to what extent these widely held beliefs can be confirmed. The searching, ultimately minute examination of the value of men of widely various training in varied situations raises a number of the most fundamental and involved questions of development. Granted the fact that inquiries into development and its nature, while now intense, are comparatively new and that the questions arising are markedly controversial, both on the practical and the philosophic levels, it is clear that no paper is likely to be able even to present, let alone solve, these questions in a manner satisfactory to all.

The normal instincts of economists and those others seeking to state the problem as objectively and rigorously as possible is to resort to models using statistics of stocks and outflows of professionals and of replacement of such stocks through education; then to adduce the elements of economic planning and manpower requirements where these are available to show shortfalls in economic plans or in experts needed for certain rates of growth. One can also show, to some extent, the ratio of "professional, technical and related workers" to all non-agricultural workers and the total economically active population. One can also, of course, use statistics showing the ratio between physicians and population, thus tending to indicate welfare needs. Using these, one can gain some picture of depletion of stocks and the skill-intensity of emigrants in relation to the remaining population. Some statistics of this ilk are indicated in Tables X and XI.

Such statistics, like many others, are expressive of many kinds of severe developmental gaps existing in the present world. Taking such figures and correla-

ting them with what we know about similar statistics for countries on the verge of modernization - the United States about 1850, Western Europe about 1820, Japan about 1880, - we might be able to see what these countries might need to develop if they were the United States, England, France, Germany, and Japan and if one could assume that their development entailed similar requirements and would proceed along a like course.

The difficulty is, of course, that probably none of these assumptions are true. Models, mathematical or non-mathematical alike, based on "normative optimality values" for the highly-trained manpower required for modernization fail to take into account that development consists in the operation of a communication system within a community such that the innovative contributions of science and technology can be received and implemented. This communication system has cultural requirements. We do not know precisely what these are. We think we know something about what they were in given developmental instances. But, even if we know this, we are far from sure that the development which occurred was the only or even the best way in which it could have happened. We certainly do not know whether, because it occurred along certain lines for Japan, it should also occur along similar lines for the Congo and that the applicable prestidigitation is to reproduce Japanese conditions within aspiring African nations.

In other words, while we know that where no one is educated, development is unlikely to take place, we are not certain that where everyone has a PhD a country will certainly develop and with a predictable rapidity and intensity. While we are fairly sure that there is a certain correlation between education and development, we have not found exact correlations between the input of professionals and the output of development. Such correlation is almost certain to vary from one society to another and from one set of conditions to another. Indeed, one of the reasons for knowing more about migration of high-level manpower from developing countries is that it may give us information about what these correlations actually are for different circumstances. In any case, we do not know enough about such correlation to be able to place total values on the loss involved in migration.

With this in mind, it is interesting to observe the striking discrepancies in the ratio of physicians to population evident from Table X. Only Israel, Argentina, Greece, and Uruguay have attained the medical standards of developed countries. Ethiopia, Indonesia, Nigeria, Ghana, Vietnam, Haiti, and Burma have not reached even the "extremely modest" minimal target of one physician per every 10,000 inhabitants set by the World Health Organization. Kenya, Morocco, Thailand,

and Algeria - the last three suppliers of many doctors to developed nations - have barely attained even that modest ratio.[1] Even a few migrating physicians - 14 from Ethiopia - could, if properly used at home, have as much or more effect on health than many withdrawn from such comparatively well-stocked countries as the Philippines, which loses hundreds annually, or Argentina. Endless illustrations of bad physician distribution, internally or externally could be given - few countries are exempt.

Nurses, who migrate widely and in large numbers, are everywhere in short supply. Their emigration is detailed in Table X, column 5. No developed country has enough for demand and few if any developing countries have enough for basic health purposes. Their absence affects the work of physicians who must then perform many nursing tasks themselves if medical care is to be effective. Nurse migration can thus encourage the non-return of physicians.[2]

Health suffers. The lowering of health is felt to affect development. Outright physician unemployment is rarely a cause - it rarely occurs. Yet if the physicians had stayed, statistics demonstrate that they would mostly have practised in urban communities which are relatively well served. Meanwhile the centres to which they go in developing countries, mostly as interns and residents, cannot spread new medical knowledge to the unserved populations without practitioners, preferably ones speaking native languages.

Would these physicians leave if developed countries did not compete with developing countries for their own medical personnel? If they did not leave, would their presence eventually create more productive use in rural areas, much as science teachers eventually created science teaching jobs in earlier European experience? Would their discontent at home become a developmental factor or is their emigration from home more of a stimulus for change? If they do emigrate, will medical institutions in developed countries make greater attempts to help medical work in developing countries than is now the case? Should receiving countries give more aid in the medical field stimulated by their debt for the medical gifts of developing countries? The answers to these questions are not yet known.

1/ Calculations from the ILO from date in Annexes 4-6, World Directory of Medical Schools, Third Edition, WHO, Geneva, 1963.

2/ Korea has exported on contract 2,550 nurses to West Germany alone (Korea Week) No. 23, 20 November 1969. The Kwangju Christian Hospital (Korea) in a 1969 brochure says: "The truth is that nurses are harder to find than any other medical workers. The situation is desperate."

Clearly, there is a quite general phenomenon of mal-distribution of medical opportunity and service. Migration study is one way of showing that this problem is not being solved. This may be a more useful conclusion than characterizing the phenomenon in terms of loss.

2. Loss of Stock of Educated Men

Table XII shows the annual number of graduates in various fields of study in each country and Table XIII the ratios of the annual rate of emigration of each type of manpower to the annual number of graduates from the related field of study around 1960. Such figures have important implications for education in attained manpower accumulation and for loss of investment in education.

Many of these losses appear most disquieting. Some 8% of Latin American university output in engineering, social and natural science and medicine enters the United States as emigrants.[1/] Colombia has in some years lost high level manpower at some 3 1/2 times this rate.[2/] So has Greece.[3/] Argentina lost some 15% of her active engineers between 1950 and 1964. India has lost some 10% of her medical doctors while Haiti lost 6.4% of hers in 1964 alone and Honduras 3.2%. Trinidad and Tobago lost some 65% of its professional manpower in 1965 through emigration.[4/] Large outflows of engineers occur from Hong Kong, Honduras, Haiti, the Dominican Republic, Iran, Syria, Chile and India,[5/] in the first three countries, annual exodus has exceeded the annual numbers of engineering graduates. Medical outflows large and serious in terms of replacement occur for the Dominican Republic, Israel, Colombia, Lebanon and Haiti. Outflows of nurses are exceptionally large in Venezuela, Trinidad and Tobago, Jamaica, Barbados, Chile, Colombia and Jordan. Losses of scientists are serious for Colombia, Brazil and Chile and for natural scientists for Costa Rica, Venezuela and El Salvador. Some countries

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1/ Gustavo R. Gonzales (ILO), "The Migration of Latin American High-Level Manpower", International Labour Review, Vol. 98, No. 6, December 1968.

2/ G. Eusse Hoyos, "The Outflow of Professional Manpower from Colombia", UNITAR paper.

3/ G. Coutsoumaris, "Greece", in The Brain Drain, ed. Adams, 1968, p. 169.

4/ Statistical Office, Trinidad and Tobago, "Brain Drain", 1969, UNITAR Report.

5/ India illustrates the fact that statistics alone do not show the quality of the loss. India's outflow of engineers, though heavy, is still a small percentage of her output. But a high percentage of this outflow comes from among graduates of India's five elite Institutes of Technology, considered "the elite that is expected to keep the country running and developing in the next generation". (New York Times Magazine, 12 May 1968, p. 53.).

like Korea without sufficient nurses and doctors for their own populations still supply nurses by the thousands to developed countries, partly under contract and allow physician outflows by the hundreds.[1]

Table X attempts to indicate in the most feasible manner the level of professionals compared to the level of development. For purposes of brain drain, it would be better to combine such statistics with those of budgeted positions utilizing professionals. The latter figures not being available, the Table shows something about optimal needs rather than demands. The Table indicates the level of professionals in relation to the agricultural and industrial population and to an index of development. Column 2 indicates the scarcity of high-level manpower taking into account such dynamic elements as the increased degree of industrialization. Striking differences can frequently be observed between these two percentages, as in Turkey, Thailand and India, reflecting the overwhelming weight of agriculture in the economy of these three countries. Unusually low percentages of "professional, technical and related workers" among non-agricultural workers in Haiti and Syria reflect paucity of high-level manpower. Similarly, low figures in column 2, particularly those for Haiti, Thailand, Pakistan, Iran, Turkey and India imply the need for large accumulation of highly-trained manpower to permit the industrialization these countries desire. All are source countries of emigrating high-level manpower, thus probably slowing these plans.

Comparison of the percentage of "professional, technical and related workers" among non-agricultural workers with the percentage of "professional, technical and kindred workers" emigrating to the United States and Canada[2] further supports the thesis of "The New Migration"[3] by demonstrating that the emigrating labour force is far more skill-intensive than the labour as a whole in almost any developing country, Mexico and the Dominican Republic being among the only exceptions. The current preference quota and work permit immigration system plus the educational over-production of skills for which demand in developing countries is ineffective produces a migration which reduces, in one degree or another, and sometimes markedly, the trained human resources of a quite large number of developing countries, including skills needed for industrialization. We can only presume, however, that these people would have been used for development and industrialization had they remained. Such correct use is the unknown for all evaluations.

1/ Korean Report, Vol. 19, No. 3, Washington, D.C., July-September 1969, p. 9.

2/ Table XI.

3/ Chapter II above.

3. Effect of Outflow on Manpower Requirement

The needs of developing countries for practically every variety of professionals and skilled services are almost unlimited if need is defined in terms of what is necessary to bring the standards of developing societies up to near those of developed countries or even in terms of fulfilling the expectations of the vocal citizenry. These needs are often alternatively phrased as requirements.[1/] The capacity of developing countries, even with aid, to support the employment of specialists and professionals so that they can effectively administer to these needs and also obtain a satisfying professional return on their personal educational investments is limited, in many cases extremely so. The gap between needs and economic demands reflect lack of purchasing power, inadequate mobility of labour within the country or the lack of complementary labour or capital. Such gap is the dilemma and present tragedy of development. The specialist and the professional frequently tend to be cast in the victim's role. They cannot be nourished by an abstract need. They must be employed especially within an institutional framework which will give them the tools to be effective, the support required for quality results. It is the plight of development that such conditions are often lacking.

They are, however, by no means always so. Specific evidence that conditions exist in developing countries which are attractive to experts and which constitute demand can be drawn from the presence of some 100,000 experts there under various technical assistance schemes. In 1962, the cost of all such foreign experts was about $4 billion, that is an average of about 1.6% of the Gross National Product of developing countries combined.[2/] The extent to which indigenous (or other) personnel trained abroad could be substituted for the above foreign experts is subject to a large number of variables. Approximately 100,000 foreign experts

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1/ According to J.G. Scoville of the ILO: The Occupational Structure of Employment, 1960-1980, August 1966, the net requirements for manpower in professional occupations in developing countries between 1970-80 will be 16.9 million compared to 5.3 million in the previous decade. Some earlier projections and estimates have been, in various categories, still higher. (ECOSOC E/3901/ Add. 1, 3 June 1964). Brain drain raises the question whether professionals in that number can be absorbed.

2/ E/4353, 8 May 1967, "Development and Utilization of Human Resources in Developing Countries", Report of the Secretary-General, p. 28. This passage is also partly based on A. Maddison, Foreign Skills and Technical Assistance in Economic Development, OECD Development Center, Paris, 1966.

serving in developed countries balance roughly the same order of magnitude of experts and professionals from developing countries serving in developed countries. Such vast professional numbers - more than the whole world contained until the nineteenth century - leads to a strong suspicion that much overlap and duplication is present - also in aid programmes - and that much substitution should be possible. Without such substitution, in fact, it may be difficult to adjust educational systems formed in a colonial image which may be contributing to the brain drain problem.

In addition, if development is ever to be possible, it is not reasonable to assess the manpower requirements in developing countries on the basis of current effective demand alone. Development requires special initiatives and discipline for the sake of the future. Without the professional no one can create the institutions and the processes needed by developing countries. As we have seen, the supply of professionals often had to exist before the demand and must, in fact, play a role in creating that demand. Professionals must constitute in each country a principal force for the creation of needed changes and for their priority within the framework of nation-building; for this purpose, however, their voices must be given due weight and satisfactory communication with governmental planning. In former generations, the professional or specialist had fewer alternatives to solving problems as best he could at home. Today, he commands an increasingly high price in a highly mobile international market. Alternatives are his in every major developed country. His departure and his non-return are more easily arranged than ever before.

His role cannot be expressed in his salary or that of the foreign technician he replaces, or even in his actual professional accomplishment during his lifetime. If his government works with him and he with his government (or with private enterprise) to create institutions of education, of research, of planning, of industry, the professional creates deferred value.

Deferred value is no emotional myth. It can be demonstrated in nineteenth century Japan.[1/] During the first two decades of the Meiji era, from approximately 1870-90, Japan made the decision to make all-out efforts to modernize. She hired, at great cost, teachers, technicians and scientists from the United States and Europe. Around them she started to build institutions - educational, technical,

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1/ For the description of Japan's experience, I am grateful for Paul Ritterband, op. cit., pp. 185-187.

scientific, industrial. She at the same time encouraged Japanese to study abroad both under public and private funds. In 1873, the Ministry of Education recalled all Japanese studying abroad on the grounds that their activities were not in the interest of advancement of learning in Japan. That same year, the Ministry of Education began the policy of choosing the scholars to be sent abroad and these, in turn, "became the main channel by which modern natural science was brought to Japan."[1/] Building institutes and sending students abroad and hiring foreign scientists and technicians were co-ordinated policies. From about 1880 on, these students increasingly took the places of foreign employees. There is no evidence that attempts were made to give these returned students the same or comparable salaries to those received by their foreign predecessors, who were on temporary contract. Japanese salaries have always been, and continue today to be, low relative to those of trained personnel elsewhere. Nor was or is Japan distinguished for natural wealth. Nor did the first generations of scientists produce especially outstanding advances for world science as a whole: it took nearly sixty years for Japan to develop full scientific maturity. Yet Japan's present scientific and technical prowess she owes largely to these earlier men. Their value was, to a substantial degree deferred. Yet Japan's successful modernization has been significantly dependent on the purposeful co-ordination of the above policies. It should be added that these concerted efforts took place against the background of an indigenous culture markedly rich in hierarchical and institutional loyalties.

Japan did not have a formal development plan in a modern sense. She had a general strategy whose consistency was sufficiently insured by the stability of her political institutions under the emperor and by bureaucratic continuity within a class which enjoyed close inter-connections and relatively deep mutual understanding. Even with hindsight, it is difficult to see today how one could have placed on the many hundreds of students Japan sent abroad for training an exact valuation. It is hard to deny that the return of these trained men <u>together with</u> the determination of the government that they should be used and the creation of institutions to do this has been worth the development of Japan: that is to say, untold billions.

A consciousness of deferred value must enter any attempt to value talent in accordance with existing national development strategy and plans. Moreover, few

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1/ Cited by Ritterband from Tuge, Hideomi, <u>Historical Development of Science and Technology in Japan</u>, Tokyo, Kokusai Bunka Shinkokai, 1961, p. 101.

plans are very clearly defined and fewer still reflect the needs of the country in manpower targets broken down by occupation and skill.

India had a detailed plan but over-optimism in employment capacity has resulted in unprecedented joblessness productive of both migration and internal unrest; as a result, the equivalent of the production of several Indian engineering colleges, including many of India's most qualified young engineers have immigrated to developed countries from India in 1967 and more are being urged to do so. In order that India should satisfy her own targets for physicians while maintaining her present rate of emigration in this field, more than 154 medical graduates will have to be produced each year than otherwise; medical graduates are everywhere expensive to produce and no mechanism currently exists whereby the Indian government is repaid for its losses.

More striking is the plight of the Nigerian government.[1/] The National Manpower Board estimates that the minimum out-turn of senior category manpower required to sustain the Nigerian economy at a 4% rate of growth, without replacing expatriates was (1968) on the order of between 3,100 and 4,100 per annum. In order to replace the expatriates, the rate would be 5,100 - 6,200 per annum. In the intermediate grades, the minimum turn-out would be about 8,400 per annum. Nigerian universities, however, are geared to turning out senior category personnel. The turn-out is only about 3,000 per annum. The short-fall at the intermediate level is thus about 5,400 per annum, and, at the senior level, to replace the expatriates, there is a gap of about 2,000 persons per annum. The only source from which such nationals can be drawn is from Nigerians overseas of whom there are estimated by government sources to be some 30,000 in senior and intermediate categories, some 18,000 in the United Kingdom alone. On Nigeria's ability to recruit some 2,500 of its nationals for senior, professional and technical positions every year depends, virtually entirely, its ability gradually to replace its expatriate staff of 14,888 (as of early 1968) which currently costs Nigeria scores of millions of dollars per annum ($120,000,000 if costs per expert are considered at $8,000/yr, a low figure). Clearly, also, its ability to recapture from the United Kingdom as many as possible of the 5,000 intermediate personnel working there would have much to do with Nigeria's possibility of maintaining, according to these criteria, even a modest growth rate of 4% per annum. Since few more than 103 of the above possible 5,000 have been induced even to register, the prospect for significant repatriation seems, however, dim.

1/ "Nigeria's High-Level Manpower", 1963-70, p. 21 and T.M. Yesufu, op. cit., pp. 4-6.

The Cameroonian 5-year plan, 1966-71, estimates personnel needs for "qualified" personnel at 17,500 persons. Of these, over 15,000 are needed either for new jobs or to replace Cameroonians retiring or hired without the necessary background. Three thousand alone are needed to replace expatriates now serving in Cameroon. Over 4,000 Cameroonians of intermediate or advanced qualifications are serving outside Cameroon.

In quite elaborate tables, a Cameroonian scholar[1/] has shown how the repatriation of Cameroonians available now and through 1971 could reduce Cameroonian reliance on imported or to be imported foreign experts by 1971 by percentages which vary up to 100% for many technical fields, and which are frequently large. All levels of training are concerned: ouvrier qualifié (a workman trained and competent for a general work speciality), agent de maîtrise (a highly-trained master of a working profession who directs groups of workmen and, where necessary, performs highly-trained work), technicien (a highly-trained technical assistant to the overall director of an enterprise, and cadre (the highest-trained management and directional personnel.

If, for example, Cameroon's 62 emigrant doctors would return (mostly from Paris) to practice at home, Cameroon might have to train only eight more under her 1966-71 five-year plan instead of having to train seventy.

Those considered in the study to be working overseas and not returning to Cameroon following their training, number 1,413 composed of 889 ouvriers qualifiés, 186 agents de maîtrise, 224 techniciens, and 114 cadres. In virtually all cases, it would appear that there are expatriates working in Cameroon in these same categories. While the replacing of one expert with another involves factors which cannot be solved on paper, it is equally clear that the above figures are both too large and too consistent to be based on atypical personal causes alone. They constitute a clear phenomenon. France, Cameroon, and other national and international agencies aiding Cameroonian development appear to be spending several million dollars to support in the Cameroon expatriate personnel whose qualficiations would, on paper, at least, appear to be possessed by Cameroonians working outside Cameroon.

In the case of qualified workers, the author of the study believes that reliance on expatriates could be almost completely eliminated if Cameroonian

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1/ Paul Bourget Sack, op. cit.

qualified workers working elsewhere were repatriated.[1] Except in the case of technicians, among whom 67 of the 224 outside Cameroon were employed in France, large majorities of all the above categories were employed in France and minorities only in other francophone African countries. The author of the study believes that, especially in education, the repatriation of Cameroonians employed outside Cameroon would contribute enormously to Cameroon's 5-Year Plan and would hasten her development objectives.[2]

In Iran, likewise, a clear index of current need is the fact that there are some 6,000 paid foreign experts working in a great variety of fields and positions, and also hundreds of experts sent to Iran by technical assistance agencies and by the Peace Corps. High officials have stated that their places could be taken by qualified Iranians who have not returned.[3]

Whether measured by national plans or by expert research, there seems little question of a widespread lack of persons to fill teaching positions in higher education. In many African countries such positions are still very significantly filled by foreigners, even in countries whose native cadres are partly expatriate. A recent doctoral thesis on Korea has extensively investigated staffing needs in Korean higher education, especially in regard to the supply and demand of faculties both from quantitative and qualitative viewpoints. "This revealed an acute state of need in both dimensions, especially in regard to quality. The migration of faculties to employment opportunities and that of students to graduate schools in foreign countries - specifically the U.S. - and their subsequent non-return had significantly contributed to the problem of staffing in Korean higher education..."

1/ The preceding material is drawn from Paul Bourget Sack, "Formation et Evasion des Cadres au Cameroun", op. cit. pp. 47-58. Tables shown, specialty by specialty, the numbers of non-returnees, the numbers of expatriates employed in Cameroon, the numbers of Cameroonians employed in Cameroon and the numbers foreseen as needed in accordance with the 5-year plan. The study covers only Cameroonians working in France or other francophone countries. A World Health Organization study of 31 July 1968, referred to in Jeune Afrique, No. 427, 16 March 1969, places the number of Cameroonian doctors practising outside France at about 100 and those practising in Cameroon at 47.

2/ Ibid. pp. 61-63. Return of Cameroon's middle-level manpower is complicated by the fact that very little of it left the country legally.

3/ Habib Naficy, Technical Undersecretary to the Minister of Education, Iran, in Colloquium on Intra-Regional Technician Training, 1967, Colombo Plan Bureau, p. 123.

As a result of this and other sociological and economic factors, "indigenous graduate schools were ineffective in developing the needed faculties ..., only 5% of graduates from the baccalaureate level were entering Korean graduate schools and U.S. institutions were still regarded as superior by both faculties and students. In recent years, one-third of the graduates were entering the teaching profession (including all levels of education) but this number was insufficient to meet the demand for teachers. Although the record of the indigenous graduate schools in supplying the demand for faculties was by no means exemplary, they were, nevertheless, more effective than were U.S. graduate schools which had returned only about 6% of the Koreans enrolled over a fourteen-year period. Unfortunately, the combined efforts of the indigenous and the foreign graduate schools were not sufficient to meet the demands for faculties on both graduate and undergraduate levels."[1/]

In both Argentina and Brazil, group migration of scientists and technicians following political changes has closed or crippled a number of key institutes.

In all such cases, national targets are delayed, some are endangered partly by migration, even more basically by misplaced investment priorities. Even where good plans do not articulate them, national hopes are almost everywhere deferred. A vicious circle is started; professionals are forfeited because they cannot be effectively employed, and they cannot be effectively employed because the economy loses, along with them, the stimulation toward development.

4. Loss of the Costs of Education

The migration of trained personnel deprives the homeland of the costs of that person's education and of the services it provided during his upbringing; these it cannot recover either through increased national productivity or through taxes on the recipient and his salary as, frequently, immediate and permanent emigration takes place.

Educational costs are not easy to describe. As one expert has put it: "One might have thought that at least the costs of schooling would be known. Not only are they reckoned in ways that make it hard to interpret them; but, what is much more serious, a large class of these costs is hidden, and until very recently

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1/ Lydia Arlene Sitler, "An Investigation of the Need for Increased Support and Improvement of Indigenous Graduate Education in Korea", doctoral dissertation, op. cit., pp. 313-315.

nothing has been done to discover the amount of these hidden costs and who bears them."[1]

All educational systems, public and private, subsidize education, though at widely varying cost. In general, particularly large percentages of educational expense in developing countries are government-subsidized and especially high portions of national income and budgets are reserved for higher education in the

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1/ Theodore W. Schultz, The Economic Values of Education, Columbia University Press, New York, 1963, p. xi.

belief that it is vital for development. Higher education in many new nations also tends to be especially costly since much equipment, many books and, frequently, many faculty members must be imported from high-cost developed countries. In many cases, especially in Africa, it is calculated that the subsidies for one person's education through a national university are greater than the lifetime income of an average citizen.[1/]

The problem of how to cost the education of an emigrant professional involves a large number of assumptions almost any one of which is open to question and attack. Assumptions must, for example, be made about the timing of his departure; whether or not he would be replaced in the system by someone who would have remained; whether one can divide the costs of education evenly among the total of those educated or, if not, how one can take into account the marginal productivity of education. The following is one example of costing. It is open to a number of objections of various kinds as would, in their turn, other systems thus far used.

The average migrant is young - the average immigrant to the U.S. is in his early twenties. More study is needed to ascertain the average age at which professional migration takes place but most evidence points to its taking place for nationals of developing countries at the end of the student stage, prior to any opportunity to pursue a professional career at home.[2/] Developing countries, also, tend to have more highly developed educational expectations than they can satisfy within their present educational systems: hence the assumption that if the emigrant professional had not been educated, another national would have taken his place seems more nearly reasonable than any other assumption. Whether this place would have been taken by a person who would himself have remained in the country and contributed to development is far more questionable: in the cases of major

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1/ As, for example, the cost to Ghana of the education of one Ghanaian student through the University of Ghana. In Tanzania, the average annual per capita income is only £20, the unit cost in secondary education is £400 and in higher education is well over £1,000. (UNESCO, "Manpower Aspects of Educational Planning", op. cit., p. 47.)

2/ In the case of the U.S., this conclusion can be inferred from figures on adjustment of status from student to permanent resident. There is the further question of what educational stage the student completed in his own country before going abroad for education, a question with complex and varying answers.

contributors to the brain drain it could not be assumed. Its assumption for costing purposes must rest on the fact that extremely few countries - perhaps none - exist which explicitly budget their costs of higher education on the assumption that the product will be used outside their own economy.[1] Using the above assumptions, loss might be roughly computed by multiplying the total unit costs of education by the number of graduate emigrants indicated in the first four Tables, or by multiplying the aggregate educational investment by the ratio of the annual number of emigrant graduates to the annual output of graduates in Table XIII. This is, as noted, only one alternative costing method; others might lead to different results. Some feel that education is a 'sunk cost' which should not be included since it would have been expended whether or not the emigrant left.

Total costs of education consist of the direct costs and the earnings foregone. Occasionally the concept of 'present cost' is used. Such estimates are sometimes available for developed countries but very rarely for developing ones.

Using somewhat similar but more elaborate calculations, one expert values at circ $20,600 the present worth of the investment costs of a Turkish university graduate in 1965 and at $11,555,000 Turkey's annual loss of 575 professionals or 2-3% of total capital formation annually in the educational system.[2]

UNESCO estimates that a year of elementary education in Latin America costs the government about $42.00 but that university education averages $700.00 per person per annum.[3] According to some estimates, Indian educational costs are estimated at Rs.3,093 or $367 for a non-technical diploma, Rs.4,176 or $560 for a technical diploma, Rs.10,237 or $1,374 for a college degree and Rs.19,083 or $2,561 for a technical degree.[4] On this basis, the aggregate costs of education

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1/ Some countries, like Ireland, Greece and the Republic of China do pocket an export loss in the production of highly-trained manpower which is chronic and high. It may sometimes be assumed that remittances will contribute more to the economy than the internally-employed graduate could; or, in exceptional cases, that lossoof product is less serious than abandoning a famous department which, like that of statistics in India, could hardly operate without exceeding national demand.

2/ Frank, EWA report, op. cit.

3/ House Report, 28 March 1968, p. 27.

4/ A.M. Nalla Gounden, "Investment in Education in India", The Journal of Human Resources, Vol. II, No. 3, Summer, 1967, pp. 347-358, cited by Watanaba, op. cit. Education obtained before the devaluation of the rupee in 1966 should be valued at approximately 70% higher.

lost to India due to emigration of professionals to Canada, France and the United States would have been over many years in excess of (before 1966) $1,700,000 per annum and, since the precipitous rise in the last year of professional Indian immigration into the United States, would currently be at a far higher rate than that; indeed, if one assumes that India loses the Indian equivalent of a degree for each of the professionals India lost to the United States, plus nurses to the United States and elsewhere, the loss for that year in education costs alone would be approximately $5,500,000.

Indian costs, however, are exceptionally low. Africa's, especially for higher education, are vastly higher. Latin America falls in between and may not be far from the norm. Here, calculation of educational costs has greatly varied. The U.S. House of Representatives put these "conservatively" at $20,000 per person for Latin American professionals leaving for the United States.[1/] A recent Colombian study estimates the cost of educating a Colombian professional at U.S. $3,182.60. When adjusted for the different exchange rates operating during the period considered and for the fact that emigrants generally have the most, not the least, expensive education in their fields and that the proportion of medical doctors, with by far the most expensive education, is about 35% of Colombian emigrants to the U.S., the author of this study has agreed that the educational cost of the average Colombian professional emigrant to the United States would not be under, perhaps over, U.S. $10,000.[2/] On this basis, Colombia's average yearly loss in educational expenses for her emigrating high-level manpower from 1955-68 would be on the order of U.S. $25,000,000, plus $4,958,000 for intermediate personnel. Educational expenses for fourteen years to 1968 were equivalent to considerably more than the sum allocated for educational expenses in the national budget for 1969. In addition, the amounts consumed in foreign exchange by those students abroad who then emigrated without returning were $57,100,000 in foreign exchange for the fourteen-year period from 1955-68.

Cameroon, which sponsors about 250 persons for higher education in France each year, losing about one-third of them, is estimated to lose thereby in these supporting costs alone about F7,000,000 a year.[3/]

1/ House Study, July 1967, p. 105.

2/ G. Eusse Hoyos, "The Outflow of Professional Manpower from Colombia", Bogota, (UNITAR study).

3/ Paul Bourget Sack, op. cit., p. 62.

One expert, examining closely the phenomenon of Turkish brain drain, reckons the present value of the future gross earnings foregone at nearly five times the value of the educational investment in Turkey. It would appear to be less than this in Africa, where educational costs are higher and salaries lower. It would be more in many South American and some Asian countries where earnings are a higher multiple of educational costs (as they are in developed nations.) On this basis the present value of future earnings foregone for Turkey's annual exodus of 575 professionals at U.S. $54,000,000, equivalent in value to one month of Turkey's commodity exports.[1/]

If one assumed that, considering nations above and below this line, Turkey might not be so distant from median in this regard, one might value the future earnings of the 1968 immigration of professionals into the United States from developing countries - allowing for the quality level present in the professional, technical and kindred - at roughly on the order of U.S. $1.5 - 2 billion and for world professional migration of this ilk not less than U.S. $3 - 4 billion. If one ignored the concept of present value of education received but took the Colombian-level educational cost and multiplied by five for the earnings foregone one still arrives at over U.S. $1 billion as the approximate valuation of earnings foregone in developing countries of the 1968 immigration into the United States of professionals from developing countries. The world total would be likely to be over U.S. $2 billion, in that year. These are substantial figures compared to the aid currently given by the main recipients of professional migration.

Such figures are subject to myriad reservations and can be thought of at best as the roughest and most uncertain of estimates. On the one hand, they would be lessened by the fact that some among the above professionals would not be employed in their home countries. Most evidence indicates that these are minor percentages except in the case of India, Pakistan and, perhaps, Taiwan. One must assume that the figure is an uncertain compromise between the lower earnings of those professionals who, despite graduation abroad, are of indifferent ability and those who are brilliant and whose discoveries and contributions would be far above the average indicated.[2/]

1/ P.G. Franck, op. cit.

2/ The recent Education and World Affair study, op. cit. believes that on the order of half the non-returning students are of fairly routine talent and attainment and only a very small percentage (5-10%) brilliant. Important discoveries can add many millions of dollars - or even more - to national economies.

Such costing assumes only educational costs for an emigrating professional. His burden to the economy and services of his own country during the years he was being raised without performing economic tasks, plus the income foregone during the educational process, plus interest charges, might be regarded as additional to the above schooling costs. Against such costs must be set those costs which developed countries contribute to the higher educational costs of many foreign students who later emigrated.

If one takes the figure of $10,000 per professional for educational costs, a figure a little less than that estimated in the Colombian study by a government institute long operating in this field, assumes that it would not be too far from an average among world costs in developing nations as a whole, does not add any figure for the non-educational economic costs for raising the expert, one would arrive at a total of educational costs to developing countries of the 1968 professional and technical immigration into the United States on the rough order of $220,000,000 and a world total which might approach twice this figure.[1/]

5. Loss of the Effect of Trained Individuals

The above sections attempt to relate the loss to developing countries from the outflow of trained men and women to categories which yield statistics and a degree of measurement. The most important losses, however, centre around the contributions trained persons make not only professionally but creatively in terms of leadership and talent. Without such qualities development cannot take place and the demands of leadership, politics, planning and imaginative management cannot be met. In addition, trained men have now become the masters of those techniques of management, control and planning which are the keys to modern national wealth and power. Though unappraisable because the potential contribution is a result which did not take place and because means for assessing the exact relationship of trained men to development have not been found, losses of talent certainly have profound developmental repercussions.

a. Migration of Unemployed

At one extreme, there is the professional or the skilled person who is completely unemployed in a developing country, as is the case currently with Indian civil engineers.

1/ It would probably be an overestimate of educational expenses alone since by no means all the 'professional, technical and kindred' would be as expensively educated in this, but the income foregone, non-educational expenses, interest, etc. expenses would be counterbalancing factors.

Other instances of fairly substantial professional, skill or intellectual unemployment are traceable in Korea, in Hong Kong, in Taiwan, in Greece, in Dahomey and a few other places at certain times. Where unemployment is complete, the skilled person contributes nothing in an economic sense (though he might contribute informally in the realm of ideas, communication and social action). Whatever goes into him to sustain him might be held to be a 'dead weight' on the economy. The loss suffered by the economy is the loss of the subsidies and services which went into him and his education. These losses, however, are suffered regardless of whether he remains or migrates. Migration to a job would tend to relieve the economy of a slight burden and, if the migrant sends remittances, the economy would addedly profit.

Insofar as we deal with non-returnees, it is hard to conjure with the dimension of unemployment since the non-returnee has not tested it. It is usually not valid to take figures for general intellectual unemployment in countries like India and Korea and equate them with the employment likelihoods of the average returnee. The over-expansion of colleges in the above countries have created thousands of graduates from inferior institutions who would not even be accepted in foreign institutions for further training. The value of these can certainly not be compared to that expectable of a graduate better-qualified to begin with who then acquires still better education abroad. On the whole, outright unemployment in most less developed countries is somewhat more alarmist than real except in a fairly small minority of instances. For professional emigres who are not students adjusting status, we have interesting evidence from Trinidad and Tobago, where unemployment is some 14% of the labour force, that almost all such migrants were persons employed in middle-class or better jobs.[1/]

b. Mal-distribution of Talent

Brain drain is part of a far vaster wastage of human resources in developed but especially in developing countries which, through mismanagement, undermines maximum utilization. A country clearly loses less when a trained man leaves if it does not use him well when he stays. Such mismanagement is of several typical kinds:

(i) Educational (see Chapter V). When, for example, 54% of Greek university enrollment is in law, the humanities, and in general economics and politics while

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1/ Statistical Office, Trinidad and Tobago, report for UNITAR.

only 14% are in applied fields of science including agriculture, the products of education are not properly useable.[1] There are probably no countries which do not waste talent through inflexible, tradition-ridden educational systems like the foregoing. As a result, marginal productivity in these professions becomes low and salaries and incomes follow as, often, does emigration.[2] The same result occurs when a talent, useful in one quantity, is vastly over-produced, as with Indian engineers or Korean pharmacists or when, as in Argentina, only 81% of persons holding engineering degrees (as compared to over 94% in developed countries) are in occupations normally employing this type of profession.[3] (See V,F.)

(ii) Non-use of talent in rural areas. Insufficient rewards are given all over the world for the application of skills and professions to those needing them most in rural areas. This is especially true of medical personnel. The equivalent of 51% of Bolivia's annual output of physicians applied for immigration to the United States in 1965 while most of Bolivia's rural areas were most inadequately, from a health point of view, covered by doctors.[4] Half of the government clinics in the Punjab are vacant and thousands of Indians die daily of preventable causes while many thousands of Indian doctors, 10% of her stock, practice in developed countries. "The Korean government has built about 800 dispensaries in rural areas over many years but half of them are not staffed with even a single doctor. Statistics show that only 1,000 doctors are practising in rural areas where fifteen million Koreans live."[5]

Yet everywhere, even where, as in Nigeria, there is only one doctor for 32,000 people, physicians congregate in cities and are of little service for rural needs. The emigration of such a physician might, statistically, be viewed as inflicting great loss in terms of many people's health; in fact it is more likely

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1/ C. Coutsoumaris, "Greece", The Brain Drain, op. cit., p. 173.

2/ However, emigration is more apt to take place not in the over-produced fields of law or arts but, often, in those less produced or even underproduced. The former are tied to the nation of origin while the latter, like engineering, medicine and the sciences, are more international. This indicates that world competition for talent is a very important factor in migration.

3/ OECD, Education, human resources and development in Argentina, Paris, 1967, p. 281.

4/ Depa tment of State, "The International Migration of Talent and Skills", October 1966, p. 131.

5/ Ahn, Chae-ho, M.D. "A Medical Trip to my Homeland, Korea", Asian Forum, Pan Asia Foundation, Washington, D.C., January 1969, p. 27.

to mean that twenty-five patients in Lagos or Ibadan who can go to another physician will have to do so. (See, inter alia, Recommendation IX, D. 1, e., IX, B, 4, b.)

(iii) Other mal-distribution of talent. Political balkanization or linguistic, cultural and racial differences within countries may also impede using talent where it is most needed. This probably occurs in India.[1] In some cases in Africa, as in Nigeria, preferences have appeared for importing foreign skills rather than utilizing indigenous skills available in surplus in other parts of the country.[2] Emigration is a natural response to such conditions. (Recommendation IX, B. 1. b., IX, B. 5)

c. Under-valuation of Talent

Many states including some older developed ones, are dominated by social and institutional value systems which rewarded the class, social, literary and legal values associated with land ownership in agricultural states or with the early rise of a pre-technological bourgeoisie. Wealth now tends to reside in science and technology rather than in the holding of property. In the long run, reward systems must reflect these new conditions. Countries of Confucian - and of many other types of traditional - background have encountered problems in valuing the technician and the specialist as highly as the generalist and literatus; a contributing factor to large outflows of specialist talent from the Republics of China, Korea and Vietnam.[3] Latin America and, indeed, much of the developing world, similarly have under-valued the agronomist and the veterinary. Industry in much of Europe, including Greece, has tended to under-value long-range research and expert advisory services.[4] Improvements here would attract professionals

d. Lack of Adequate Support for Professionals

It is characteristic of developing countries that the amount of physical capital available per worker is low. Largely for this reason, the new institutions of developing countries have usually lacked the logistical and career means of

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1/ Indian Manpower Journal, October 1965-March 1966.

2/ The replacement by French advisors of qualified West African experts who then went to international agencies has also been noted in UNDP reports.

3/ Much the same applies to many other countries including England, and has been a subject of criticism and of recent administrative measures in the United Kingdom.

4/ G. Coutsoumaris, op. cit., p. 175.

satisfying the high expectations of newly-trained professionals. Often not through mismanagement but through lack of time and resources, developing countries have inadequate buildings, libraries and equipment to support teaching, let alone funds for research, staff or adequate settings for the deeper communication of ideas in the sciences. There is frequently a lack of middle-level personnel who can take routine work off higher-trained hands. There are few hierarchies which can satisfy the professional's desire for advancement in his chosen world. Frequently job security is lacking and management fails to perceive the most profitable uses for the expert. (Recommendation IX, B. 1, 2 and others.)

Specific instances of actual damage to real developmental activities have been slow to be adduced, but they exist. Several technological institutes in Argentina and Brazil have been either closed or severely crippled as a result of group migration of their scientific staffs. A number - probably, if studied, a quite large number - of aid projects in Near Eastern and other developing countries have been financed at higher expense, more slowly and with results less permanently beneficial to infrastructure because indigenous personnel were scattered abroad and package imports of temporary foreign experts were used.[1/] In other cases, in Pakistan and elsewhere, university departments which were needed and planned for could not be started because of the emigration of key professors.

e. Migration of the Fully-Employed

Except for some Asian countries, notably India and Pakistan, the professional more often emigrates even when he is employed, even though not as fully and professionally active as he might be in a developed country. This is particularly true of the high-calibre professional whom the immigration policies of developed countries seek to attract. Sometimes for salary reasons sometimes for others cited elsewhere, the migrant will accept jobs abroad with more modest administrative or hierarchical responsibilities and sometimes at salaries which, though higher, are a far less high multiple of unskilled labour in the home country.[2/]

1/ For illustrations, see Zahlan and Franck articles, op. cit.

2/ In India, for example, a head meteorologist received a salary about thirty times as high as that of the Indian who carried papers around his office; in Pakistan, twenty-seven times. The salary of the corresponding U.S. position was five-six times higher than that of the person carrying papers around the U.S. office. (Tibor Scitorsky, "The Trend of Professional Earnings", American Economic Review, March 1966.)

Turkish doctors, for example, have no trouble finding employment in Turkey but, out of a stock of 12,000, 1,200 work abroad, 800 in the United States. A recent study estimates at $88,000 the cost to Turkey of one professional emigrant if estimated future earnings foregone are included.[1/]

The emigrants from Colombia for the fourteen years from 1955-68 are estimated in another study to have cost Colombia a loss in potential salaries of $71,164,315 during these fourteen years or 4.4% of the Colombian national income for 1967. The same study reckons the potential loss suffered by Colombia because of the lack of contribution of the emigres to the Colombian GNP at $106,657,600. As with Turkish doctors, unemployment for Colombian professionals was insignificant. Among many returnees interviewed, only 6% took longer than four months to find a job in Colombia. Average professional unemployment in Colombia is 4% - no higher than in the United States, though there is more underemployment and employment at low salary levels.[2/]

Such cases imply that competition between developed and developing countries for the talent of the latter does take place and does damage development. If the world community wishes to give overriding value to development, the emigration of the fully-employed professional is an area in which individual desires conflict with international value. In such cases, the loss of new science and technology is serious despite the higher stated value of the salary to which the innovative migrant went. This would particularly be true when, as in some instances, the departure of the professional breaks up a team and multiplies the departures which his own may bring about.

C. General Value of the Highly-Educated

The highly-educated are a chief force for stimulating personal initiative, expectations, ambitions, political reforms and the spirit of enterprise. They generate creative thinking without which no profound transformation of traditional ways of life is conceivable. There are several unquantifiable qualities, such as:

Leadership Initiatives

The highly-educated are mainsprings of national leadership and progress in every field, many heading developing states and constituting the competent, risk-taking element which has spearheaded political change.

1/ Dorothea Franck, "The Student Dilemna", Mid East, pp. 23-24.

2/ G. Eusse Hoyos, UNITAR study, op. cit.

Two trends are now qualifying these generalist contributions. Modern experts are increasingly specialized and, as science has expanded, more effort must go into mastery of lesser portions of any field. Such specialization is perhaps intrinsically less easily transferable to general administrative and political utilization than education in law (e.g. Gandhi and Nehru) or general humanities. More specialized education also gives rise to increased valuation by the student of his worth in terms of technical contributions within the profession judged primarily by an international peer group.

The increase in such specialized education corresponds historically to the achievement of political independence for most world nations. The struggle for independence with its 'sacrificial' and political values created demands for general national leadership which now seem less urgent, especially to the more recent specialist whose values are more clearly lodged in an international professional group. This trend may, to some extent, run counter to the needs of newly-founded states for educated leadership whether in office or generally in civic activities: the new professionals respond less enthusiastically to such leadership needs either in their return or in their political commitments once returned. Such loss or erosion of potential educated leadership, while not statistically demonstrable, may be worth many times the value of technical skills alone. The loss of even small numbers of such leaders can therefore be serious, even crucial, for development. The very breadth of the gap between rich and poor states demands unusual imagination and leadership which must come largely from those educated in the era of the new technology. The emigration of large numbers of such persons might, in extreme instances, conceivably block the possibility of development almost completely.

D. Offsetting Factors for Developing Countries

Certain advantages undoubtedly accrue to developing countries as a result of the migration of skilled and highly educated nationals to developed countries.

1. Remittances

The remittance of portions of overseas earnings to the home country has historically played a significant role in the balance of payments of a number of developing (as well as developed) countries, in some cases leading to encouragement of emigration by their governments and leaders. China, India, Greece, Portugal, Turkey, Italy, as well as some Latin American countries have all profited substantially. Turkish workers abroad - probably, however, mostly unskilled, sent a total of $70 million home in 1965, equivalent to 15% of Turkey's export proceeds

or 12% of its import bill.[1/] Lebanese emigrants in Arab countries (only circ 2% are college graduates) contribute some LL400 to 600 million a year to the Lebanese GNP of LL4 billion. What highly-educated emigrants to the United States, Canada, etc. to contribute is not known.[2/] The remittances of Jordanians working outside the country constitute the second largest source of Jordan's foreign exchange. For this reason, and because of high unemployment in Jordan, it is believed that the Jordanian government is not willing to take serious steps to stem the flow.[3/] Very few such workers, however, (there were 77,712 of them in Kuwait alone in 1965) were highly-educated. Since the earnings of highly-trained men in developed countries are high, there are many instances in which their remittances are also. For example, medical personnel from Korea working abroad remitted a total of $14,310,222 to Korea from 1964-68.[4/] Some no doubt send home more than they could save and sometimes more than they could earn if they had worked in their own countries.

Unfortunately, though there are statistics on total remittances, there appear to be almost none which separate earnings from the highly-trained from many other sorts of remitted earnings. Many historical instances of substantial remittances by large numbers of unskilled or lesser-skilled workers working abroad are known. No instances of very substantial foreign exchange earnings derived specifically from highly-trained emigrants appear thus far to have been publicized except for the cited Korean example.

Further study of this aspect is called for and countries which feel such remittances to be important would perform a service by coming forward with appropriate statistics. It should, however, be borne in mind that such remittances are voluntary and private, going usually to relatives. They do not repay the subsidy which the nation gave to the emigrant's education. In addition, the immigration legislation of most 'receiver' countries is written to encourage the immigration of relatives of permanent immigrants, including wives, children, and, frequently,

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1/ See C.P. Kindleberger, "Emigration and Economic Growth", Banco Nazionale del Lavoro, Quarterly Review. September 1965; Robert H. Eldridge, "Emigration and the Turkish Balance of Payment", Middle East Journal, Summer, 1966. I am grateful also to Mr. S. Watanabe of the ILO, "Brain Drain from Developing to Developed Countries", April 1968, a manuscript on which was based Mr. Watanabe's "The Brain Drain from Developing to Developed Countries", International Labour Review, Vol. 99. No. 4, April 1969, pp. 401-433.

2/ Zahlan, UNITAR study, op. cit., p. 29.

3/ Mid East, January-February 1969 issue on the brain drain, p. 9.

4/ Korea Week, Washington, D.C., 15 July 1969.

parents, brothers and sisters. Such legislation has the effect of transferring the remittance beneficiaries to the developed country and increasing the expenses of the immigrant there. Eight thousand nine hundred and seven such 'preference relatives' were adjusted to permanent status in the United States in 1967 alone and thousands more appear to have entered as relatives under other categories. Highly-trained persons tend, therefore, to have more expenses in the country of immigration at the same time as they earn more. This is less true for migrant workers on a lower level and appears to explain why, in addition to their large numbers, the latter have been historically more important sources of remittances.

On the whole, remittances by professionals seem not to be a factor of first-rate significance.

2. Contributions to Knowledge

a. Student Returnees

Despite increasing emigration, we have seen that foreign-educated have also been increasingly returning to their home countries. These returns have aided a flow of knowledge, technique, science and administration from developed to developing countries inestimable in its value.

b. Professionals from Developing Countries active Abroad

By placing their productive skills in institutions which industrialized societies have equipped with the finest facilities and most excellent staffs and by being there adequately and securely supported, the professional, especially the scientist from the developing country, may be able to maximize his contribution to the advancement of knowledge and to its dissemination to developing countries through learned articles and books, or in improvements spread by commercial or foreign aid. In contrast, if these same persons remain in their own countries without research facilities, their potential may be lost. If, also, they remain at home and their home developing country constructs research facilities which they use, substantial investment is incurred, the fruits of which might be obtained from the developed country without this high investment cost.[1/] Many migrant scientists are deeply committed to this view.

1/ Among those holding such views are Harry G. Johnson, "The Economics of the Brain Drain": The Canadian Case, Minerva, Spring, 1965, and Herbert B. Grubel and Anthony D. Scott, "The International Flow of Human Capital", American Economic Review, Papers and Proceedings, May 1966 and Grubel in Proceedings of the Conference on the International Migration of Talent and Skills, U.S. Department of State, October 1966. In addition to capital expenditures, the emigration of professionals reduces to some degree expenditures of foreign exchange and for luxury.

Iti is unquestionably true that his argument has force in the instances of Nobel Prize-winning Chinese scientists and with scientists of top calibre. Few doubt that this is one reason, in fact, why international migration of the highly skilled should never (it certainly can never) be stopped. There is severe question, however, as to the relative role of such persons in the total picture of present migration. Of the 10,506 professional immigrants into the United States from developing countries in 1967, for example, immigration statistics show that only 1,472 were natural scientists. As in all professional categories, these represent greater and smaller skills, higher and lower levels of occupation to the lesser of which the argument would apply with little force.[1/] A somewhat similar picture seems true of Canada as regards natural scientists and far smaller proportions of such scientists apparently migrate to the United Kingdom. It is thus most unlikely that this argument applies with conviction to more than a very small minority of the present professional migration. In addition, as noted elsewhere, the high involvement of immigrant scientists in defense-connected programmes plus the lack of institutions in developing countries for receiving science and technology casts doubt on the general thesis that the fruit of their knowledge is automatically available to developing countries.[2/] High talent may be international, but the problem of its allocation still remains; it still matters considerably where such talent is located.

3. Relief of Unemployment

When the professional is completely unemployed within a developing country, as apparently, thousands of professionals are in India and Ceylon, emigration relieves the economy of the need for supporting him and may, in some instances, remove a source of dissatisfaction and political instability. A recent ILO draft report on brain drain makes clear that unemployment is, however, exceptional and shortages of high-level personnel, especially of engineers, natural scientists and medical personnel are, in most countries, the rule.[3/] While economic and political burdens

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1/ Some non-scientist researchers would also, however, fall within the argument.

2/ Of course, heightened productivity in developed countries probably applies to most skilled migrants but except where advances of knowledge occur and are internationally communicated, the fruit of heightened activity is a benefit for the developed country alone.

3/ S. Watanabe, op. cit., p. 39.

may sometimes be lessened, migration of professionals or skilled workers is in no case sufficient to relieve the excessive pressure of population as a whole on resources nor does it contribute significantly to decreasing population increase. Indeed, some have argued that the migration of those who would have exerted strong pressure for population control measures constitutes one of the real costs of brain drain.

4. Channel of Communication

Brain drain is part of a new environment of communications. Working through the communications revolution, the migrant professional could become, and sometimes is, a communication channel of high quality between his adopted and his home country. Through him his country can forge better links with the world network of knowledge. Support for change, application of new theory to specific developmental situations, advice, books can reach former associates back home. He also helps in the placement of new professionals from his own country in the hierarchies of developed countries.

Up to now, much of the potential of this new communication system remains promise rather than actuality, unevenly developed at best. As foreign professionals from many developing areas have built up and become better established, there has been discussion of more organized use of this potential communications system. Despite its potential, however, there seems only very limited evidence of its active creation as yet for many areas.[1/] Communication between European professionals employed in the United States or Canada and their European colleagues and bases appears to be much better than communication by professionals from developing countries with their home bases.[2/]

1/ See, for example, A.B. Zahlan, The Brain Drain (Lebanese and Middle Eastern Countries), (UNITAR study). The Korean Institute of Science and Technology is an organized developmental instrument of communication between the United States and Korea which includes many Korean graduates of U.S. institutions at both ends. Developmental institutes and research centres in France, England and elsewhere also make some use of this communication potential.

2/ A 'brain drain' conference of European scientists employed in the United States taking place at the Harvard Center for International Affairs, 24-25 April 1970, felt strongly that the Atlantic had become a river and that it no longer greatly mattered on which side of the river one lived. Most participants visited their home countries every year. The same could not be said of most professional migrants from developing countries, many of whom have not gone home in fifteen years or more and maintain little professional correspondence with their home countries.

5. Emigration as Stimulation

Professional success in the developed countries may serve as a stimulus for fellow countrymen in developing countries to enter the same professions and work hard at them. Such motivation generally tends to perpetuate emigration but where social discrimination against certain technicians or professionals exist in a generalist traditional society, such emigration in itself may constitute a stimulus for needed social change. In some specialized fields, there are arguments of the advantages of economy of scale. Prestigious academic departments in such countries as India (statistics) or Hungary (mathematics) might operate less efficiently (if at all) and lose their quality and standing if they did not produce partly in excess of local demand.

E. Advantages to the Developed Countries

1. Deductions from Immigration Legislation

The advantages to advanced countries of the professional immigration can be accurately appraised from the immigration legislation passed by them during the last decade.[1/] Such legislation takes care that persons admitted will not be public charges, will adapt easily and will be of maximum benefit to the economies which they enter. Except in categories where it is known that jobs are, almost automatically available, the possession of jobs is an important, usually a necessary, requirement of immigration. Such legislation justifies a presumption of full employment of professional immigrants by complex economies. Immigrant professionals are, in fact, employed at virtually every technical and teaching level from Nobel scientist to teaching assistant, residents of small hospitals, or drill operators. The overwhelming majority of these immigrants are young and this is especially true of those from developing countries.[2/] The productivity of most in the developed countries is likely, from what we know, to last throughout their entire professional careers which may, on the average, be somewhat lengthened by the higher health conditions pertaining there.

1/ Hearings of the Sub-Committee on the Judiciary, U.S. House of Representatives, 1964, run to several volumes in the instance of the 1965 U.S. Immigration legislation. These volumes shed added light on the question of intentions.

2/ Annual Report of the Immigration and Naturalization Service, Washington, D.C., 1967, gives the median age of all migrants to the U.S. at about 24, the age level remaining quite stable over a number of years. The average age of professionals from developing countries is believed to be in the late twenties.

2. Valuation on the Job

a. Postulates of the Value of Education and Training

The professional from a developing country brings with him, on entering employment in a developed country, a value of education, training and skill. Sometimes - as with most doctors - this education has been acquired entirely in a developing country. Sometimes, as with many engineers and most scientists, it has been acquired at the university level in a developed country (usually the one in which he is employed) but also at previous levels back home. Different assumptions exist in the valuing of this education. One can either estimate actual cost by averaging the cost of educating professionals within developing countries and multiply by the number of migrating professionals. Or one can assume that the job, if not filled by an emigrant, would have had to be filled by a national of the country and value the contribution by the cost of the education and training which would have had to be given the native applicant in the developed country. Neither figure will have much accuracy but will indicate roughly the order of magnitude with which one is dealing.

We have assumed above an average educational cost, based on Colombia figures of some U.S. $10,000 per professional. This is undoubtedly low but would then allow for the contribution which developed countries make to the more expensive portions of the education undertaken within them. On this basis the educational value contributed by developing nations to the 75,000-odd scientists, engineers and medical personnel entering the United States from 1953-69 would be on the order of $750,000,000, $132,000,000 in fiscal year 1968 alone. The value of those going to other developed countries might amount together to an amount close to this, if not somewhat more. The figure of $10,000 selected is low. Another expert has recently calculated the value in the case of Colombia of a university education for engineers at $13,220, for scientists at $10,920, and for physicians and surgeons at $13,220.[1/] The figure used by the Research and Technical Subcommittee of the U.S. House of Representatives was $20,000 per professional. If such estimates were used the figure would rise to or well over U.S. $1 billion for the total intake from developing countries to the United States. The House estimate seems high in the light of subsequent research, but the total seems clearly to lie between U.S. $ one and one half billion.

1/ G.R. Gonzalez (ILO), op. cit., p. 14.

Costs of educating professionals in the United States are, of course, very much higher, mounting, in the case of surgeons (the most expensive), up to $83,000 per person.[1/] Even if one took the cost of producing professionals in the United States as being in the $20,000-40,000 area during the years concerned, such costs would be on the order of upwards of $2-3 billion.[2/] For the 1968 inflow alone, they would be on the order of half a billion dollars. The education within the United States of the 28,000 medical doctors from developing countries would have cost at least U.S. $1 1/2 billion.

The above concerns only value at the moment of entering a career in a developed country. The value which the professional migrant adds during a full career in a developed country at the salary and production levels of developed countries would be, of course, greatly larger, perhaps on the order of twenty times or more the figures for the U.S. value of the education at the time of entering the job and certainly in the tens of billions of dollars for the United States and in the billions of dollars for other developed countries.[3/] Such figures indicate in fact, the great productivity which professionals have when they enter developed economies: certainly, productivity far greater than it is likely to be within their home economies. These statistics are, of course, influenced by the overall quality of the professional migrants and would be reduced by the flow-backs which return home during the career span. They do not include, however, the contributions of middle-level personnel.

Such estimates, however rough, indicate that the picture of aid between developed and developing countries has yet to be expressed in a form recognizing that this aid is quite importantly a two-way process even though the methods and channels of this aid differ. This is particularly true because large numbers of

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1/ Hardly any doctors from developing countries enter with an education which even in U.S. terms would be anywhere nearly as costly as this, however.

2/ A former U.S. Deputy Assistant Secretary of State (Harold Howland) estimates the imported scientists and engineers at nearly 100,000 and estimates at "at least $4 billion the saving to the United States in total educational costs". Interchange, Vol. 4, No. 5, December-January 1970, Washington, D.C., p. 2.

3/ Such figures will seem more modest when it is recalled that the invention of power steering alone by a single, not very well-known (native) American inventor is credited with having added $5 billion to the U.S. economy. Houston Branch and Wendell Smith, The Unreasonable American, Washington, D.C., 1968, p. 155.

professionals tend to come from those same countries to which the developed countries have given great aid. Thus in 1967, eleven major recipients of U.S. developmental assistance were the source of 5,189 scientists, engineers and physicians or two-thirds of the total immigrating in that year from developing countries to the United States.[1/] Much the same could be said for France and the United Kingdom.

b. Questions Regarding Careers in Developed Countries

Among many other factors, the valuation of professionals from developing countries depends upon the level actually present behind the title of professional. In some cases, this is clearly extremely high.[2/] In more cases, the level appears to be comparatively low.[3/] While there are many practising physicians of distinction, the majority of medical doctor imports from the developing world, for example, appear to be used in middle-level resident and intern positions. It is widely believed that fairly large numbers of former African students remaining in France are educational drop-outs or take exceptionally long periods of time to finish their degrees after which they sometimes find relatively modest employment. Ex-students from the Middle East in Germany frequently engage in small business after graduation. While some professionals from developing countries have become professors of great distinction, more have gravitated to smaller colleges and schools which in the United States could not retain accreditation without obtaining Ph.D's whose supply from native graduates is inadequate. In contrast to the thousands of Indians practising as doctors in the United Kingdom, recent investigation disclosed no single Indian who occupied a full professorship in science or medicine at an English university. Evidence on this point is to some extent counterbalanced by the distinguished records made by many scientists from developing countries in industrial research, Chinese, for example, having earned an

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1/ House Report, op. cit., p. 14. The countries are: India, Turkey, China (Taiwan), Brazil, Pakistan, Philippines, Iran, Chile, Israel and Colombia.

2/ Two post-World War II Chinese scientist emigrees into the United States, for example, won the Nobel Prize.

3/ "Modernization and the Migration of Talent", Education and World Affairs, 1970, p. 20, estimates that about half the graduates from developing countries in the United States have only the formal evidence of graduation without the substance of knowledge and training what make them valuable. The rationale of this estimate is not given.

enviable reputation as physicists and engineers.[1/] Further study is clearly needed here. If there is, in fact, a tendency to use fairly large numbers of professionals from developing countries in middle-level rather than upper-level positions, the total value of the above contribution would be lowered, the long-term promise of career may be lessened and the tendency to eventual return may be greater than what can now be suspected or statistically supported.

c. Other Values

One advantage which may accrue to a developed country from the immigration of professionals trained in other cultures is the value of an "international mix". Certain large, older business firms, General Electric (U.S.), for example, have found over a period of many years' experience that they obtain more value and stimulation, particularly in research, by mixing people who come from different cultures and educational systems than they obtain by drawing on a relatively uniform product.

A further advantage to developing countries from such immigration lies in enhancing the capacity of industrial concerns to operate in developing countries, establish branches, affiliates, etc. Clearly this should often be a factor of mutual advantage to both sides and, if well-managed, could even lead to greater advantage to the developing than to the industrialized country.

Communities of highly intelligent foreigners within the societies of developed countries may have certain favourable effects on the levels of understanding which the developed country may develop for the home country of the foreign community. On occasion, foreign and aid policy might be favourably influenced through such factors.

F. Offsetting Factors for Developed Countries

It is most difficult to find factors of substantial disadvantage to developed countries. The following are the few which could be identified.

1. Educational Places

Since few developed countries can operate their economies adequately relying solely on their own educational systems and since, on the whole, the expansion of educational systems in developed countries has generally lagged behind need, the

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1/ Nearly half (48%) of all foreign Physics graduate students in the United States from both developing and developed countries are Chinese and Indians, Physics Manpower, 1966, op. cit., p. 93.

significant number of places which the United States, the United Kingdom, France and Germany provide within their own higher educational systems for foreign students does involve some cost. This cost is increased by the fact that considerable organizational expense has been invested in procedures for the selection and admission of these students and for their welfare while abroad.[1/] It can be argued that the receiving country may thus have been penalizing the opportunities of portions of its own population - including disadvantaged portions - to receive a higher education; to a small extent, the general price of higher education may be raised.

2. Postponing Solution to Internal Problems

The United States, the United Kingdom, Canada and, possibly France, are using imports of foreigners to solve problems of internal adjustment between educational supply and job demand which they would have been forced to solve for themselves using their own citizens if a ready supply of human imports from economies with lower standards of living had not been readily available. This is especially true in the field of medicine, where, for example, the United States graduates only some 9,500-10,500 doctors to supply annual needs in the neighbourhood of 13,000-14,000. Many medical experts in developed countries feel that, in addition to the effect on developing countries, industrialized societies have lowered health standards by admitting to hospital work thousands of practitioners possessing medical degrees which are not the equivalent of those in developed countries. In Canada, "heavy dependence on immigrant skill, particularly in the period from 1946-56, tended to mask the slow development of labour skills among the native-born population."[2/] Only after this period was the inadequacy of vocational training in Canada recognized and acted on. In so doing, these countries have also prevented an internal adaptation to demand which might have brought presently under-privileged groups among their own nationals in greater numbers into the medical profession, thus penalizing the long-run strength of their medical systems and hindering processes of betterment within their own societies. Certain sub-fields, as for example, "classical" electrical and mechanical engineering, have encountered similar problems as indigenous graduates flock to atomic and

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1/ I.e., the Institute of International Education, the British Council, Foreign Student Advisors, etc.

2/ Manpower Policy and Programmes in Canada, OECD, Paris, 1966, p. 53.

satellite engineering, leaving thousands of teaching positions in the older fields to be filled by foreign graduates.

G. Conclusion

It is not possible to assess with confidence the loss (or profit) that the present migration of professionals inflicts on developing countries. Nor would all agree that important development which would have occurred if migrating professionals had stayed has not occurred because they left. It is not even possible to be certain that "brain drain" causes lack of development; it is more probable that lack of development caused migration. As part of development, professional outflow can only be ameliorated as consciousness of it and of the development problems associated with it themselves lead toward solutions.

Certainly, however, there are some costs to developing countries in terms both of education given with the fruits withdrawn, in terms of high-level service denied. Larger, probably far larger, than these is the benefit which developing countries obtain from the careers, often high-level, which they obtain partly and sometimes wholly without payment for the preparation of these skills. Migration may not be one of the more major causes of under-development or of presently widening gaps between rich and poor countries; yet it certainly contributes to such gaps, probably to an appreciable, though minority, extent.

Fears have often been expressed that developing countries may come to believe that their chances for development are handicapped because of the exportation of their natural resources. Such sentiments are beginning to be more widely expressed by the leaders of developing countries. The exportation of human resources is not unlikely to become the subject of similar fears. Men welcome the freedom to move where they choose; they applaud the United Nations Charter support for such freedom - even with the knowledge that real freedom of permanent emigration remains, in fact, the privilege of the few. Yet, in a world of stark wealth-poverty, there are legitimate doubts as to whether complete freedom of movement is, in fact, compatible with the maximum development of developing countries.

VIII. MEASURES CURRENTLY BEING TAKEN REGARDING THE OUTFLOW OF TRAINED PERSONNEL

A. The Climate of Action

The extreme complexity of the issues involved in the migration of talent, the difficulty in awarding valuation under varying circumstances and of resolving the conflicting demands of individuals and of societies have resulted in mixed views and varied positions on the question not only internationally but also within many individual nations. In a few countries, like the United Kingdom and India, the migration of professionals has become an issue between the government and the opposition. In others, some parts of government are concerned while other parts favour talent emigration or are silent. In still others, there is pervasive official silence broken only occasionally by individuals.[1] Many countries are just beginning to study the issue and to express concern.

Several international and national attempts have been made to solicit governments' opinion on the migration of talent. Among the international, the latest was resolution 1274 (XLIII) of ECOSOC asking, in part, for the "observations of Member States" on the results of "consultations with the United Nations bodies" regarding the proposals and priorities contained in the Secretary-General's first report on the utilization of human resources in developing countries (E/4353 and Add.1). The above included the question of brain drain. Twenty-one replies were received of which thirteen were from developed countries and nine from developing. Only one country each from the developing areas of Africa, South America and the Caribbean replied.[2]

Another attempt was made by the U.S. Department of State which sent an airgramme to U.S. Missions to eighty governments which were current or former recipients of assistance under AID. Of seventy-six replies eventually received, fifty-three stated that failure of academic visitors to return home after completing programmes in the U.S. did not pose a serious problem of migration of talent to the U.S., sixteen replied that they were affected to some degree, seven

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1/ The Republic of China has said remarkably little, for example, about its especially heavy migration of the highly talented and the highly educated. On 19 June 1968, however, Dr. Wang-Shih-shieh, President of the Academia Sinica and a former Foreign Minister, at the second conference of the International Association of University Presidents in Seoul, was reported in the N.Y. Times on 20 June as urging the United States to help developing nations reverse their "brain drain" by encouraging foreign scientists in America to return to their own countries.

2/ E/4483/Add.1, 14 June 1968, pp. 3-4.

stated that migration to countries other than the United States posed a problem and seven stated that they needed more information upon which to evaluate the issue more thoroughly.[1] In addition, the (U.S.) National Association of Foreign Student Affairs (NAFSA) recently conducted a survey among 120 foreign embassies in Washington to ascertain the kind of contact these embassies maintained with students relative to future employment. Only thirty replies were received of which only five reported regular recruitment efforts.[2] Besides informal studies which certain governments, including Iran, have made of their students abroad, the Statistics office of the Government of Trinidad and Tobago has studied the problem, the Government of Israel has initiated a special study of its students in the United States as has the Committee of Vice-Chancellors of Nigerian Universities for Nigerian students in the United States. Such special studies have been recent and, until now, rare. Such facts co-exist with expressions of great concern from some of these same countries in United Nations debate and with highly diverse individual views on the part of citizens and officials.

It is thus apparent that the climate of action is as yet far from being clear or resolute. On the whole it appears that comparatively few developing states have, up to now, felt strongly that action should be taken. Some have, because of concern for the "brain drain" or for general reasons of administration, taken steps which relate to study abroad to manpower policy or planning or to other aspects bearing on migration. Under the circumstances, however, very comprehensive action has yet emerged.

So many countries are concerned and the areas in which they could act are so broad that the following listing of measures taken cannot pretend to completeness. It is hoped that countries whose action has not been included will inform the United Nations of their activities.

B. Steps Taken by Developing Countries

1. Selection. Many countries, including Colombia, and many newly-emerging nations like Malta, Tanzania and Somalia have established official committees to select not only government scholarship recipients but also those offered scholarships from foreign governments and private institutions. In Tanzania, in Tunisia in Colombia and widely in Eastern Europe, tied-bursary schemes are used, binding

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1/ Department of State Memorandum of 26 February 1968, made available to participants in a research meeting on 26 January 1968.

2/ NASA contribution to 26 January 1968 meeting above. For further details, see p. 139 below.

the recipient to serve from three to five years after graduation in whatever job he is directed to by the government. Similar provisions are often applied to loan scholarships awarded with little or no interest to students entering fields of key need.[1/] The above countries and others like Lesotho, Guyana and Niger, answering a UNITAR questionnaire of November 1967 say that they attempt to select students on the basis of national need. Some nations feel that scholarship policies of this ilk have increasingly become practical tools for implementation of development plans. Those nations from which many students emigrate, however, appear to put comparatively few of their applicants for study abroad through such selection committees or otherwise to equate their plans for education abroad with national need. The situation in most developing countries remains unclear; it would be useful if it were clarified so that each country could compare its procedures and their results with those of other nations.

2. Most countries limit or otherwise control the use of foreign exchange by students and a few countries, like Tanzania, demand either that the student deposit a bond against his return or that his family agree to make payment in the event of non-return.

3. Some countries limit the validity of their student passports to short periods thus increasing control by the renewal requirement. Some demand, in this connection, an official record of grades before renewal is given. In a very few cases, foreign embassies retain the student's passport at the embassy until the student's departure. Others have policies of allowing students to have passports only for study in certain fields, usually technical and scientific. India no longer permits the examination of the (U.S.) Educational Council for Foreign Medical Graduates to be given in India,[2/] and does not usually grant passports for students to study law. In a decree of November 1967, the Turkish cabinet promised to take measures to stem the brain drain by limiting and discouraging the permanent employment of Turkish scientists, medical and technical personnel in foreign countries.[3/]

4. Regarding more positive measures, NAFSA's survey (above) found that only five foreign embassies reported regular efforts to recruit their own foreign

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1/ UNESCO, "Manpower Aspects of Educational Planning", op. cit., p. 50.

2/ Passing this examination has been a requirement for admission to U.S. hospitals as interns or residents.

3/ The extent to which the governments of developed countries are responsive to such restrictions is not known. The U.S. Immigration Service does not feel itself limited by anything which a foreign government may inscribe in a student passport.

students in the United States for employment back home. Five others reported occasional recruitment. Two had regular and two occasional job-interview boards, twenty-six had none. The rest reported no recruitment efforts. Five had special publications giving information on employment opportunities, two occasionally sent such publications, twenty-three had none. Though these results are not conclusive since, in addition to non-replying countries, some countries, like Israel, send newsletters from Ministries other than the Foreign Ministry, hence not through embassy channels, many opportunities for contact seem evidently unutilized. A very small number of embassies maintain special student offices which keep students constantly in touch with job opportunities; in the case of Thailand, this effort appears to have had good results. The Chinese Committee for Scientific Development has been trying to attract scientific talent back to Taiwan. It has made a survey of all trained Chinese scientists it can reach and manpower policies to utilize these have been formulated by the Executive Yüan. In Pakistan, employment bureau and placement officers have been set up in universities and technical institutions to provide employment counselling to students in Pakistan.[1/] The Iranian Government has also recently established a placement office in Teheran which is designed to "coordinate and match the needs of both the public and private sectors of the economy with the educational preparation of Iranian students abroad."[2/] Iran has also strengthened the Student Affairs Department at the Iranian Embassy in Washington, D.C., to improve communication with Iranian students in the United States. Iran, in addition to a quarterly newsletter, has offered students wishing to return home for the summer substantial air fare subsidy and has moved toward considerable leniency on its military service requirements for returned students. Kenya recruitment tours have reportedly obtained the return of some 170 students. India mails its students a weekly listing of employment openings. Positive efforts of this character to broaden contact with students abroad, many of whom feel greatly isolated from their homelands, should be applauded and can, with great potential profit for the homeland, be extended. (Recommendation IX. B. 3 below).

5. An effort which has found especially appreciative response from students of the problem has been ICETEX, the Colombian Institute for Student Loans and

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1/ Colloquium on Intra-Regional Technical Training, 1967, Colombo Plan Bureau, p. 93.

2/ Peter Smith, "Iran: Point of Return", Mid East, op. cit., p. 20.

Advanced Training Abroad.[1] An almost unique autonomous government agency when it was founded in the mid-1950s, ICETEX conducts significant studies to ascertain Colombian national priorities and facilitates the selection of those overseas students most likely to serve Colombian needs. ICETEX rationalizes overseas training by pre-selecting for foreign scholarships, making loans, allocating foreign exchange for overseas study based on the fittingness of the student's programme for national priorities. Some 90% of Colombia's students departing for study abroad register with ICETEX and every such Colombian is required to sign a contract with ICETEX which binds him to return to Colombia. Where ICETEX administers scholarship funds from other institutions, it normally requires that students helped by it should work for two years in Colombia for every one year spent in study abroad, though conditions demanded for return have differed somewhat. The Director of ICETEX has given technical assistance to the governments of Venezuela, Peru, Panama, the Dominican Republic and Argentina to enable them to set up institutions similar to ICETEX.

6. India maintains a National Register of Scientific and Technical Personnel, started in 1948, as a clearing house for information pertaining to Indian scientists, engineers, technologists and medical personnel at home and abroad who have at least a degree in science or medicine or a diploma in engineering or technology. Registration is voluntary but encouraged. The Register is regularly tapped for locating high-level personnel for employment and has been receiving about 3,000 vacancy notifications a year for scientific and technical posts. The Division for Scientific and Technical Personnel which maintains the Register carries out manpower research and publishes reports thereon together with vacancy notifications in its monthly bulletin Technical Manpower. The Division also operates the Scientists' Pool for highly qualified scientists, technologists, engineers and doctors, especially those returning from abroad, who have not been able to secure employment. On selection to the Pool, a person is attached to a suitable organization in India where his qualifications can be used immediately. He receives a salary. Persons in the pool are considered automatically for vacancies. About 6,000 persons have been selected to the Pool whose status is as follows as of 1 December 1968:[2]

1/ See G. Eusse Hoyos, "The Outflow of Professional Manpower from Colombia", Bogota, 1969.

2/ Information on the Indian Registry and Pool drawn from "National Register of Scientific and Technical Personnel: What it is and what it does", Technical Manpower, Vol. X, No. 12, December 1968, pp. 1-3.

Working in the Pool	327
Left Pool on securing employment	2,053
Selected for Pool but secured employment soon after	821
Those abroad who have been selected in advance of return	1,890
Left Pool and gone abroad	120
Pool employment terminated	142
Those in India offered Pool employment	588
Total:	5,941

7. Korea, with nearly 50% support from the United States, is setting up an Institute for Science and Technology which will provide concerted research in a well-equipped environment favourable for Korean scientists trained abroad. Nearly fifty of these have, reportedly, (as of late 1969) agreed to return home to work at this Institute which will have considerable U.S. research help. Support assures these scientists between $300.00-400.00 a month plus free housing, such salaries being three to five times what government scientists could generally obtain up to now. The Republic of China is building, with the co-operation of the U.S. Pacific Science Board and the National Academy of Science, six university graduate schools in the natural sciences so that fewer Chinese scientists will have to rely on overseas education. A number of other institutes in lesser source for talent countries exports have had institutional support from developed countries under conditions helpful to the overall problem. Such institutions would have to be numerous, however, to hire important numbers of the professionals available. Argentina has relaxed import taxes and helped provide housing for returning Argentinian professionals.

8. Colombia ascribes a decrease in 1967-68 in the trend of its professional emigration to educational changes, including the establishment of vocational high schools, educational loans, of intermediate career systems and post-graduate courses at the higher educational level. In addition, a special fund for the development of scientific research has been created. A Colombian Institute for the Advancement of Higher Education offers added pertinent advisory, financial, professional and co-ordinating services.[1/]

1/ G. Eusse Hoyos, op. cit.

9. Finally, some newly-emerging nations, like Jamaica, whose internal promotional steps in their administrations were co-ordinated with the exam system in the former colonial country are now nationalizing their systems thus gradually removing one incentive for study abroad.

C. Steps taken by Developed Countries or International Bodies

1. The United Nations International Center for Theoretical Physics in Trieste plays a major role in stemming the migration of high-ranking physicists from developing countries. An IAEA project receiving help from Italy and UNESCO finances associateships under which a scientist from a developing country receives a three-year appointment to spend 1-3 months each year at the Trieste Center. It has recently provided 50 leading physicists, mostly from developing countries, with international fora, renewed contact with the most recent developments and thinking in physics and an expanded basis for research.[1/] The Royal Society (England) also awards 50 scholarships with provisions for dividing the time of the recipient between the U.K. and the developing home country of the recipient.

2. Other schemes are under active consideration in the universities of the United States whereby promising scientists and scholars from less-developed countries would be appointed Distinguished Fellows for 5-10 years at major U.S. research centres at which they would spend 3-4 months each year while otherwise continuing to pursue their careers in their own countries. The University of Wisconsin has also taken steps to bring international development and regional specialists into the planning of Master Degree programmes in education so that educational specialization can be integrated into developmental activity and training. Summer internships in experimental developmental programmes are included.

3. The Inter-American Development Bank has extended financial assistance for planning in Latin American education at both the national and institutional levels with special priority to developmental education and attention to structural changes in universities, teacher training and loans to students doing practical work and research.[2/]

4. There is considerable fruitful support of educational institutions in developing countries by universities and institutes in developed countries, both

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1/ Philip Dallas, "Helping Young Nations Keep Their Physicists Home", Management Review, February 1968.

2/ "Educational Development by the Inter-American Bank", Washington, 31 December 1966.

between countries who formerly had colonial relationships and between some others (see 2(e) above). The research link between Glasgow University and the Veterinary Faculty of Ibadan and between the Universities of Cologne and Kabul are examples. The University of Wisconsin Land Tenure Center, founded with AID financing has done extensive inter-disciplinary investigation in the area of rural institutional change in Latin America and has attracted to this task Latin American scholars, some of them U.S. trained, whose attention thereby becomes concentrated on local issues. Only students interested in local development are chosen. The concept of doing research relevant to the community is thus fostered.[1/] The Delhi University Centre for Higher Physics is linked with the Kapitsur Institute in Moscow for joint research in super-fluidity and super-conductivity.[2/] Universities in France, Germany, Canada (Centre for Developing Area Studies), Sweden, Israel and some other countries have developed helpful ties of this kind.

5. Certain return and placement efforts have been financed by U.S. foundations, such as Assist, a placement agency in India for foreign-trained Indian professionals.[3/] Transportation for returning Koreans has sometimes been supported through the American-Korean Foundation which has also supported an office in Seoul which helps place returning Korean professionals.

6. The Exchange-Vistor (J) visa of the United States can be regarded as an official attempt to help return through specifying the purpose of foreigners' coming in terms of strict programmes of between two and five years and by requiring that, at the end of his programme, the foreigner depart for two years before re-applying for admission in any other category. Unfortunately, the waivers of the departure requirement, which were 184 or under until 1965, mounted to 1,115 for "hardship" and 429 "granted at the request of other Government agencies", during 1967.[4/] Frequently, also, instead of going home, J-visa holders went to Canada from which they gained permanent entry to the U.S. Nevertheless, the vast majority of J-visa holders have returned and the provisions have, at least until last year, constituted considerable pressure for so doing.

1/ House Report, 23 January 1968, p. 26, statement of Dr. William C. Thiesenhuisen of the Land Tenure Center.

2/ The Times of India, New Delhi, 18 January 1969.

3/ Later, however, India did not permit Assist to accept a grant from the Ford Foundation.

4/ Annual Report of the U.S. Immigration Service, Washington, 1967, p. 10. The Worksheets of the U.S. Immigration give 1,051 in this category for fiscal year 1967.

Various measures have, since the 1965 legislation, been proposed in the United States Congress which would either curb or encourage the immigration of professionals to the United States from the developing countries. No major general measures have, however, been passed.

IX. CONCLUSIONS, STRATEGY AND RECOMMENDATIONS

A. Conclusion

It is a striking current paradox that many developing nations who most need, but do not most demand, engineers, doctors, nurses, technicians and other professionals are losing many of their best, including many of their best-trained professionals, to the developed countries. Moreover, this trend has recently been rapidly increasing.

At the same time, a number of the major developed countries have been relying at rapidly increasing rates on professionals from developing countries for their own technological and industrial needs, until, in a few cases, a majority of such immigrant professionals come from this source.

The causes of this phenomenon are of extreme interest to the study of development; so much so that further study of it is important whether or not the results are applied to migration itself or, as many believe, preferable to the problems which lie behind it.

The reasons for professional migration lie in a combination of factors in developing countries which make professionals there willing or anxious to leave and factors in developed countries attracting them. On the whole, most students of the problem believe that currently the former factors predominate and the latter play the primary role of providing an alternative.

The phenomenon of professional migration is not yet general. A few developing nations are sources of great numbers; a few others provide significant percentages of their stock or of their output of professional talent. A larger number of nations participate modestly, still others have little and, in a very few cases, no brain drain. Even to the extent that the phenomenon is widespread, it is not necessarily for that reason consistent of the same casual mix nor would it be likely to respond to the same remedies.

The chief general cause of brain drain appears to be the lack within developing nations of effective demand for professionals despite the presence of almost unlimited need. This cause, in turn, is subsumed by an astonishing variety of further causes.

There are many paradoxes in the failure of many developing nations effectively to utilize the professionals whom they have. Many, for example, do have a demand for foreign professionals whom they are at the same time importing from developed countries and whom are paid at high levels, frequently by these nations themselves. The causes for this fascinating phenomenon are somewhat moot, and raise questions

regarding the effectiveness of foreign vs native expertise for introducing change which not all nations would be likely to answer similarly. Most would agree that one important cause of failure of response to existing demand resides in the educational systems by which professionals from developing countries are trained. The internal educational systems appear frequently to be cast with such awe in the image of the former colonial nation as to train its products more aptly for the needs of Paris, London and New York than for those of Cameroon, Ghana or the Philippines. At the same time, not all modern specialties can be trained within the average developed nation and the prestige of foreign institutions beckons even those who can be trained at home. Yet education in developed countries is, approximately, equated to developed requirements and certainly not geared primarily to respond to the needs of developing nations. At the same time, foreign education provides an environmental training which educates the expectations of students from developing nations away from the conditions of their native lands. Both at home and abroad, therefore, education contains much that is clearly dysfunctional for developmental needs. With the enormous growth of education both internally and abroad, this dysfunctionality is now not only a local but a global problem which migration in part expresses.

There are other prominent instances, like China and Korea, in which the colonial factor either does not exist or is not currently expressed. In such countries, the traditions of educating more nationals than can conceivably be used in an economic sense are ancient but are now combined with a modern shift of this education toward the technical and scientific which has made its students internationally usable - and internationally absorbed. Such countries can at the same time develop rapidly and export considerable trained men, although their ability to spread development throughout society remains limited - as it so far has in all societies.

A wide variety of other factors impede internal use of indigenous experts. These are impossible to generalize for the scores of countries concerned. The structure of all states changes more slowly than the sources of their power. Power is most consisted of the ownership of land and the use of men as soldiers or farmers. Power now inheres in the professional and the technician. Recognition of this change in the political, social and hierarchical systems of foreign countries comes slowly, as it did - and still does - in developed countries as well. Meanwhile the professional is, to varying extents, denied the prestige and power which he knows that his skills can command. He is frustrated, even when he is

employed. Former generations knew this frustration but without the communications and the alternative employments of the present age. Formerly, societies gradually had to adapt themselves to the demands of the professional. The question arises as to whether this adaptation will occur if it is drained away. The answer may lie in the prodigality of present educational systems which may produce enough both for export and for development and the adaptations it requires. The levels required to accomplish adaptive results remain, however, unknown.

Whatever rigors professional outflow might exact are cushioned to some extent by the fact that, in most developing countries, internal migrations are considerably larger and more important among the educated and result in internal development gaps as grievous as the world chasms between rich and poor nations. In many ways, these two migrations are related, both in their causes and in their dynamic: once it becomes natural to leave village and small town for a capital, it is a much smaller wrench to leave the national for the world capital; the cultural change is frequently not much greater and sometimes in developing countries even the linguistic one is not more marked; indeed, it may be less so. The results are probably more demonstrably adverse in the instance of internal than for external migration. Few developing countries can have modernized economies without modernizing their agriculture. To do this requires nearly the range and complexity of skills needed for at least the earlier stages of industrialization. It is internal brain drain which seems first to erode this capability. It is probably true that the solution to the internal problem is more critical and has higher priority than the solution to the international migration of professionals. We know little about whether, if more professionals returned from overseas, more pressure would be exerted to solve internal intellectual distribution. There is so far little evidence that it would. Most of those used to world capitals eschew places below the national capital with more distaste than do most national intellectuals.

There remains the factor of salary, material conditions, facilities for research. Appraisals of these differ. All concede, however, that they have considerable importance, though perhaps somewhat less than career opportunities. The problem here is difficult and controversial. On the one hand, there are certainly cases where professionals are paid less, even in terms of the wage scales of developing countries, than they are worth. Here it is easy to say that these LDC salaries should be raised and material conditions improved. On the other, there are even more cases in which the salary level for the professional is already higher in terms of the LDC economy involved than is the salary of a corresponding

professional in developed countries in terms of those economies. Yet the professional still has ample lure to migrate. In such cases, developing countries are, in effect, competing in an international market for the trained talent of developing countries and at prices which the latter cannot, because they are developing, afford to pay. Even if they could, there is some question as to whether the result would not be the creation of unbearable or unwise conditions of inequity and inequality in the society involved. When this condition is combined, as during the last decade, with increasing instances in which developed countries take far larger proportions of professionals from developing countries than they take from other developed countries (such as Italy or Ireland), the inequity involved might appear to be deepened. The various factors bearing on professional outflow are so involved and interlocked and exist in so bewildering a variety of instances, that it is impossible to be sure exactly what share these more competitive factors play in the total and to what extent they raise, so to speak, the price of development. To some extent, however, however small and indeterminate, present competitions for world talent may partake of competition in partial restraint of development.

Finally, there seems every likelihood that, in the long run, at least, the migration of professionals out of developing countries will grow. In the short run, reductions in American support for research and other economic adversities may reduce the movement temporarily, as it has, overall, for the United States and Canada in 1969. But experience has shown that smaller developed nations often export more of their professionals than developing nations do.[1/] As more people in developing nations are trained to have more qualifications, more will wish to and be able to migrate. Such migration will co-exist with considerable economic development. It may also co-exist with lengthening gaps between developed and developing nations. Brain drain from developing to developed nations is likely to continue its present trend of replacing gradually the older brain drain from smaller to larger developed countries.

Professional flows from developing countries contribute to developed nations: the contributions are small relative to the economies involved but appreciable in terms of the aid levels of these countries. The flows certainly add little to

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1/ Forty-eight percent of the number of engineers annually graduating in Canada emigrated to the United States between 1956-61. Norway loses 23.8% of her graduating engineers, Switzerland 22.4%, Netherlands 21.8%, Greece 20.7% - many to larger European countries. (See also statement of Dr. Charles Kidd, House Hearings, 23 January 1968).

developing countries. They hence contribute something, though probably not alarmingly, to the widening gaps between industrialized and non-industrialized countries. Among both developed and developing nations benefits and losses in this process are most uneven.

Such conclusions might justify, in themselves, some mild recommendations. They leave, however, the main issue of development unanswered: how much, if at all, and in what way does this outflow damage developing countries and retard the development process? The question is the most important one which can be asked about "brain drain" and one of the most important which can be asked about development in general. The fact that it cannot be clearly answered in itself risks consequences. For if the withdrawal of professionals by the tens of thousands from developing countries cannot be demonstrated to have measurable effect adverse to development, current assumptions that training and education are major requirements of development may suffer major revision and education and fellowship programmes may be affected.[1/]

One cannot value that which does not take place. The ultimate valuation of high skill and education rests on an assumption of dynamism and potential: that talent and education set in an under-privileged environment will contribute by way of leadership, intelligence and planning, as well as by technique, to development. When the talent leaves and the development does not take place, there is no way of knowing whether it would have taken place or not had the talent stayed. Those societies which are developed and have lived in an atmosphere of dynamic growth bring to such migration a presumption that the trained man in an environment of poverty is challenged, responds to the challenge and developmentally shapes the terms of life around him. Those societies which have never been touched by dynamic growth and are not developed tend to bring to this question less optimistic promises of what the trained man might have done. This may, in part, explain the irony that, up to the present, views condemnatory of talent outflow from developing countries have come mostly from the side of the developed countries profiting from this movement. Such divergencies probably result less from a crisis of conscience than from a difference in presumption - where presumption must, since it deals with the unaccomplished, dominate.

In valuing or even assuming 'loss' to development and to developing countries the analyst thus faces an essentially unstatistical, unmeasurable problem which lies close to the actual core of development as a process: different expectations concerning the problem-solving capability of the trained or educated man when faced

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1/ Charles Frankel, former Assistant Secretary of State of the United States describes the brain drain as "one of the basic causes of the inequality of nations", in "Plans and Prejudices", Foreign Service Journal, October 1970, p. 22.

with the environment of development. If one's expectation is low, if one believes that educated men cannot exert their problem-solving skills unless armed with the kind of equipment and organizational setting usually found only in developed countries, then analysis must appraise loss or damage to development as small and recommendations must be reduced. If one believes that the power of trained men to overcome obstacles and to improve their environment is great, even when the developing environment around them is adverse, appraisal of loss and damage is much higher and would bring with it the obligation to formulate corresponding measures.

It is important that information shedding more specific light on losses occurring through professional migration be accumulated. In the absense of much objective material supporting either pessimistic or optimistic appraisal it would seem unjustified to abandon the current belief in the developmental creativity of the professional and the educated. To regard the departure of trained men from development as being without effect even when such effect is inadequately shored up by detail and evidence would appear to raise serious questions as to how or whether - in many poor countries, at least - development can in any way be obtained within the framework of a world with wealth-poverty gaps wider than ever before in human history.

The response to this quandry must be to assume that trained men are valuable for development if properly used; to view the facts behind the professional outflows from developing countries as clues to numerous improvements which must and can be made so that trained men can make development possible: to regard the outflow of professionals as a serious loss of opportunity however difficult it is to place precise value thereon. It is very largely on the basis of this criterion that the conclusions which follow must rest. In essence, they must concern themselves chiefly with improvements in the utilization of trained men and women for development and they lie chiefly with improvements which must be taken on a national basis, responsive to the different balance between trained people and opportunity for their utilization which each country faces. Finally, they deal with amelioration rather than with 'solution' or the categorical imperative of 'stopping'. The current migration of professionals is probably far from the optimum allocator of existing human resources; still it possess many salutory results both in terms of technical and research advances and as an expression of the expansion of human choice and will. Its cessation is neither feasible nor desirable and could be accomplished only in contravention of UN Charter freedoms.

Before starting the recommendations, it is also necessary to observe that their scope, though broad, could be broader still. This report cannot cover all the important implications for the international community of a migration new in character, varied in meaning which is likely to become a phenomenon of pervasiveness in the future relations between states. If, as seems likely, the rapidly-expanding economies of developed states continue to be unable to supply their own increasingly voracious demands for both middle and high skills from their own educational and training systems, if competition for trained men grows and if the economies of Europe become still less able than at present to part with their own talent resources, "brain drain" will spread and will acquire increasing international significance.

Since no single, sweeping recommendations 'solving' brain drain are desirable, many steps affecting varying portions of the "brain drain" phenomenon are recommended for action by developing states, developed states, international agencies and in education. The effectiveness of these steps would be enhanced if they were, as much as possible, co-ordinated and if information on them were channelled to the Economic and Social Council which could periodically report on them. In this way, talent migration could become a key to national policies and part of a strategy for development through the improved creation and utilization of trained talent.

B. Strategy for Developing States

1. Formulation of National Policies

a. Science Policies

Science policies which include policy toward attracting and retaining scientists, engineers and physicians are important elements of most modern - and of numbers of ancient - dynamic states. Presently, many governments attempt to formulate general science policies. These should include emphasis on a science and technology relevant for the development of the nation concerned, appropriate graduate education, measures improving the transfer of technology, and policies concerned with study abroad. Such policies in themselves and the environment they create, will have much to do with whether scientists will stay abroad or return. Science policies with definite and detailed relationships to foreign relations, to scientific migration and to questions of status, salary, institutions needed for science and technology[1/] and research requirements and conditions needed to retain

1/ Including "Centers of excellence" as in recommendations of the Advisory Commission on the Application of Science and Technology, STD/9/1A, 1 March 1968.

scientists, tend to be limited to major states; science policies of this kind are needed by states which have not formulated them. Such policy should relate to questions of the employment (or non-employment) of all students, public or private, who have received subsidized education to pursue scientific, engineering or medical studies at home or abroad. It should relate to such controls of foreign exchange or permission to study abroad as governments may feel appropriate in order to encourage their own science.[1/] The encouragement of business and entrepreneurship is also important to the environment of research and technology; science policies, in the broad sense, might appropriately apply to graduates in these fields.

b. Regional Arrangements

Large numbers of small states, geographically propinquitous, and in early stages of development may not be able to have science policies along the above lines which are very effective. In this case, science policy offers a particularly promising field for regional frameworks in which education and employment arrangements can be shared, and made more complementary and interchangeable, with greater resulting opportunity for the highly-trained.

c. Policy Toward Study Abroad

Most countries have, and will continue to have, needs for skills and education which can be best obtained in foreign institutions. The nature and extent of these needs will vary greatly as will the resources available for meeting them. Nations seriously desiring to utilize their professional resources might include in their policies the fields in which they would like to see study abroad encouraged and those where encouragement is less needed or unneeded. Such policies should be connected with selection and the committees appropriate to it, with the awarding of scholarships and fellowships, with the allocation of foreign exchange and with proper mechanisms for keeping contact with students abroad and for employing them when they return.[2/] An excellent example of handling this problem in a manner

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1/ This does not mean that all states must and will employ all students or that firm controls are necessarily advisable It indicates that countries should seriously consider comparing their needs with the students proceeding abroad for study and deciding what policies they should pursue in regard to their employment and to the conditions under which they may permit those unemployable to leave for such study and remain abroad.

2/ T.M. Yesufu, "Loss of Trained Personnel by Migration from Nigeria", op. cit., p. 15 recommends cutting down on scholarship awards for first degrees and increasing post-graduate awards to Nigerians as well as an expansion of the Careers Guidance Service in the Federal Ministry of Education.

tolerant, flexible, purposeful and reasonably comprehensive is provided by the Colombian Institute for Advanced Training Abroad (ICETEX). This Institute appears to be one of the best mechanisms for dealing with this problem yet devised and could serve as a useful reference for other countries facing similar problems. Another recommendable method of handling the question is the creation of a National Planning Commission for Graduate Education.

Uniformity of policy toward students abroad would not reflect diversity of need. A few general conclusions from experience so far might, however, be recommended for fairly general consideration:

(i) Students proceeding abroad for study at very young age (in general, before 18-20 years of age) are especially subject to cultural alienation leaning to emigration. Education abroad should, to the greatest degree possible, be reserved for the graduate school (or other advanced educational) stage.

(ii) After three-four consecutive years of study abroad and especially if this study began at an early age, the student's chances of return to his own country decline.

(iii) If a highly-trained professional has not completed required military service before leaving his country, such requirement can be an obstacle to return. Developing countries which have recognized this are increasingly either requiring completion of such service before the student leaves or allowing the professional returnee to substitute field service in his specialty for military service.

(iv) The more specific the aim of the student and the greater his experience and connections within his field in his home country, the greater is the probability that he will return, (see below).

(v) While education abroad should not, certainly not normally, be limited to those who already have had some employment in a profession and have families of their own, possession of these things or of a job to which the student can return add to the probability that study abroad will not become emigration.

(vi) Contact between students studying abroad and their own missions is frequently poor and strained, particularly in regard to employment opportunities at home. The possibility that small states in the same region might jointly circulate a publication on employment opportunities should be considered.

d. Policy toward Attracting Foreign Scientists

If it continues to be apparent that genuine surpluses of scientific and technical skill exist in a few countries which these countries are willing or glad to see employed elsewhere, countries with insufficient professionals of their own may include in their policies plans for drawing on these surpluses, perhaps with the aid of bilateral or multilateral aid programmes. Nations too small and with resources inadequate to countenance such measures for themselves will have to do so in association with others if they wish to speed their development. Region-wide recruitment of professionals and co-operation in promoting their immigration offer possibilities of ameliorating the present situation.

e. Manpower Policies

In addition to science policies, manpower offices in developing countries should formulate a far more careful and planned correlation between the developmental demands - not just needs - of each developing country and the kind of education given at home and allowed - or encouraged - for its students to obtain abroad. Better scheduling of the formation of talent of all sorts and far more concerted and understanding use of it once produced must occupy high priority on the agendas of an increasing number of developing countries. Manpower offices should also take into account factors of under-utilization and movement out of occupations in calculating the accumulation of high-level scientific manpower to satisfy national requirements, including those for localization and self-sufficiency.[1/]

2. Education in Developing Countries

a. Developing countries should formulate their own educational ideals related to their own needs. They should construct their own curricula and inculcate the values which will turn the voluntary efforts of their citizens more directly to the problems of their home countries. In ambition for high-level education, they should not scant production of middle-level skills which are needed in larger quantities. The fact that so much education in developing countries is cast in the image of that of the major powers is a basic reason for the tendency of its graduates to make their way to the centres from which these educational systems came.

1/ See U.S. Department of State, AID, Office of Labor Affairs, "An Inventory of High Level and Skilled Manpower in Developing Countries", December 1966. A manual of how to make such inventories.

b. Most nations with many professional émigrés are heavily subsidizing professional education while losing increasing numbers of the beneficiaries abroad. Such nations should review their policies to determine whether their priorities are wrong and whether their subsidies cannot be diverted to employment rather than merely educational areas.

c. It would be uneconomic for each developing country to seek to establish an educational system so complex that it could satisfy every national need. The need for developing countries to educate some of their citizens in developed countries is a legitimate one; but this need should be considered a developmental one and should be purposefully pursued.

d. Very small states, in particular, must rely more on the educational systems of those around them, as the older (and richer) small states like Luxembourg have done. Some financial support now being provided for the education of students in developed countries might be used to aid the establishment of higher education in developing areas, where possible on a regional basis.

3. Employment

While mentioned under I.A.3, employment and the mechanisms enabling it are so important to the return of graduates that countries apprehensive over talent emigration should seriously consider establishing an employment office specially concerned with the employment of those trained highly overseas. This office must have influential support within the government. It should be encouraged to correspond with student nationals while they are abroad. The preparation of newssheets giving information about job opportunities and the circulation of such sheets to students overseas should normally be one of its duties.

4. Salary and Status Structures

a. Salary

Salary structures inexpressive of developmental priorities are widespread. Frequently outflow of trained personnel can offer an index of salary levels which can be corrected. Developing nations, especially those with large professional outflows, might study the effect which salary levels and related conditions have on the migration of talent and, where possible, adjust salaries and enhance conditions of professional work. Having done so, they should inform professionals going abroad of what has been done. Salary structure must be fair internally; they cannot and should not be equated to salaries in different and more developed economies.

b. Status

Inequities of status especially afflict middle-level personnel who are often the very persons developing countries can most immediately use. Nurses in general are widely affected and, in some countries male nurses, in others female, find adverse prejudice or difficulty in getting appointed. Where emigration shows that such conditions exist - as in the Caribbean, Latin America and parts of Africa - governments should make specific efforts to improve employment conditions. In general, governments must be certain that their high-ranking technicians are given honours and status commensurate with their economic worth. Special status and promotion for work in rural areas might be considered.

C. Strategy for Education Abroad

Education of students from developing countries in developed countries has yielded many benefits and will yield more. It is now facing some difficulties due to over-rapid expansion. It is, as a whole, unplanned and unco-ordinated with the national needs of developing countries and done in a way which all too often contributes to the estrangement and eventual emigration of the highly educated from their own national settings. The problem is especially acute with respect to students coming on private funds or with the support of universities or other private groups; these constitute a major share of foreign students. In obtaining scholarships from colleges in developing countries, these private students frequently argue public need at home for their education abroad.

1. An international meeting, possibly under the auspices of UNESCO, should concentrate on the problem of the 'private' student from developing countries studying in advanced countries to clarify the participation in the development process which such students should be expected to have and how best to encourage such participation. If it is the opinion of most educators from developing and developed countries that the private nature of the student's support relieves him of any obligation to take part in the development process, this view should be made increasingly clear to those private agencies and educational institutions currently sponsoring such students. Such meeting might consider some of the educational recommendations here advanced.

2. If there is dominant feeling that the critical nature of development justifies the maximum participation of the private student, national vocational guidance and career advice services should be established for such students both at home and in the developed countries whey they study.

3. Universities should be encouraged to develop policies of their own stimulating the utilization of higher education for development. Affiliations between universities in developed countries and those in developing countries should be encouraged and these might include within them increasing proportions of the students who study overseas. A graduate of a university in a developing country which had such an arrangement would require the backing of his home university before being admitted to the university in the developed country and his educational programme might comprise an element of foreign study within a framework defined by his native university, which, in accordance with the agreement, could offer the final course and award the final degree which the student would go home from his foreign studies to receive.

4. The status of a student abroad should normally be one whose temporary character is expressed in a formal document. Developing countries concerned with student non-return should institute the practise of giving all departing students such documents where they have not previously had this practise but have permitted, in the name of special relationships with former colonial countries, a fluid merging of permanent with temporary status. Developed countries, even when encouraging complete freedom of movement should encourage and respect such documentation as would enable statistical knowledge of study and work abroad by trained personnel from developing countries.

5. It is a legitimate inference from fifteen-year statistics of student movement from the Republic of China, Hong Kong, India, Iran and possible some other nations that substantial numbers of students apply for temporary visas with the intention of permanent migration. Since this is consonant with the UN Declaration of Human Rights, such intentions deserve their own status. Consideration might be given to awarding such students a special immigration status of a Migrant Scholar type. The current 'system' in which a majority of thousands of students from the above developing countries state each year intentions of temporary sojourn for study which they then steadily foreswear is not recommendable for its honesty or for its usefulness for development.

D. Strategy in Developed Countries

1. Education

a. Developed nations which rely on large numbers of trained personnel from developing nations and which bid for them at rates with which the home countries cannot compete should expand their training facilities and improve their

internal career ladders so as to avoid reliance on the human resources of developing nations. Such recommendation applies not only to professionals, but equally to middle-level personnel whose importation from developing countries may be considered a substitute for the training of under-privileged citizens in developed countries. Such recommendation applies with special force to the medical field, including physicians, health research personnel and nurses, particularly in the United Kingdom, the United States, Canada and Australia.

b. Developed countries which have profited from the immigration of professionals from developing countries should feel special obligation to help in the above and other ways to improve conditions of education, science and technology in the lands from which this human wealth came.

c. The chief developed receiving countries should encourage their educational institutions to establish special courses in development in their curricula. Professionals from developing countries studying in developed countries should be put through at least one course in economic and social development so that they understand the possibilities and needs of development. Graduate programmes in development should, in a more limited number of centres, enable concentration in this field.

d. The blocked currency now owned in large quantity by some developed countries in some developing ones might be used to found International Institutes for Development. Such arrangement might provide education with excellent international staffs for students from all developing countries in the environment of a developing country. India would be a plausible locus for one of these Institutes.

e. Consideration could be given to how the residual obligation of a professional emigrant who has never worked in his home country might fairly be met. One possibility is that, where the prospective migrant has had no national or military service either in his home country or his adopted one, the developed country might require him to undergo a period of civilian service in his home (or, alternatively another developing) country within his profession preferably where, as in rural areas, the need for the application of science and technology is greatest.

f. Both developing and developed countries should consider setting aside portions of the grants which are received by students in developing countries for study abroad as funds earmarked to aid the returning student to find a professional career under the best circumstances possible. Such help should include the supply

of books and related materials and the possibility for occasional attendance at international conferences to renew contact with his profession. Such funds should preferably be added to those now available for scholarships; if they are not, the number of scholarships may have to be reduced so as to make possible this 'return support'.

g. Universities and professional association in developed countries, with private Foundation aid if necessary, should subsidize extra runs of learned journals to be sent at nominal charge to specialists who have returned to developing countries.

2. Immigration

(see also B.1, above)

a. Except in cases of genuine political refugees, the general terms of return contained in the United States J (exchange visitor) visa might be more widely used internationally so that foreign students would normally be required to leave the country of study for two years - preferably with some indication of return home - before reapplying for re-entry in more permanent status. Countries using the work permit system could give effect to such terms by not issuing work permits to students studying in the developed country concerned for some two years following the end of education abroad. Such provision would give the developing home country some increased opportunity to employ the returned student usefully.

b. The needs and aspirations of developing states might be considered by developed states also in their general immigration legislation. In doing so, there are several possible options:

(i) Bilateral agreements with developing countries concerned with the problem which would limit professional immigration in accordance with mutually agreeable terms in cases where clear demand for certain professionals or middle-level personnel concerned exists in the developing countries concerned.

(ii) General policies of consulting developing nations in the formulation or administration of immigration legislation and regulations to ascertain that immigration policy does not seriously interfere with development plans and that the implementation of immigration regulations and law does not deprive the developing country of service for which it has a demonstrable and immediate use.

3. Research Help

a. Research and Development programmes in the major developed countries should contract, to the maximum extent possible, to do research work in centres in

developing countries, especially in such fields as tropical medicine, biology, botany, zoology and meteorology and can, in some instances, tie such contracts with the return of key scientists trained abroad.

b. Wider application in developing cosntries of the idea of scientific institution-building, as viable centres of excellence should be encouraged. Examples this far include, the Korean Institute for Science and Technology, The Indian Institute of Technology, The DiTella Foundation in Buenos Aires, Hacettepe University Medical School in Ankara, LaMolina Agricultural University in Peru, The University of Valle (Cali, Colombia) and many newly-created centres in Asia. Many others are needed, especially in the Near East and Africa.

E. International Strategy

1. There is need for a cockpit for strategy on brain drain in the United Nations. Presently, interest with the problem is so widely scattered among agencies with responsibilities for education, employment, health and social development that concern is fractured and recommendations unco-ordinated. The Assembly may wish to consider the formation of a committee appropriately composed of a few members from both developing and developed countries which might review the information flowing into the Department of Economic and Social Affairs, recommend requisite filling of lacunas in such information field and make further recommendations to the Economic and Social Council and to future sessions of the General Assembly.

2. A further project would be the formation of an International Science Foundation whose funds would be granted only to scientists in developing countries for projects of special importance to those countries, thus encouraging LDC scientists to stay at home and work for modernization of their own societies.

3. Certain developing nations, notably ones of large populations and educational systems like India, and the Republics of China and Korea, produce professionals in apparently surplus quantity.[1/] At present, the great majority of these professionals, together with others who are probably needed, are emigrating to major, high-developed economies, thus contributing somewhat to increasing current wealth-poverty gaps. This problem should be further studied and consideration given to establishing an international pool of skilled manpower for development.

1/ The concept of what, exactly, constitutes a surplus of professionals in countries which continue to have many developmental needs, including medical and engineering ones, remains controversial and difficult of definition.

It could be further considered whether those countries which have profited from the immigration of this talent might make financial contributions to development through support to this pool.[1] Such pool might be drawn on for both international and national development programmes.

4. To reduce professional isolation in developing countries, international organizations and developed countries should increase the kind of "associateship" illustrated by the Center for Tehoretical Physics in Trieste. In addition to D.I.F. above, universities in developed countries might put a portion of the funds they now expend on foreign students into arrangements paying air fares for several years to permit promising graduates in science to return from developed countries to utilize laboratory facilities with which they are familar for two or three months a year on condition of return to their positions in the developing country. It is understood that Britain's Royal Society is in the process of developing a similar scheme. In 1968, the United Nations proposed to the National Research Council of Canada and the National Academy of Science of the United States that similar opportunities be provided to 200-300 scientists from developing countries.[2]

5. Whether considered reckoned in cost of education or in potential contribution, the value of trained emigrating personnel is high. It is the only export besides unpatented knowledge for which no compensatory payment is made to the source country. Consideration might therefore be given to the working out of an international payments scheme aimed at formulating norms for reasonable compensation by developed countries to developing countries (and possibly to any source country) for the value received. The regional banks would be appropriate loci for working out the complex problems involved. Such compensation could, for example, be paid as tax, similar to those for social security, shared by the expatriate and his employer during the former's active professional life in developed countries and representing a small return on the professional's total value to a developed institutional setting. Alternatives to this could also be considered.

1/ HIH the Shah of Iran has made a proposal along essentially similar lines at the Commencement Exercises of Harvard University, 13 June 1968, for a Peace Corps - like international organization called perhaps, the University Welfare Legion, to be operated under the auspices of the United Nations.

2/ EWA, "Migration A Talent", op. cit., p. 6.

6. A payment scheme alternate to the preceding would be the establishment of a special international development fund with contributions from the developed countries roughly proportional to the gains each might fairly be considered to enjoy as a result of the immigration to them of trained personnel from developing countries. Grants would be made from this fund to the developing countries, in rough proportion to the losses imputed to them from the outflow of trained personnel, for the purpose of subsidies to the salaries of their professionals to cover part of the salary gap between their valuation in a developing economy and in a developed one. Alternate uses for the fund would be to support improvements in the education system, research facilities, the purchase of professional books and magazines and occasional sabbatical trips, as noted above.[1/]

7. The demonstrated capacity of each developing country effectively to employ and utilize the trained human resources existing among its own nationals should increasingly become one of the recognized international criteria for the priority with which its aid proposals - especially those involving the import of foreign technicians - are considered multilaterally or bilaterally. A brief review of this qualification, checked with major training countries and utilizing information on non-returnees, should accompany each project for which aid requiring trained personnel is requested.

8. There is a clear need not only for further study but for better record-keeping by almost all member states on the stocks and flows of their highly educated personnel. Statistics on return flows of educated manpower to the developing countries are almost totally lacking and must be obtained if a more accurate total picture is to be formed. It is highly desirable that the statistically completely unclear pictures in France and Germany be clarified. British statistics, though improved, are acknowledged by Britain's own experts to be inferior to those of Canada and the United States. Australia's are relatively good but could be improved by indications of how many professionals for each skill come from each source country. Each developing country concerned should be strongly urged to keep a record of all its high-level skills, both those available within the country and those in advanced stages of training or otherwise in residence abroad; developed

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1/ This suggestion has been proposed in the reference paper received from the ILO. For the idea of treating human capital like any other capital and turning invisible debt to visible debt between developing and developed countries, see K.E. Boulding, "The National Importance of Human Capital" in Walter Adams The Brain Drain, op. cit., pp. 109-119. Such ideas are often regarded as unimplementable.

countries are urged to aid developing countries in keeping up to date the latter records. International attention could be given to this problem and copies of such records should be made available for consultation by all countries and agencies scheduling aid involving technical experts so that foreign experts are not, as often at present, substituted for highly-trained native talent in the same fields. UNESCO has in 1969 launched an effort partly directed toward improvement of migration data.

9. The effects on world health of the outflow of doctors and nurses from developing to developed countries warrants special study and concern. Research on this problem by the WHO is urged.

10. Policies encouraging science and technology and in support of the above recommendations should be made parts of the programmes of regional commissions and organizations.

A N N E X E S

Table I

Immigrants admitted into the United States, by country of origin and occupation from the year ended 30 June 1962 to the year ended 30 June 1967

Country of origin	(1) Total Immigrants admitted	(2) Immigrants with occupation	(3) Professional, technical and kindred workers	(4) Engineers	(5) Natural scientists	(6) Social scientists	(7) Physicians*	(8) Professional nurses
Europe								
Greece	39,608	12,006	2,068	323	150	26	180	83
Turkey (Europe and Asia)	7,808	3,455	1,518	327	31 x/	16	319	34
Asia								
Burma	NA	NA	NA	40	10	4	13	3
China (including Taiwan)	51,218	23,291	7,343	1,406	610	72	99	112
Hong Kong	11,942	1,666	814	478	189	17	83	127
India	10,034	6,121	5,078	2,141	624	78	174	34
Indonesia	6,056	2,634	680	25	14	4	5	4
Iran	5,363	3,074	1,564	369	85	18	311	52
Iraq	3,128	1,434	608	122	52	3	33	10
Israel	6,694	2,304	1,201	371	130	48	174	153
Jordan (including (Arab Palestine)	5,880	2,508	636	79	38	7	18	17
Korea	15,093	2,529	1,895	293	226	71	163	61
Lebanon	2,981	1,359	547	177	72	11	89	62
Malaysia	311 a/	165 a/	75 a/	35	26	3 x/	27	18
Pakistan	993 b/	681 b/	546 b/	119	45	4	33	6
Philippines	30,149	10,384	5,421	434	187	36	1,158	793
Syrian Arab Republic	1,613 c/	794 c/	311 c/	83	23	3	24	6 x/
Thailand	NA	NA	NA	28	4	3	40	152
Vietnam	765 d/	168 d/	114	27	6	3	3	15

1056

Table I (continued)

Country of origin	(1) Total immigrants admitted	(2) Immigrants with occupation	(3) Professional, technical and kindred workers	(4) Engineers	(5) Natural scientists	(6) Social scientists	(7) Physicians*	(8) Professional nurses
North America								
Mexico	269,014	90,941	3,628	328	176	48	559	248
Dominican Republic	60,344	26,468	2,094	168	49	11	235	160
Haiti	16,232	8,130	1,988	78	34	10	114	161
Costa Rica	11,558	5,682	803	59	26	3 x/	32	132
El Salvador	8,896	4,538	634	21	20	3	27	99
Guatemala	8,269	4,286	722	33	11	5	30	103
Honduras	10,297	5,039	760	42	18 x/	4 x/	32	83
Nicaragua	7,089	8,011	367	24	13	1 x/	32	44
Panama	11,235	4,471	527	40	7	4	25	60
Other West Indies	-	-	-	1,127	388	74	1,184	1,733
South America								
Argentina	27,738	12,745	4,226	516	213	43	742	186
Bolivia	2,319 e/	1,014 e/	362 e/	57	23	7	101	40
Brazil	12,891	5,389	1,539	251	106	23	168	95
Chile	7,767	3,142	912	136	44	13 x/	50	81
Colombia	45,515	16,924	3,924	383	137	71	601	234
Ecuador	21,984	8,897	1,646	78	41	9	84	132
Paraguay	NA	NA	NA	8	8	1 x/	27	10 x/
Peru	12,877	4,894	1,229	144	30	13	195	114
Uruguay	NA	NA	NA	28	4	- x/	20	13
Venezuela	5,788	1,450	650	211	72	20	125	60

Table I (continued)

Country of origin	(1) Total immigrants admitted	(2) Immigrants with occupation	(3) Professional, technical and kindred workers	(4) Engineers	(5) Natural scientists	(6) Social scientists	(7) Physicians*	(8) Professional nurses
Africa								
Algeria	918 x/	418 x/	98 x/	4	1	- x/	5	1
Ethiopia	NA	NA	NA	9	1 x/	1 x/	14	1
Ghana	NA	NA	NA	12	6	2	9	10
Kenya	NA	NA	NA	18	4	2	3	4
Morocco	1,894	747	183	14	3	- x/	9	9
Nigeria	417 f/	255 f/	131 f/	31	9	2 x/	9 x/	34
Tunisia	392 g/	145 g/	23 g/	1 x/	5	1 x/	6	2
U.A.R.	6,285	2,998	1,181	89	57	13	91	15
Total above developing countries	749,355	291,157	58,044	10,787	3,978	811	7,475	5,606
All countries	1,863,980	818,660	180,877	27,877	10,686	1,895	14,029	23,886

Source: The figures in column (1) and column (3) have been compiled from the figures given in the first and second columns of Table 8, the Annual Reports (Department of Justice, Immigration and Naturalization Service, Washington, D.C.) for the years 1962 through 1967 inclusive. Those in column (2) have been calculated by subtracting the figures on "housewives, children and others with no reported occupation" of the same source from the corresponding figures in our column (1). Columns (4) through (8) have been compiled from the corresponding data in Appendix A, tables I through V in the Staff Study of the Research and Technical Programs Subcommittee, House of Representatives, July, 1967.

Foot-notes to Table I

* Physicians include surgeons, and each occupation includes professors and instructors.

a/ 1965 only.

b/ 1966 and 1967 only.

c/ From 1963 through 1967 only.

d/ 1966 and 1967 only.

e/ 1965, 1966 and 1967 only.

f/ 1964 through 1966 only.

g/ 1962, 1963 and 1964 only.

x/ 1962 through 1966 only.

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Table II

Immigrants admitted into the United States, by country of origin and occupation

A. From the five years ended 30 June 1962 to 30 June 1966, and
B. For the year ended 30 June 1967

Country of origin	(1) Total immigrants admitted		(2) Immigrants with occupation		(3) Professional, technical and kindred workers		(4) Engineers		(5) Natural scientists		(6) Social scientists		(7) Physicians*		(8) Professional nurses	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Europe																
Greece	24,703	14,905	5,631	6,375	1,479	589	227	96	111	39	14	12	125	55	50	23
Turkey	5,595	2,213	2,423	1,032	1,091	427	256	71	31	-	14	2	208	111	26	8
Asia																
Burma	n.a.	-	n.a.	n.a.	n.a.	n.a.	25	15	3	7	1	3	9	4	3	0
China (Republic of)	31,477	19,741	13,467	9,824	3,419	3,924	484	922	262	348	33	39	53	46	66	46
Hong Kong	6,587	5,355	851	815	411	403	251	227	90	99	8	9	50	43	75	52
India	5,392	4,642	3,315	2,806	2,604	2,474	1,074	1,067	355	269	38	40	87	87	14	20
Indonesia	5,586	470	2,430	204	559	121	14	11	9	5	1	3	-	5	2	2
Iran	3,949	1,414	2,178	896	1,014	550	236	133	57	28	10	8	188	123	32	20
Iraq	2,057	1,071	983	451	428	180	86	36	40	12	1	2	22	11	8	2
Israel	5,213	1,481	1,657	647	826	375	255	116	33	47	35	13	138	38	123	30
Jordan	4,276	1,604	1,895	613	461	175	54	25	35	3	3	4	12	6	12	5
Korea	11,137	3,956	1,454	1,075	1,065	830	185	108	140	86	34	37	93	70	37	24
Lebanon	2,229	752	1,031	328	414	133	136	41	48	24	9	2	50	39	45	17
Malaysia	311 a/	n.a.	165 a/	n.a.	75 a/	n.a.	27	8	17	9	3	-	22	5	14	4
Pakistan	347 b/	646	245 b/	436	205 b/	341	62	57	28	17	1	3	19	14	4	2
Philippines	19,284	10,865	5,555	4,829	2,621	2,800	86	348	81	106	21	15	608	550	358	435
Syrian Arab Republic	1,058 c/	555	528 c/	266	215 c/	96	66	17	20	3	2	1	19	5	6	
Thailand	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	15	13	3	1	2	1	32	8	76	78
Vietnam	275 d/	490	59 d/	109	39 d/	75	21	6	3	3	1	2	1	2	12	3
North America																
Mexico	226,643	42,371	78,607	12,334	2,931	697	267	61	142	34	34	14	473	86	202	46
Dominican Republic	48,830	11,514	23,203	3,265	1,824	270	151	17	33	16	7	4	197	38	130	30
Haiti	12,665	3,567	6,559	1,571	1,681	307	65	13	30	4	8	2	74	40	133	28
Costa Rica	10,383	1,175	3,283	399	734	69	53	6	23	3	3	-	29	3	119	13
El Salvador	7,851	1,045	4,025	513	574	60	19	2	18	2	1	2	22	5	88	11
Guatemala	6,800	1,469	3,598	688	633	89	30	3	10	1	4	1	22	8	95	8
Honduras	8,747	1,550	4,469	570	701	59	39	3	18	-	4	-	26	6	72	11
Nicaragua	6,360	729	2,709	263	325	42	23	1	12	1	1	-	25	7	38	8
Panama	9,559	1,676	3,942	529	451	74	38	2	4	3	2	2	24	1	51	9
South America																
Argentina	25,261	2,477	11,637	1,108	3,720	506	424	92	172	41	33	10	616	126	167	19
Bolivia	1,684 e/	635	732 e/	282	266 e/	96	41	16	19	4	5	2	85	16	30	10
Brazil	11,215	1,676	4,784	605	1,348	191	197	54	91	15	17	6	149	19	82	13
Chile	6,931	836	2,798	344	790	122	116	20	40	4	13	-	47	3	74	7
Colombia	40,959	4,556	15,496	1,438	3,532	392	310	73	122	15	63	8	485	116	213	21
Ecuador	19,265	2,719	8,109	788	1,495	151	62	16	37	4	7	2	67	17	116	16
Paraguay	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	7	1	6	2	1	-	19	8	10	-
Peru	11,207	1,670	4,020	874	1,097	132	122	22	27	3	12	1	168	27	98	16
Uruguay	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	25	3	3	1	-	-	13	7	9	4
Venezuela	5,249	539	1,350	100	357	293	186	22	62	10	17	3	110	15	60	-
Africa																
Algeria	918	n.a.	418	n.a.	98	n.a.	4	-	-	1	-	-	2	3	1	-
Ethiopia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6	3	1	-	1	-	13	1	1	-
Ghana	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	8	4	2	4	1	1	1	8	5	5
Kenya	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12	6	2	2	-	2	2	1	4	-
Morocco	1,437	457	555	192	138	45	9	5	1	2	-	-	7	2	9	-
Nigeria	417 f/	n.a.	255 f/	n.a.	131 f/	n.a.	14	17	5	4	2	-	9		19	15
Tunisia	392 g/	n.a.	145 g/	n.a.	23 g/	n.a.	1	-	4	1	1	-	3	3	2	-
U.A.R. (Egypt)	4,582	1,703	2,112	886	787	394	56	33	37	20	8	5	65	26	14	1
** Total developing countries	727,920	209,885	294,465	87,295	57,595	23,705	6,835	4,229	2,477	1,472	533	279	5,655	2,041	4,249	4,784
All countries	1,532,008	361,972	665,735	152,925	139,225	41,652	19,055	8,822	7,793	2,893	1,351	544	10,703	3,326	19,102	2,004

Source: As in Table I.

Notes: a/ 1965 only; b/ 1966 only; c/ From 1963 through 1966 only; d/ 1966 only; e/ 1965 and 1966 only; f/ 1964 through 1966 only; g/ 1962, 1963 and 1964 only.

* Physicians include surgeons, and each occupation includes professors and instructors.

** The totals used are those of all developing countries. These add to the above-listed countries the following rubrics appearing in the U.S. Statistics: "Other Asia", "Other North America", "Other South America", "Other Oceania", "Other West Indies" and "Fiji". The totals of the above are generally of minor consequence except in the instance of "Other West Indies", which contributed 1,521 Engineers, Scientists and Medical personnel to the U.S. in FY 1967 of whom 1,025 were medical personnel which included 202 doctors and surgeons, 19 dentists, 784 professional nurses and 20 student nurses. Jamaica and Barbados are major contributors to the "Other West Indies" category.

Table III

Immigrants admitted into Canada, by country of last permanent residence and occupation, 1962-1967*

Country	Total immigrants (1962-1966)	(1967)	Total immigrant workers (1962-1966)	Professional and technical workers (1962-1966)	(1967)	Engineers (All for 1962-1966)	Natural Scientists (All for 1962-1966)	Physicians (All for 1962-1966)	Professional nurses (All for 1962-1966)
Argentina	1,837	(544)	731	114	(58)	16	5	22	7
Brazil	2,019	(715)	885	137	(45)	34	3	8	1
Ceylon	387	(112)	188	66	(35)	10	2	1	3
China (incl. Taiwan)	4,898	(6,409)	1,859	1,075	(1,376)	208	65	88	238
Egypt	7,888	(1,728)	3,150	913	(309)	116	68	100	7
Greece	25,707	(10,650)	15,171	435	(177)	36	30	38	31
Hong Kong (1962-1965 only)	11,789	-	2,991	848	-	190	63	77	143
India	6,894	(3,966)	3,243	1,967	(1,213)	408	206	164	150
Israel	4,427	(2,345)	2,165	428	(262)	100	24	33	26
Lebanon	2,597	(1,096)	1,223	244	(165)	19	8	41	10
Mexico	645	(318)	209	75	(31)	14	4	19	3
Pakistan	1,447	(648)	772	477	(233)	144	52	37	7
Syria	266	(192)	158	37	(36)	5	2	9	2
Turkey	1,578	(488)	687	314	(109)	23	12	115	11

Source: Immigration Statistics, Canada, 1962-1967, Canada Immigration Division, Department of Manpower and Immigration. Also S. Watanabe, "The brain drain from developing to developed countries", International Labour Review, Vol. 99, No. 4, April, 1969, Table I.

* Calendar years.

Table IV

Immigrants admitted into Canada, by country of origin and occupation, over the period 1964-1967*

	Total immigrants (1964-1966)	(1967)	Total immigrant workers (1967)	Professional and technical workers (1964-1966)	(1967)	Engineers	Natural scientists	Physicians	Professional nurses
						(All for 1964-66)			
Algeria	21	(15)	11	5	(3)	1	2	-	-
Burma	66	(7)	28	19	(3)	4	3	7	1
Chile	213	(105)	167	33	(20)	12	4	3	2
Colombia	200	(87)	93	41	(18)	5	2	11	-
Indonesia	33	(11)	19	13	(6)	3	2	1	2
Iran	293	(136)	147	93	(49)	17	15	33	3
Iraq	152	(102)	81	33	(16)	13	8	2	-
Jordan	256	(166)	149	35	(23)	-	3	2	4
Kenya	309	(239)	140	80	(61)	10	9	4	1
Malaysia	298	(199)	144	102	(66)	13	20	8	21
Morocco	2,151	(547)	1,506	119	(48)	4	13	5	2
Peru	177	(78)	73	30	(24)	8	3	5	5
Philippines	4,378	(2,994)	3,746	3,266	(2,022)	237	202	221	1,902
Taiwan	500	-	280	238	-	45	31	27	30
Tunisia	54	(12)	20	5	(3)	-	-	2	1
Uruguay	258	(101)	102	10	(5)	1	3	2	1
Venezuela	963	(374)	418	44	(24)	11	6	1	1

Source: Immigration Statistics, Canada, 1964-1967, including special tabulation prepared by the Canada Immigration Division.

* Calendar years.

2062

Table V

New working licences issued to foreigners by the French Government by country of origin and occupation over the period 1962-1966

Countries	Engineers	Natural Scientists	Physicians	Professors
Europe				
Greece	100	50	-	-
Turkey	119	15	-	1
Asia				
China	31	25	-	-
India	57	36	-	-
Indonesia	3	1	-	-
Iran	73	43	1	-
Iraq	1	4	1	-
Israel	169	50	2	1
Korea	21	11	-	-
Lebanon	129	24	-	1
Pakistan	13	1	-	-
Syria	56	9	4	-
Vietnam	185	27	2	3

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Table V (continued)

Countries	Engineers	Natural Scientists	Physicians	Professors
South America				
Argentina	97	41	1	1
Bolivia	2	3	-	-
Brazil	62	23	-	-
Chile	18	8	1	-
Colombia	14	4	-	-
Ecuador	2	-	-	-
Paraguay	-	-	-	-
Peru	13	4	-	-
Uruguay	5	2	-	-
Venezuela	11	2	-	-
Africa				
Morocco	129	14	2	6
Tunisia	94	11	3	-
U.A.R. (Egypt)	44	13	-	-

Source: A special tabulation provided by La Direction de la Population et des Migrations du Ministère des Affaires Sociales, Paris.

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Table VI

Foreign students in France in 1966/1967 by country of origin and field of specialization

(selected countries)

Country	Law	Sciences	Letters	Medicine	Pharmacy	Total
Asia						
Cambodia	40	63	14	38	18	173
China (Nat.)	30	21	19	6	1	77
India	7	49	21	1	2	80
Indonesia	3	2	16	-	-	21
Iran	107	316	114	187	28	752
Iraq	51	14	17	7	-	89
Jordan	2	3	6	4	1	16
Korea (South)	8	5	24	-	1	38
Laos	56	75	23	61	11	226
Lebanon	62	376	72	357	15	882
Pakistan	2	15	6	2	-	25
Philippines	1	-	7	-	-	8
Syrian Arab Republic	67	139	52	100	31	389
Thailand	26	1	13	2	-	42
Vietnam (North)	16	99	34	50	27	226
Vietnam (South)	278	755	142	320	165	1,660
South America						
Argentina	9	19	29	5	-	62
Bolivia	2	2	9	2	-	15
Brazil	36	23	74	1	1	135
Chile	12	6	34	1	-	53
Colombia	11	17	25	2	-	55

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Table VI (continued)

Country	Law	Scienes	Letters	Medicine	Pharmacy	Total
Africa						
Algeria	300	325	105	219	41	990
Cameroon	264	149	96	99	35	643
Congo (Dem. Rep. of)	84	45	19	127	3	278
Congo (People's Rep. of)	81	32	34	53	15	215
Dahomey	124	69	45	30	5	273
Gabon	54	46	31	37	8	176
Guinea	56	16	27	6	4	109
Ivory Coast	46	37	13	20	5	121
Madagascar	94	186	93	211	41	625
Mali	98	94	34	38	11	275
Senegal	97	62	28	35	5	227
Togo	111	66	49	26	3	255
Tunisia	380	770	326	618	213	2,307
United Arab Republic	79	41	48	11	6	185
Upper Volta	46	37	13	20	5	121
Total foreign students (above and other countries)	4,855	6,453	7,719	4,218	1,165	24,410

Source: Ministère de l'éducation nationale, service central des statistiques et de la conjoncture, Paris.

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Table VII

Student enrolment at universities and other institutions of higher learning in France, as of 31 March 1968

Field of specialization	Student enrolment at Universities		Student enrolment at Other institutions of higher learning		Total
	French	foreign students	French	foreign students	
Law	96,905	5,737	8,816	1,686	113,144
Sciences	124,067	7,097	5,353	274	136,791
Arts	153,865	11,133	2,849	3,129	170,976
Medicine	51,052	4,757	2,648	67	58,524
Surgery (Dentistry)	5,216	340	-	-	5,556
Pharmacy	16,540	1,195	20	14	17,769
Technology	-	-	5,220	139	5,359
Total	447,645	30,259	24,906	5,309	508,119

Source: Ministère de l'éducation national, service central des statistiques et de la conjoncture, Paris.

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Table VIII

Aggregate immigrants into Canada by occupation
in the years 1962-1968*

Category	1962	1963	1964	1965	1966	1967	1968
1. Total immigrants	74,586	93,151	112,606	146,758	194,743	222,876	183,974
2. Immigrants with occupation	36,748	45,866	56,190	74,195	99,210	119,539	95,446
3. Professional, technical and kindred workers	8,218	9,640	11,965	16,654	23,637	30,853	29,250
4. Engineers	967	1,198	1,416	2,254	3,210	3,704	2,914
5. Natural scientists	473	444	640	945	1,251	1,721	1,776
6. Physicians and surgeons	530	687	668	792	995	1,213	1,277
7. Professional nurses	1,621	1,379	1,967	2,829	3,732	4,262	3,375

Source: The Canadian figures are compiled from the data in the Immigration Statistics, Canada, 1962-1968.

Note: The Canadian figures are related with each calendar year and do not include professors and instructors in the relevant fields.

1068

Table IX

Aggregate immigrants into the United States by occupation in the years 1962-1969

Category	1962	1963	1964	1965	1966	1967	1968	1969
1. Total immigrants	283,763	306,260	292,248	296,697	323,040	361,972	454,448	358,579
2. Immigrants with occupation	134,824	140,669	131,098	130,811	128,333	152,925	226,292	157,895
3. Professional, technical and kindred workers	23,710	27,930	28,756	28,796	30,039	41,652	48,753	39,980
4. Engineers	2,940	4,014	3,725	3,455	4,921	8,821	9,310	7,098
5. Natural scientists	1,104	1,612	1,676	1,549	1,852	3,158	3,110	858
6. Physicians and surgeons	1,797	2,093	2,249	2,012	2,552	3,326	3,128	2,756
7. Professional nurses	3,429	4,135	4,037	4,071	3,430	4,874	6,942	5,466

Source: The annual reports of the U.S. Immigration and Naturalization Service, 1962-1969 and the tables in the House Reports of 1967-1968, U.S. Congress. Also 'Reviews of Data on Science Resources', National Science Foundation, Washington, D.C., 1969, NSF 69-36 and NSF 70-123, release of 24 February 1970.

Note: The United States figures are for the fiscal year, which starts on 1 July of the previous year and ends on 30 June of the year under which the figure is listed. The United States occupational figures include professors and instructors in the relevant fields.

1069

Table X

Stocks of professional manpower by country around 1960 and of medical personnel around 1964

Country	(1) Percentage of professional, technical and related workers in total non-agricultural workers (Per cent)	(2) Percentage of professional, technical and related workers in total economically active population (Per cent)	(3) Physicians	(4) Inhabitants per Physician	(5) Nurses
Europe					
Greece	7.5	3.4	11,980	710	2,987
Turkey	7.1	1.6	9,664	3,220	2,383
Asia					
Burma	n.a.	n.a.	2,079	11,700	3,376*
China (Taiwan)	6.3[a]	3.1	4,983	2,420	1,844
Hong Kong	5.0	4.6	1,386*	2,660	714*
India	6.3	1.7	77,780*[b]	5,800	39,350*
Indonesia	n.a.	n.a.	2,935	35,000	21,117
Iran	3.4[a]	1.6	7,090	3,220	1,797
Iraq	n.a.	n.a.	1,470	4,760	683
Israel	13.1	11.4	5,928	420	2,955
Jordan	6.4	4.1	361	5,300	289
Korea	5.9	2.2	9,695*	2,850	8,159*
Lebanon	n.a.	n.a	1,691[c]	1,320	945*
Malaysia	7.4(d)	2.8	1,295	6,600[m]	n.a.
Pakistan	5.5	1.4	15,668*	6,400	3,962*
Philippines	6.9	2.7	21,859	1,430	22,953*
Syria	3.8	2.2	978[c]	5,100	408*
Thailand	7.0	1.3	3,462	8,600	1,947
Vietnam	n.a.	n.a.	748[b]	20,000	2,223

Table X (continued)

Country	(1) Percentage of professional, technical and related workers in total non-agricultural workers (Per cent)	(2) Percentage of professional, technical and related workers in total economically active population (Per cent)	(3) Physicians	(4) Inhabitants per physician	(5) Nurses
North America					
Mexico	7.9	3.6	20,590[d]	1,750	n.a.
Dominican Republic	7.3	2.8	2,153*	1,620	437
Haiti	2.9[e]	0.5	314[f]	15,000	308
Costa Rica	10.3[c]	5.2	705	1,970	n.a.
El Salvador	6.4	2.5	653	4,320	802
Guatemala	6.4[g]	2.3	1,066	4,040	920
Honduras	7.6	2.5	423[f]	5,400	259
Nicaragua	6.4[c]	2.6	649[f]	2,560	339
Panama	8.4	4.5	534	2,220	264
South America					
Argentina	n.a.	n.a.	31,931*[b]	670	28,114*
Bolivia	n.a.	n.a.	977**[c]	3,680	367
Brazil	n.a.	n.a.	34,251***	2,300	6,054
Chile	6.8	4.9	4,250[h]	1,810	1,570
Colombia	5.0[i]	2.3	7,305[c]	2,470	1,177
Ecuador	7.3[b]	3.3	942	5,100	228
Paraguay	6.8	3.2	802[b]	2,300	157*
Peru	6.5	3.3	5,061	2,230	3,103
Uruguay	7.3[c]	5.9	3,100[c]	850	340
Venezuela	7.7	5.2	6,584	1,280	3,968[f]

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Table [illegible] (continued)

Country	(1) Percentage of professional, technical and related workers in total non-agricultural workers (Per cent)	(2) Percentage of professional, technical and related workers in total economically active population (Per cent)	(3) Physicians	(4) Inhabitants per physician	(5) Nurses
Africa					
Algeria	n.a.	n.a.	1,301	9,000	993
Ethiopia	n.a.	n.a.	324	69,000	604
Ghana	5.2	2.2	315 i/	21,000	n.a.
Kenya	n.a.	n.a.	908* c/	9,700	1,824*
Morocco	6.9	3.0	1,276 c/	9,900	1,014
Nigeria	n.a.	n.a.	1,777*	32,[illegible]	9,[illegible]39
Tunisia	n.a.	n.a.	485	9,400	55
U.A.R. (Egypt)	6.4	3.1	12,120	2,380	1,214
Developed countries					
Austria	8.8	6.8	12,953	560	12,614
Australia	9.4	8.4	15,060	740	n.a.
Belgium	8.6	8.0	13,425	700	15,123
Canada	12.1	10.6	21,000*** k/	900	50,730
Denmark	9.5	7.8	6,335	750	18,500***
Finland	12.7	8.2	3,384	1,350	12,369
France	n.a.	n.a.	57,500***	840	121,671
Germany (West)	8.8	7.6	90,128	650	128,4[illegible]4
Ireland	11.0	7.1	2,952 l/	950	15,230
Italy	7.3	5.3	81,200	610	38,000***
Japan	7.3	4.9	101,021 l/	960	130,849
Netherlands	10.3	9.2	13,904	870	15,000*** c/

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Table A (continued)

Country	(1) Percentage of professional, technical and related workers in total non-agricultural workers (Per cent)	(2) Percentage of professional, technical and related workers in total economically active population (Per cent)	(3) Physicians	(4) Inhabitants per physician	(5) Nurses
Developed countries (continued)					
New Zealand	10.5	9.4	3,873*	670	3,634
Norway	10.0	8.0	4,556	810	10,869
South Africa	5.0	3.5*	8,968*	1,900	25,351
Sweden	14.9	12.9	8,221	930	39,420
Switzerland	10.1	8.9	7,771	760	15,228
United Kingdom	9.8	8.6	57,000***	890	114,857
United States	11.5	10.8	282,564	680	550,000 c/

Source: Table is based on S. Watanabe "The Brain Drain from Developing to Developed Countries", ILO, Geneva, 1969.

Column (1): calculated from figures published in the ILO Yearbook of Labour Statistics, 1965 or 1966. The figures for professional, technical and related workers are from its table 2B, and those for non-agricultural workers have been calculated by subtracting the number of workers in all industries but "agriculture, forestry, hunting and fishing" from the total number of workers.

Column (2): quoted from table 2B in the above-mentioned source.

Columns (3) - (5): table 1.1 in the World Health Statistics Annual, 1963, World Health Organization, Geneva, 1967.

(foot-notes on following page)

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(foot-notes to table A)

Note: The figures in column (1) are related either with 1960 or 1961, unless otherwise mentioned. Those in column (2) are related with the same year as the corresponding figure in column (1). The figures in column (3) are related with the year 1964, unless otherwise mentioned. Those in columns (4) and (5) are related with the same year as the corresponding figure in column (3). Physicians include surgeons, and nurses are professional ones.

* shows the figure is concerned with registered personnel.

** number of physicians in hospitals only.

*** estimates.

a/ Figure for 1956.

b/ Figure for 1962.

c/ Figure for 1965.

d/ Compiled from Malaya, Sabah and Sarawak figures: the first figure is for the year 1957, while the latter two are for 1960, so this is not accurate.

e/ Figure for 1950.

f/ Figure for 1965.

g/ Figure for 1964.

h/ Figure for 1960.

i/ Figure for 1951.

j/ Figure from World Directory of Medical Schools, Third Edition, World Health Organization, Geneva, 1965, Annex 4, which is concerned with the year 1960.

k/ Figure for 1962-1963.

l/ Figure for 1961.

m/ Calculated from the figure on the stock of physicians in the World Health Statistics Annual, op. cit., and the estimate of population in the United Nations Demographic Yearbook, 1966.

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Table 21

Proportion of professional, technical and kindred workers out of total immigrants with occupation into the United States and Canada over the period 1962-1966

Country	(1) Immigrants into U.S.A. (Per cent)	(2) Immigrants into Canada (Per cent)
Europe		
Greece	26.3	2.9
Turkey	45.0	45.7
Asia		
Burma	n.a.	67.9*
China	25.4	57.8
Hong Kong	48.2	28.4 a/
India	78.6	60.7
Indonesia	23.0	68.4*
Iran	46.6	63.3*
Iraq	43.5	40.7*
Israel	49.8	19.8
Jordan	24.3	23.5*
Korea	73.2	n.a.
Lebanon	40.2	20.0
Malaysia	45.5 a/	70.8*
Pakistan	83.7 b/	61.8
Philippines	47.2	87.2*
Syria	40.7	23.4
Thailand	n.a.	n.a.
Vietnam	66.1 b/	n.a.
North America		
Mexico	3.7	36.0
Dominican Republic	7.9	n.a.
Haiti	25.6	n.a.
Costa Rica	13.6	n.a.
El Salvador	14.3	n.a.
Guatemala	17.6	n.a.
Honduras	15.4	n.a.
Nicaragua	12.0	n.a.
Panama	11.4	n.a.

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Table XI (continued)

Country	(1) Immigrants into U.S.A. (Per cent)	(2) Immigrants into Canada (Per cent)
South America		
Argentina	32.0	15.6
Bolivia	36.3 d/	n.a.
Brazil	28.2	14.8
Chile	28.2	19.8*
Colombia	22.8	44.1*
Ecuador	18.4	n.a.
Paraguay	n.a.	n.a.
Peru	27.3	41.9*
Uruguay	n.a.	9.8*
Venezuela	26.4	10.5*
Africa		
Algeria	n.a.	45.5*
Ethiopia	n.a.	n.a.
Ghana	n.a.	n.a.
Kenya	n.a.	57.1*
Morocco	24.9	7.9
Nigeria	51.4 g/	n.a.
Tunisia	15.9 f/	25.0*
U.A.R. (Egypt)	37.2	29.0

Source: The figures in Column (1) have been compiled from the Annual Reports, 1962-1966, and those in Column (2) from data in the Immigration Statistics, Canada, 1962-1966, while those marked by * come from data in the special tabulation provided by the same authorities.

Table from S. Watanabe, "The Brain Drain from Developing to Developed Countries", ILO, 1969

a/ 1965 only; b/ 1966 only; c/ 1963-1966 only; d/ 1965 and 1966 only; e/ 1964-1966 only; f/ 1962-1964 only; g/ 1962-1965 only.

* 1964-1966 only.

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TABLE XII

Annual number of graduates by country
and field of study around 1960

Country	(1) Engineers	(2) Natural Scientists	(3) Social Scientists	(4) Physicians	(5) Nurses
Europe					
Greece	273	313	1,210	424	196
Turkey	1,160	73	2,133		266
Asia					
Burma	n.a.	n.a.	n.a.	141	86
China (Taiwan)	1,392	496	1,539	401	413
Hong Kong	19	57	13	45	
India	5,151 a/	n.a.	14,273 a/	3,119	2,894 i/
Indonesia	n.a.	n.a.	n.a.	303	n.a.
Iran	130 b/	163 b/	— b/	493	192
Iraq	233 c/	n.a.	144 c/	108	n.a.
Israel	666 i/	168	n.a.	84	262
Jordan	—	—	—	—	17
Korea	1,030 d/	1,246 d/	4,397 d/	600	662
Lebanon	160 e/	154 e/	355 e/	74	n.a.
Malaysia	n.a.	n.a.	n.a.	n.a.	n.a.
Pakistan	472	3,163	1,517	n.a.	n.a.
Philippines	4,253 f/	451 f/	13,178 f/	1,010	2,000
Syrian Arab Republic	45	53	49	69	n.a.
Thailand	311 e/	422 e/	954 e/	225	590
Viet-Nam	54 g/	34 g/	— g/	59	n.a.

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Table XII (continued)

Country	(1) Engineers	(2) Natural Scientists	(3) Social Scientists	(4) Physicians	(5) Nurses
North America					
Mexico	818	239	9,054[h]	1,011	n.a.
Dominican Republic	65[e]	n.a.[e]	200[e]	85	n.a.
Haiti	15[e]	- [e]	15[e]	41	n.a.
Costa Rica	21	5	6	-	n.a.
El Salvador	20[h]	15[h]	11[h]	29	n.a.
Guatemala	12	12	5	30	n.a.
Panama	n.a.	n.a.	n.a.	n.a.	n.a.
Honduras	7	n.a.	7	34	n.a.
Nicaragua	n.a.	n.a.	n.a.	22	n.a.
South America					
Argentina	2,036	576	813	1,770	n.a.
Bolivia	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	1,601	697	2,099	1,528	352
Chile	102[j]	50[j]	134[j]	280	71
Colombia	269	193	147	442	93
Ecuador	40	45	19	n.a.	n.a.
Paraguay	6[h]	68[h]	n.a.	97	n.a.
Peru	204[h]	297[h]	150[h]	n.a.	n.a.
Uruguay	44[k]		32[k]	91	62
Venezuela	312[g]	31[e]	756[e]	258	23
Africa					
Algeria	n.a.	n.a.	n.a.	n.a.	n.a.
Ethiopia	29	5	n.a.	--	26
Ghana	12	40	37	--	n.a.
Kenya	n.a.	n.a.	n.a.	--	n.a.

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Table XII (continued)

Country	(1) Engineers	(2) Natural Scientists	(3) Social Scientists	(4) Physicians	(5) Nurses
Africa (continued)					
Morocco	n.a.	n.a.	n.a.	--	n.a.
Nigeria	25 e/	77 e/	47 e/	19	936
Tunisia	--	24 e/	4 e/	--	n.a.
U.A.R. (Egypt)	1,099	473	2,648	815	387

Source: The figures of Columns (1), (2) and (3) are quoted from UNESCO Statistical Yearbook 1963 and sometimes 1964, Paris, and are related with the year 1960 unless otherwise noted. The figures of Column (4) are from Annexes 4-7 in World Directory of Medical Schools, World Health Organization, Geneva, 1963 and are related with the year 1960. The figures of Column (5) are from National Reports of Member Associations, International Council of Nurses, London, 1965 and are related with the year 1962 unless otherwise noted.

Table from S. Watanabe, op. cit.

a/ Not including intermediate colleges.

b/ Figures for 1957.

c/ Distribution is by college, rather than field of study.

d/ First degree only.

e/ Figures for 1961.

f/ Not including public universities and equivalent degree granting institutions.

g/ Not including either the National Institute of Administration or the National College of Agriculture, for which data are not available.

h/ Figures for 1959.

i/ Figure for 1961.

j/ University of Chile only.

k/ Figures for 1962.

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Table XI.I

Ratio of the Annual Number of Emigrants to the Annual Number of Graduates from the Related Field of Study by Country of Origin or Last Permanent Residence over the Period 1962-1966

(France, United States and Canada)

	Engineers	Natural Scientists	Physicians	Nurses	Social Scientists
	F+U.S.+C	F+U.S.+C	F+U.S.+C	U.S.+C	U.S.
Europe					
Greece	26.6	12.2	7.7	8.3	0.2
Turkey	6.9	15.9	15.2	2.8	0.1
Asia					
Burma	-	-	2.9	1.0	-
Hong Kong	514.2	59.3	65.1	-	12.3
India	6.1	-	1.6	1.1	0.1
Indonesia	-	-	0.1	-	-
Iran	51.9	14.1	10.0	3.9	∞
Iraq	9.2	-	4.9	-	0.1
Israel	15.7	18.6	54.3	11.4	-
Jordan	-	∞	∞	21.8	∞
Korea	-	-	-	-	1.5
Lebanon	35.5	10.5	24.9	-	0.5
Malaysia	-	-	-	-	-
Pakistan	9.2	0.5	1.4	-	0.01
Philippines	2.3	18.5	19.3	35.3	0.03
Syria	56.5	11.7	9.3	-	0.8
Thailand	-	-	-	-	0.04
Vietnam	-	-	-	-	-
North America					
Mexico	7.7	12.8	9.7	-	0.07
Dominican Republic	-	-	-	-	0.7
Haiti	-	-	-	-	10.7
Costa Rica	-	-	-	-	10.0
El Salvador	-	-	-	-	1.8
Guatemala	-	-	-	-	16.0
Honduras	-	-	-	-	11.4
Nicaragua	-	22.7	-	-	-
Panama	-	-	-	-	-

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Table XIII (continued)

	Engineers F+U.S.+C	Natural Scientists F+U.S.+C	Physicians F+U.S.+C	Nurses U.S.+C	Social Scientists U.S.
South America					
Argentina	5.2	7.5	7.2	-	0.8
Bolivia	-	-	-	-	-
Brazil	3.6	3.4	2.1	4.7	0.2
Chile	30.3	21.2	3.7	21.8	1.9
Colombia	24.8	13.5	22.8	-	8.6
Ecuador	-	-	-	-	7.4
Paraguay	-	-	-	-	-
Peru	14.5	2.5	4.4	-	1.6
Uruguay	14.2	-	3.6	-	-
Venezuela	14.0	47.8	8.6	53.5	0.4
Africa					
Algeria	-	-	-	-	-
Ethiopia	-	-	-	-	-
Ghana	-	-	-	-	0.5
Kenya	-	-	-	-	-
Morocco	-	-	∞	-	-
Nigeria	-	-	-	-	0.9
Tunisia	-	-	∞	-	5.0
U.A.R. (Egypt)	1.9	4.6	3.7	1.1	0.06

Source: Table from S. Watanabe, op. cit.

Note: - denotes "not available", ∞ indicates that there were emigrants in the category concerned but no new graduates.

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Table XIV

Number of graduates per 100,000 inhabitants and percentage distribution of graduates by broad fields of study and selected countries

Country	Year	Number of graduates per 100,000 inhabitants	Percentage distribution					
			Total	Humanities, education, fine arts	Law, Social sciences	Natural sciences	Engineering, medical science, agriculture	Not specified
Africa								
Cameroon	1964	1	100	27	66	-	7	-
Dahomey	1964	0.7	100	100	-	-	-	-
Ghana	1963	24	100	90	6	0.5	4	-
Nigeria	1964	2	100	44	30	12	14	-
Senegal	1965	8	100	24	54	17	5	-
South Africa	1963	44	100	51	16	17	16	0.1
Sudan	1965	8	100	42	20	9	29	-
United Arab Republic	1965	62	100	26	34	7	33	-
North America								
Canada	1964	174	100	65	9	9	16	-
Costa Rica	1961	84	100	81	7	0.6	12	-
Cuba	1964	23	100	40	27	3	30	-
Jamaica	1964	11	100	51	20	20	8	-
Mexico	1963	47	100	29	6	3	18	43
United States of America	1965	349	100	41	15	13	13	18
South America								
Argentina	1965	69	100	30	22	5	43	-
Brazil	1964	25	100	23	40	4	33	-
Colombia	1965	18	100	28	21	8	43	-
Peru	1962	40	100	13	15	2	67	3
Venezuela	1964	16	100	9	45	0.6	46	-

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Table XIV (continued)

Country	Year	Number of graduates per 100,000 inhabitants	Total	Percentage distribution: Humanities, education, fine arts	Law, social sciences	Natural sciences	Engineering, medical science, agriculture	Not specified
Asia								
Afghanistan	1965	2	100	23	36	6	35	-
Ceylon	1963	22	100	69	13	8	9	1
China (Taiwan)	1965	94	100	27	32	9	33	0.1
India	1962	45	100	78	13	-	10	-
Iran	1957	10	100	33	18	8	40	-
Iraq	1964	37	100	38	31	4	25	2
Japan	1964	233	100	25	48	3	24	0.1
Jordan	1965	32	100	88	2	-	-	10
Korea, Republic of	1964	161	100	28	36	7	29	-
Lebanon	1965	77	100	33	33	14	20	-
Pakistan	1964	35	100	57	18	19	6	-
Philippines	1963	180	100	52	27	1	19	0.2
Syria	1964	53	100	26	47	6	21	-
Europe								
Belgium	1962	157	100	41	18	10	28	2
Czechoslovakia	1964	124	100	34	9	2	55	-
France	1964	96	100	41	14	17	28	-
Germany, Federal Republic of	1964	109	100	36	12	6	47	-
Germany, Eastern	1964	86	100	37	10	10	44	-
Hungary	1964	87	100	26	8	7	59	-
United Kingdom England	1964	167	100	43	9	17	31	-
Yugoslavia	1964	153	100	25	35	3	37	-
U.S.S.R.	1964	177	100	44	8	-	48	-

Source: Figures taken from UNESCO Statistical Yearbook, 1967, pp. 259-268.

Table XV

Awards of Ph.D.'s and Federal Funding for Basic Research, 1958-1967, United States

(Figures in parentheses represent the figures in each series normalized to a base of 100)

	Agricultural Sciences		Biological Sciences		Engineering Sciences		Mathematical Sciences		Astronomy, Physics, Chemistry, Earth Sciences		Psychological Sciences		Social Sciences	
	Ph.D.'s	Dollars	Ph.D.'s	Dollars	Ph.D.'s	Dollars	Ph.D.'s	Dollars	Ph.D.'s	Dollars	Ph.D.'s	Dollars	Ph.D.'s	Dollars
1958	337 (100)	13m (100)	1,091 (100)	28m (100)	629 (100)	25m (100)	238 (100)	11m (100)	1,650 (100)	191m (100)	745 (100)	- (100)	853 (100)	9m (100)
1959	342 (102)	14m (108)	1,021 (94)	41m (146)	699 (111)	58m (232)	289 (121)	14m (127)	1,801 (109)	289m (151)	787 (106)	9m (100)*	893 (105)	5m (56)
1960	413 (123)	16m (123)	1,160 (106)	55m (196)	792 (126)	75m (300)	291 (122)	18m (164)	1,861 (113)	315 (165)	773 (104)	17m (189)	924 (108)	8m (89)
1961	438 (130)	18m (138)	1,171 (107)	82m (293)	940 (149)	81m (324)	332 (139)	21m (191)	1,993 (121)	438m (229)	820 (110)	21m (233)	1,001 (117)	11m (122)
1962	470 (140)	21m (162)	1,299 (119)	98m (350)	1,215 (193)	114m (456)	388 (163)	26m (236)	2,096 (127)	597m (313)	857 (115)	28m (311)	1,071 (126)	18m (200)
1963	465 (138)	24m (185)	1,411 (129)	117m (418)	1,357 (216)	134m (536)	484 (203)	42m (382)	2,428 (147)	578m (397)	892 (120)	36m (400)	1,186 (139)	25m (278)
1964	517 (153)	24m (185)	1,584 (145))	142m (507)	1,662 (264)	131m (524)	590 (248)	52m (473)	2,527 (153)	862m (451)	1,013 (136)	47m (522)	1,291 (151)	34m (378)
1965	576 (171)	40m (308)	1,825 (167)	177m (632)	2,068 (329)	143m (572)	684 (287)	57m (518)	2,859 (173)	891m (466)	955 (128)	58m (644)	1,422 (167)	37m (411)
1966	572 (170)	45m (346)	1,981 (182)	207m (740)	2,283 (363)	167m (668)	766 (322)	62m (564)	3,028 (183)	1,003 (525)	1,133 (152)	73m (812)	1,533 (180)	49m (544)
1967		45m (346)		222m (793)		204m (816)		68m (618)		1,072 (561)		84m (934)		58m (644)
Normalized ratio of Ph.D.'s to $ in 1966		1:2.0		1:4.1		1:1.8		1:1.8		1:2.9		1:5.3		1:3.0

Source: N.A.S. Survey of Earned Doctorates; N.S.F. "Federal Funds for Research, Development and Other Scientific Activities", Vol. XV (NSF 66-25), 1966.

* Conservative estimate based on N.I.M.H. support of research.

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Table XVI

Immigration of Middle-level Skills

	U.S. FY 1967	Canada CY 1967	Australia yr. to Mar. 1967
Managerial-Administrative (managers, agents, proprietors)	7,974	3,023	2,450
Clerical + kindred	16,062	16,609	7,232
Sales workers	3,721	3,358	2,755
Craftsmen, foremen and kindred 1/	18,921	38,761	15,130

For Canada, 1963-1968

	1963	1964	1965	1966	1967	1968
Clerical	6,186	7,931	9,919	13,235	16,609	12,651
Construction trades	3,852	4,799	6,601	9,535	10,643	7,737
Manufacturing and mechanical	10,563	12,677	17,566	24,512	28,118	23,189

(From Canadian Immigration Statistics for these years.)

Note: Each country has slightly differing title categories for the above and its definitions of the workers included thereunder also differ. Strict comparison should therefore be avoided.

1/ Includes, inter alia, brickmasons, carpenters, typesetters, electricians, foremen, furriers, jewellers, linemen, mechanics, machinists, painters, plumbers, tailors, tool and die makers. While the categories for the three countries are not identical, Canada's import of 8,954 machinists vis-à-vis the United States 1,328 tends to show that differences may represent more those of internal demand than of definition. Canada does, however, include some categories like textile workers under craftsmen which the United States includes under Operatives.

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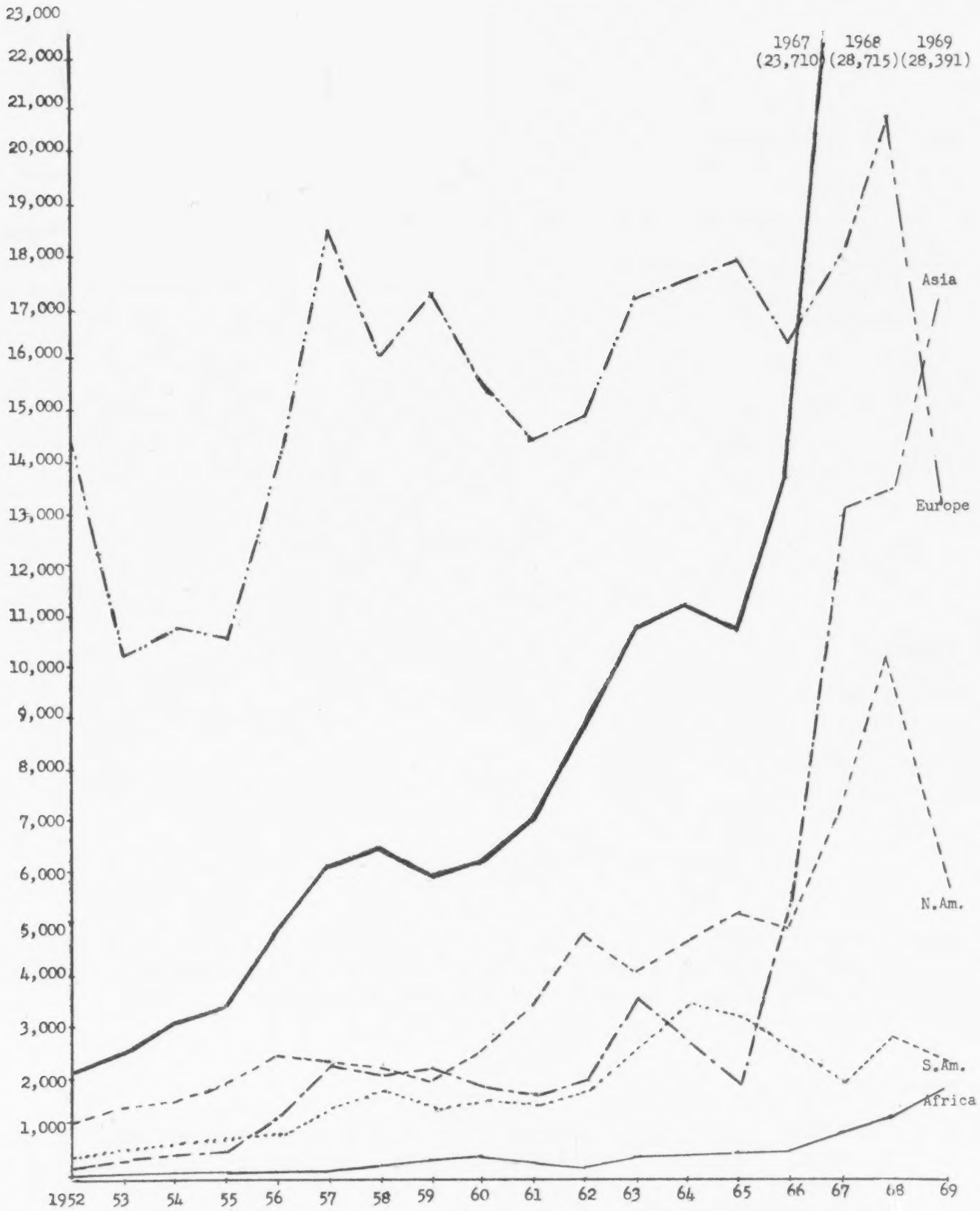
Graph 1

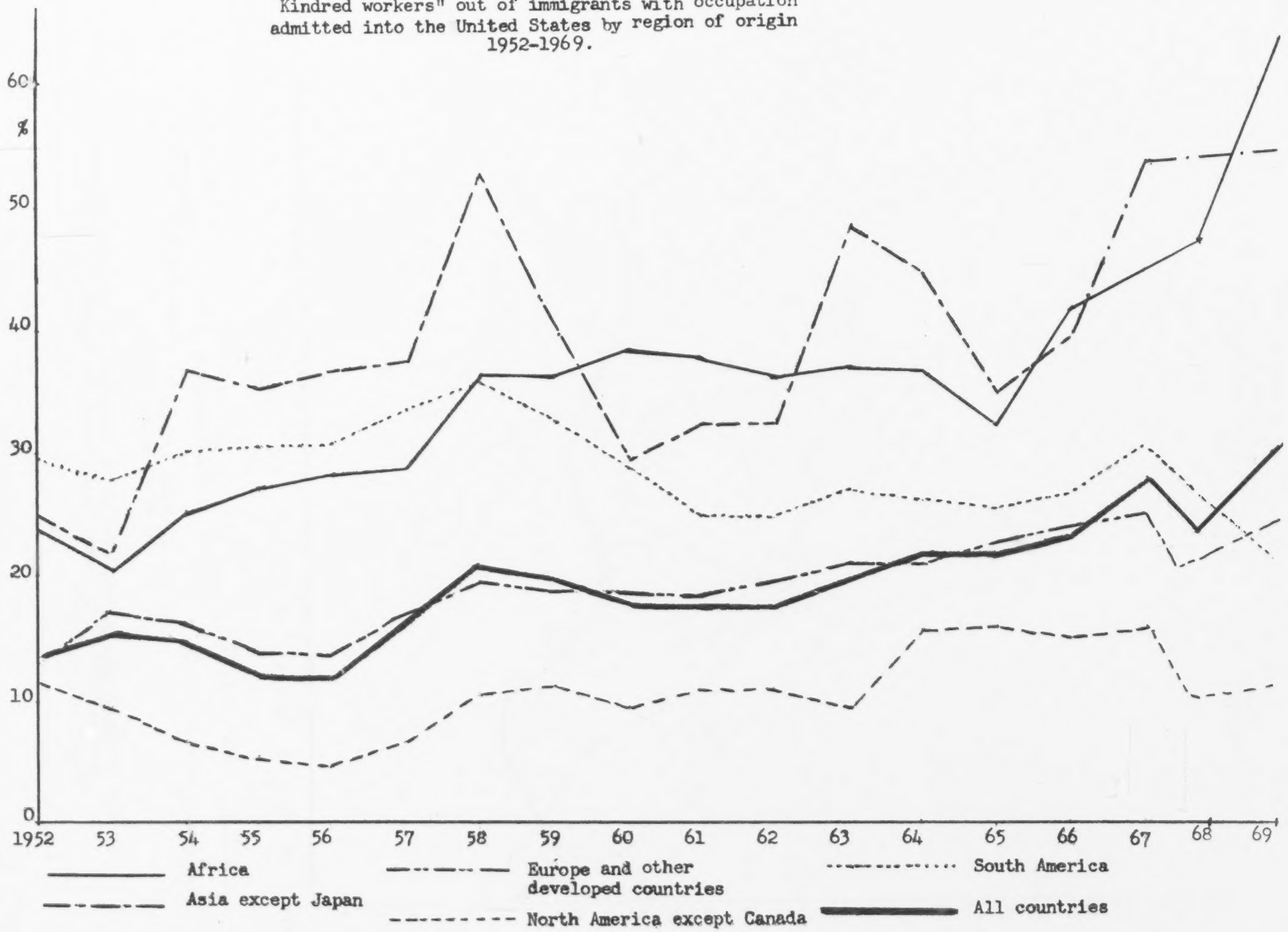
Annual number of "professional, technical and kindred workers" immigrating into the United States by region of origin, 1952-1969



Source: The U.S. Annual Immigration Reports, 1952-1969

Graph 2

Percentage of "professional, technical and Kindred workers" out of immigrants with occupation admitted into the United States by region of origin 1952-1969.



Source: The Annual Reports, 1952-1967.

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1067

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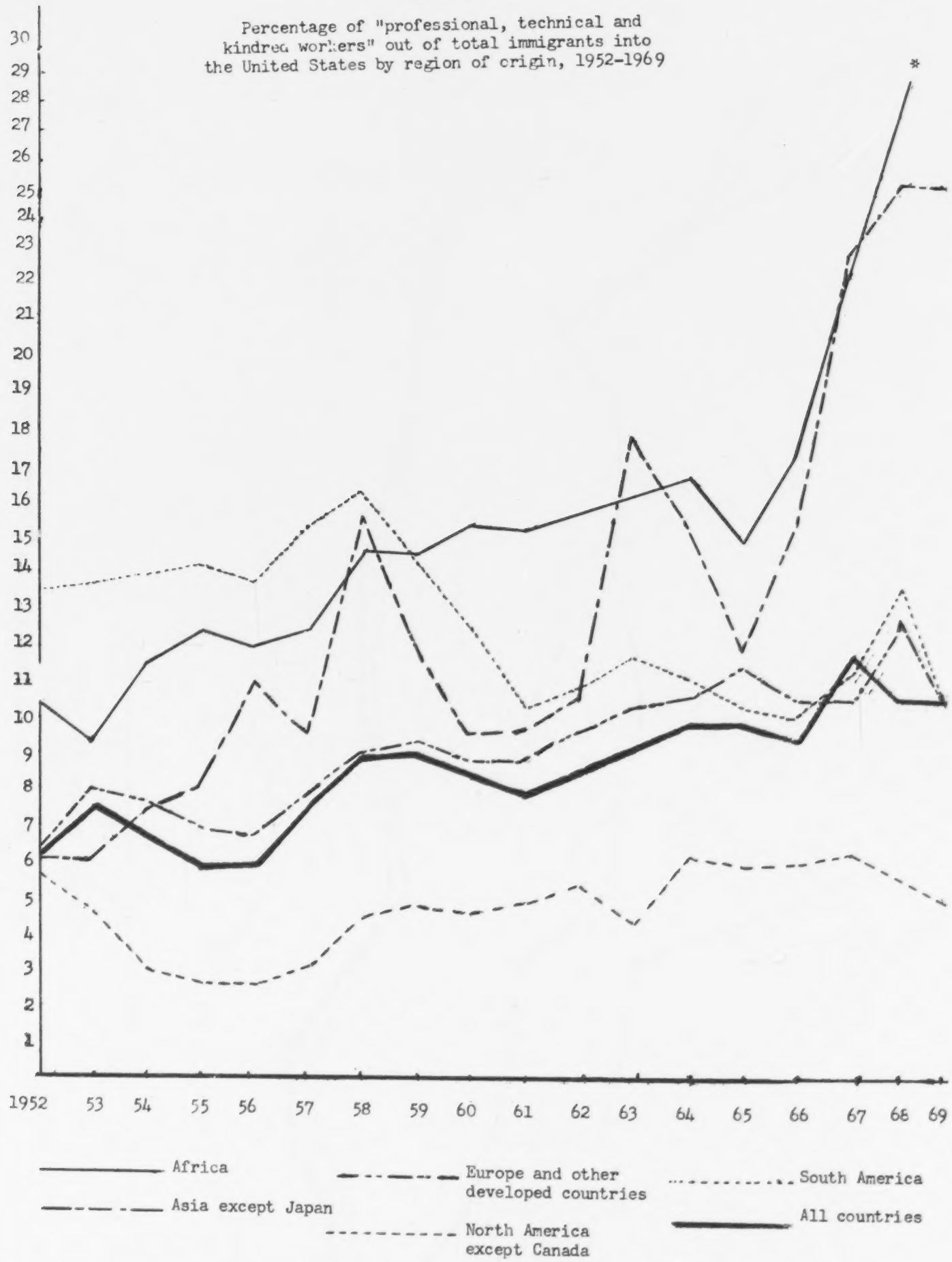
Graph 3



Source: The Annual Reports, 1952-1967, of U.S. Immigration cited from S. Watanabe, Economic Branch, ILO, Geneva, "Brain Drain from Developing to Developed Countries", April 1968.

* For Africa: 31.3% in 1968 and 31.5% in 1969

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APPENDIX

United States Visa Terminology

An alien can be admitted to the United States in two general categories: immigrant and non-immigrant. The immigrant leaves his home residence with the anticipation of residing permanently in the United States. "A non-immigrant is any alien who has been temporarily admitted to the United States other than as an immigrant. In other words, he is supposed to have a residence abroad to which he intends to return."[1] The terms "temporarily admitted", "admitted in temporary status" etc. are synonymous with the term "non-immigrant".

Immigrants become immigrants under many legal provisions but the status, on being attained, is one. Non-immigrants however, are admitted to the United States under many different legal provisions which divide them into classes or categories. Different classes of non-immigrants are known by the subletter in the United States immigration and Nationality Act, as amended, concerning the class. There are, for ordinary purposes, thirteen such visa classes.[2] They cover such categories as foreign and consular officers, other foreign government officials, temporary visitors for business and for pleasure, treaty traders, students, spouses and children of students, foreign representatives to international organizations, employees of such organizations, temporary workers of distinguished merit, industrial trainees, exchange visitors and the spouses and children of exchange visitors.

Adjustment of the above classes of visas to permanent status is, in general, possible though under widely different circumstances, procedures and precedents. The first step in acquiring permanent status on adjustment, is the award of the Permanent Residence Certificate possession of which leads to full

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citizenship after a waiting period (often five years) if the recipient has violated no law or regulation making him ineligible and if he desires to become a citizen. If he does not so desire, he can normally retain his Permanent Residence status indefinitely.

Adjustment to permanent status thus takes place from most or all of the above visa categories, though most exceptional for some, and since most or all of the above classes include persons who have received higher education as well as those who have not (and also include some persons who are pursuing higher education within the United States), the task of detailing exactly how many highly educated immigrants adjust to permanent status is exceedingly complex. The classes for which the formal educational level is known and which are most often mentioned in connection with the permanent immigration of highly educated persons are the F-1 and the J-1 visas and, to a lesser degree, their satellites, the F-2 and the J-2 visas (see below). It should be borne in mind, however, that where the figures on those adjusting from J-1 and F-1 classes alone are the basis of statistics on adjustment, some under-statement will result.

F-1 (Student) Visa (often generally referred to as the "F" visa)

The usual visa given to applicants desiring to enter the United States temporarily for purpose of study. To obtain it, an applicant must present an I-20 form from an approved U.S. college certifying that the student is eligible for and dhas been accepted by the college for study. Except for Canadian students, a valid passport, proof of sufficient finances and of English proficiency must also be provided.

F-2 Visa

The visa on which the spouse and/or minor child of an F-1 visa recipient may enter the United States. Recipients of F-2 visas cannot remain in the U.S. longer than does the F-1 visa recipient whom each accompanies.

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J-1 (Exchange Visitor) Visa (The "J" visa)

Exchange visitors are those who enter the United States to pursue a programme of study or training which has been duly approved by the Department of State. Such programmes can be sponsored by eight different specified categories of sponsors including the State Department, AID, USIA, international agencies, national, state or local government agencies, educational institutions, hospitals, businesses and industrial concerns. An exchange visitor cannot, without a special waiver procedure, change his status to that of a permanent resident until he has completed two years of residence outside the United States.

J-2 Visa

Admits the spouse or minor child of the recipient of a J-1 visa, as with the F-2 visa above.

1/ "Manual of Immigration Regulations and Procedures Affecting Non-immigrants", National Association for Foreign Student Affairs, Washington, D.C., Nov. 1966, p. 3, item 4.

The remaining material above has been drawn from pp. 3-9 of this manual which refines the complicated terminology and scattered rubrics of United States immigration legislation to make it useful for the subject at hand. The manual was reviewed by the U.S. Immigration and Naturalization Service. Commentary above relative to the brain drain is by the author.

2/ The January, 1969, edition of the above manual, revised by Furman A. Bridgers lists 27 visa designations instead of thirteen. In general, the fourteen added visa designations or classes would appear to be of lesser significance as sources for the adjustment of high-educated persons.

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/...

COUNTRY INDEX

Afghanistan	65, 193.
Algeria	16, 21, 36, 38, 55, 57, 71, 105, 168, 170, 172, 176, 182, 186, 188, 191.
Argentina	1d, 32, 34, 42, 63, 84, 104, 105, 106, 114, 121, 141, 167, 170, 171, 174, 175, 181, 186, 188, 191, 192.
Australia	1d, 6, 7, 12, 20, 21, 22, 24, 25, 47, 49, 54, 64, 81, 159, 163, 182.
Austria	18, 32, 33, 34, 182.
Barbados	57, 106.
Belgium	182, 193.
Bolivia	58, 121, 167, 170, 174, 175, 181, 186, 188, 191.
Brazil	16, 48, 106, 114, 167, 170, 171, 174, 175, 181, 186, 188, 191, 192.
Burma	24, 61, 90, 104, 166, 170, 172, 180, 185, 187, 190.
Cambodia	16, 42, 131, 175,
Cameroon	38, 56, 71, 112, 113, 117, 176, 192.
Canada	1d, 7, 13, 18, 19, 20, 21, 24, 29, 32, 35, 42, 43, 44, 45, 47, 49, 50, 54, 57, 64, 88, 107, 117, 126, 128, 135, 144, 149, 159, 162, 163, 182, 192.
Caribbean	45, 57, 59, 60, 62, 63, 64, 137, 157.
Ceylon	24, 84, 128, 171, 193.
Chile	48, 106, 167, 170, 172, 174, 175, 181, 186, 188, 191.
China	18, 20, 21, 24, 30, 34, 39, 48, 57, 63, 64, 66, 74, 75, 78, 90, 116, 118, 120, 122, 125, 137, 147, 166, 170, 171, 172, 173, 175, 180, 185, 187, 193.
Colombia	14, 34, 39, 48, 56, 58, 63, 106, 117, 119, 124, 138, 141, 142, 167, 170, 172, 174, 175, 181, 186, 188, 191, 192.
Congo	104, 176.
Costa Rica	84, 106, 167, 170, 181, 185, 188, 190, 192.

Cuba	32, 34, 52, 57, 192.
Cyprus	84.
Czechoslovakia	33, 193.
Dahomey	84, 120, 176, 192.
Denmark	182.
Dominican Republic	106, 107, 141, 167, 170, 181, 185, 188, 190.
Ecuador	58, 167, 170, 174, 181, 186, 188, 191.
El Salvador	106, 167, 170, 181, 185, 188, 190.
Ethiopia	105, 168, 170, 182, 186, 188, 191.
Finland	182.
France	12, 15, 16, 32, 36, 37, 38, 39, 42, 46, 55, 56, 60, 71, 80, 82, 85, 104, 112, 113, 117.
Gabon	176.
Germany	12, 17, 32, 33, 34, 37, 39, 41, 64, 81, 82, 83, 104, 105, 133, 135, 144, 182, 193.
Ghana	59, 79, 83, 84, 104, 115, 168, 170, 182, 186, 188, 191, 192.
Greece	21, 32, 40, 63, 64, 71, 85, 104, 106, 116, 120, 121, 122, 125, 166, 170, 171, 173, 180, 185, 187, 190.
Guatemala	167, 170, 181, 185, 188, 190.
Guinea	176.
Guyana	57.
Haiti	104, 106, 107, 167, 170, 181, 185, 188, 190.
Honduras	58, 84, 106, 167, 170, 181, 185, 188, 190.
Hong Kong	63, 64, 120, 166, 170, 171, 180, 185, 187, 190.
Hungary	130, 193.

India	24, 28, 32, 34, 46, 48, 51, 57, 63, 64, 66, 74, 75, 78, 79, 84, 88, 90, 91, 92, 93, 106, 107, 111, 116, 117, 118, 119, 120, 121, 122, 125, 128, 130, 133, 137, 140, 144, 166, 170, 171, 173, 175, 180, 185, 187, 190, 193.
Indonesia	24, 166, 170, 172, 173, 175, 180, 185, 187, 190.
Iran	16, 32, 34, 40, 48, 57, 63, 64, 66, 71, 78, 79, 85, 106, 107, 113, 138, 140, 166, 170, 172, 173, 175, 180, 185, 187, 190, 193.
Iraq	40, 79, 166, 170, 172, 173, 175, 180, 185, 187, 190, 193.
Ireland	21, 116, 149, 182.
Israel	18, 32, 40, 48, 57, 78, 79, 81, 90, 104, 140, 144, 166, 170, 171, 173, 180, 185, 187, 190.
Italy	32, 125, 149, 182.
Ivory Coast	176.
Jamaica	43, 44, 45, 46, 57, 58, 59, 60, 75, 84, 85, 106, 143, 192.
Japan	17. 39, 64, 65, 104, 109, 110, 182, 193.
Jordan	84, 106, 109, 126, 166, 170, 172, 175, 180, 185, 187, 190, 193.
Kenya	21, 104, 107, 140, 168, 170, 172, 182, 186, 188, 191.
Korea	18, 32, 34, 39, 48, 58, 63, 64, 66, 74, 75, 78, 82, 90, 107, 113, 114, 120, 121, 122, 126, 144, 147, 161, 166, 170, 173, 175, 180, 185, 187, 190, 193.
Laos	16, 175.
Lebanon	40, 41, 71, 92, 99, 126, 129, 166, 170, 171, 173, 175, 180, 185, 187, 190, 193.
Lesotho	84, 90.
Liberia	84,
Madagascar	176.
Malagasy	36.
Malawi	84.

Malaysia	24, 84, 166, 170, 172, 180, 185, 187, 190.
Mali	176.
Malta	84, 138.
Mexico	32, 34, 42, 83, 167, 170, 171, 181, 185, 188, 190, 192.
Morocco	16, 36, 38, 71, 104, 168, 170, 172, 174, 182, 186, 189, 191.
Netherlands	25, 26, 65, 182.
New Zealand	1d, 39, 183.
Nicaragua	167, 170, 181, 185, 188, 190.
Nigeria	56, 59, 60, 84, 93, 95, 111, 121, 122, 138, 168, 170, 182, 186, 189, 191, 192.
Norway	183.
Pakistan	24, 28, 34, 46, 48, 51, 63, 64, 107, 118, 140, 166, 170, 171, 173, 175, 180, 185, 187, 190, 193.
Panama	141, 167, 170, 181, 185, 188, 190.
Paraguay	167, 170, 174, 181, 186, 188, 191.
Peru	79, 141, 167, 170, 172, 174, 181, 186, 188, 191, 192.
Philippines	24, 30, 32, 34, 48, 57, 58, 63, 66, 79, 90,91, 105, 166, 170, 172, 175, 180, 185, 187, 190, 193.
Poland	33, 34.
Portugal	32, 125.
Senegal	176, 192.
Sierra Leone	83, 84.
Singapore	24.
Somalia	62, 138.
South Africa	1d, 49, 183, 192.
Spain	32, 39, 42.
Sudan	192.
Sweden	144, 183
Switzerland	32, 183.
Syria	106, 107, 166, 170, 171, 173, 175, 180, 185, 187, 190, 193.

Tanzania	138, 139.
Thailand	34, 51, 63, 79, 90, 104, 107, 140, 166, 170, 175, 180, 185, 187, 190.
Togo	38, 84, 176.
Trinidad & Tobago	43, 44, 56, 57, 58, 60, 100, 106, 120, 138.
Tunisia	16, 36, 71, 83, 115, 138, 168, 170, 172, 174, 176, 182, 186, 189, 191.
Turkey	24, 32, 34, 39, 40, 41, 48, 63, 88, 107, 116, 118, 124, 125, 139, 166, 171, 173, 180, 185, 190.
Union of Soviet Socialist Republics	33, 40, 50, 81, 193.
United Arab Republic	40, 41, 63, 81, 82, 168, 170, 171, 174, 176, 182, 186, 189, 191, 192.
United Kingdom	1d, 6, 15, 16, 17, 20, 21, 22, 26, 32, 34, 43, 44, 46, 47, 48, 53, 58, 59, 60, 64, 68, 70, 71, 74, 75, 82, 83, 89, 91, 104, 111, 133, 135, 137, 143, 183, 193.
United States of America	32, 33, 34, 35, 36, 42, 43, 45, 46, 47, 49, 50, 52, 53, 57, 63, 64. 68, 70, 71, 73, 74, 75, 76, 77, 78, 79, 81, 82, 83, 88, 91, 97, 104, 106, 107, 113, 115, 117, 118, 119, 121, 124, 126, 127, 128, 132, 133, 134, 135, 137, 138, 142, 143, 145, 159, 160, 163, 183, 192.
Upper Volta	176.
Venezuela	42, 106, 141, 167, 170, 172, 174, 186, 188, 191, 192.
Vietnam	37, 71, 80, 104, 122, 166, 170, 173, 175, 180, 181, 185, 187, 190.
West Indies	20, 21, 44, 45, 59, 60, 63, 167.
Yugoslavia	21, 32, 98, 193.

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COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY.
GUIDE V: PLANNING.

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ABSTRACT - TO BRING ALL HIGHWAY SAFETY
ACTIVITIES INTO CONFORMANCE WITH NATIONAL
STANDARDS, THE NATIONAL ASSOCIATION OF
COUNTIES RESEARCH FOUNDATION (NACORF) HAS
PREPARED A SERIES OF ADMINISTRATIVE GUIDES TO
ASSIST LOCAL OFFICIALS IN IMPLEMENTING
SUCCESSFUL TRAFFIC SAFETY PROGRAMS IN THEIR
COMMUNITIES. THIS PARTICULAR GUIDE ON
STAFFING IS THE FIFTH OF THE SERIES AND
COVERS SUCH TOPICS AS: (1) PLANNING AT THE
STATE LEVEL AND THE HIGHWAY SAFETY ACT, (2)
THE TRAFFIC SAFETY PLANNING PROCESS, (3)
FORMULATING GOALS, (4) DEVELOPING OBJECTIVES,
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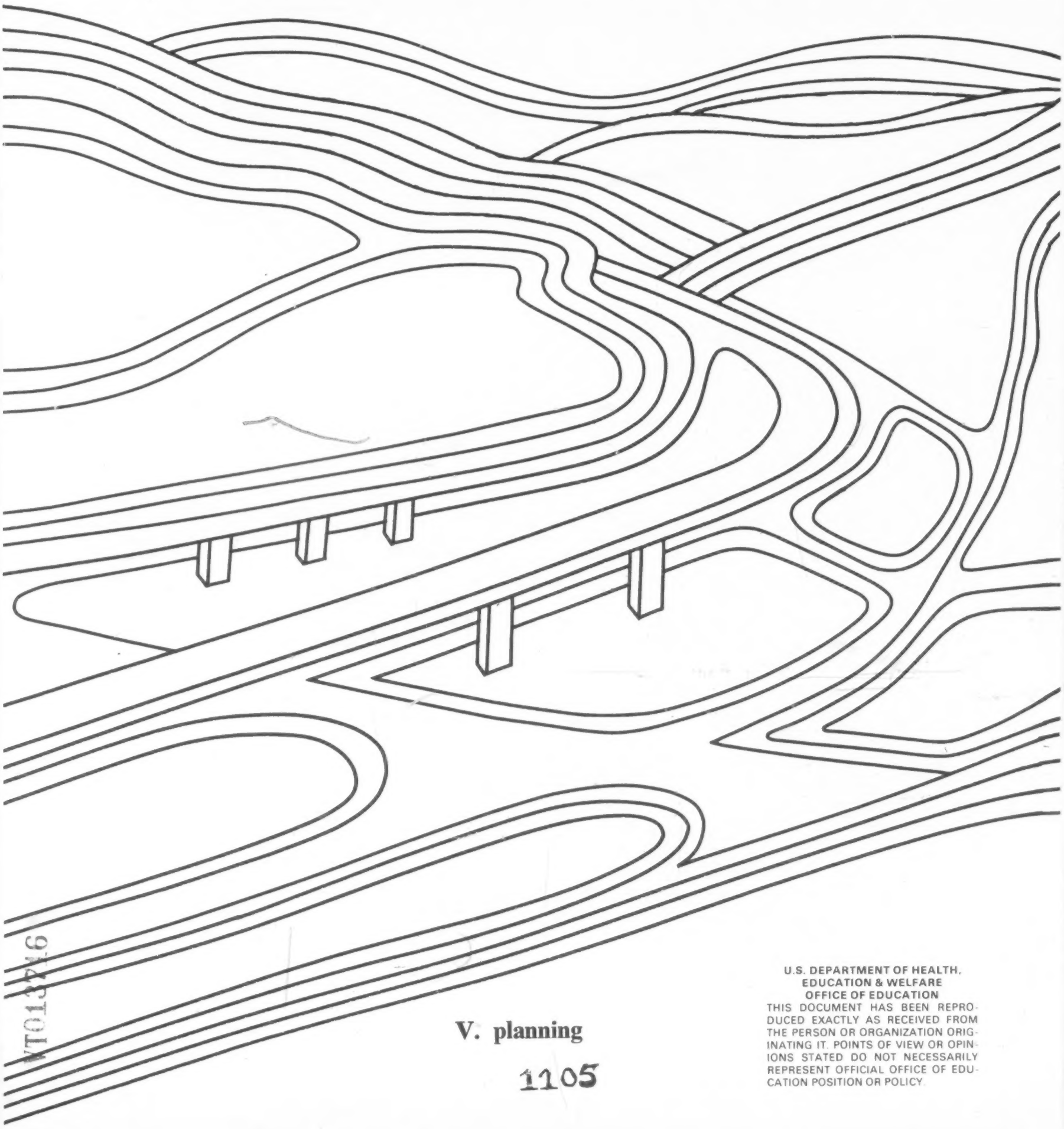

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foreword

The passage of *The Highway Safety Act of 1966* induced a national effort to curb the overwhelming personal tragedy and incalculable economic loss resulting each year from motor vehicle crashes. The national highway safety effort has combined the resources of each level of government and the private sector in a comprehensive program to bring all highway safety related activities into conformance with national standards.

Recognizing the important role that local government must play in this endeavor, the National Association of Counties Research Foundation (NACORF), under contract to the National Highway Safety Bureau of the U.S. Department of Transportation, has prepared a series of administrative guides designed to assist local officials in implementing successful traffic safety programs in their communities.

The guides incorporate the concepts outlined in the national highway safety program standards which have particular relevance to local government responsibilities. These concepts are developed as action guides along the following administrative areas: (1) responsibilities of local elected officials; (2) legal authority; (3) organization and administration; (4) areawide approaches; (5) planning; (6) staffing; (7) public support; (8) financial and technical support; and (9) an action plan for instituting effective traffic safety activities.

During the research period, the NACORF traffic safety project staff visited 50 communities throughout the nation. Each community had esablished successful traffic safety programs. The guides present descriptions of these programs as case studies illustrating practical norms and principles for effective highway safety administration.

The authors believe that this approach presents sound theory in practical relevant terms. The guides consequently will permit the application of modern creative thinking presently emanating from highway safety research and practice.

Bernard Hillenbrand
Executive Director NACORF

The Community Action Program for Traffic Safety has been developed by the National Association of Counties Research Foundation under contract with the U. S. Department of Transportation, National Highway Safety Bureau. The *Action Program* is addressed to local elected officials and their traffic safety program administrators; its purpose is to provide a practical management guide to the establishment of effective community traffic safety programs.

The Highway Safety Act of 1966 recognized that a major portion of the national traffic safety problem is rooted at the municipal and county level. State and local government in concert, must therefore assume a substantial degree of responsibility for reducing the frequency of traffic crashes and the number of personal injuries and fatalities which result. Without the enthusiastic participation of community traffic safety organizaions, the national highway safety effort will not succeed. This goal, a coordinated national effort, can be achieved through the cooperative efforts of local, state, federal and private traffic safety organizations.

I urge the readers of the *Community Action Program for Traffic Safety* to commit their program objectives and policy decisions to the goals of *The Highway Safety Act* and to work cooperatively toward their realization.

Douglas Toms, Director
National Highway Safety Bureau

COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY

by

Mel D. Powell, Project Director
Michael K. Gemmell, Research Associate
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NATIONAL ASSOCIATION OF COUNTIES
RESEARCH FOUNDATION
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GUIDE V: PLANNING

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TABLE OF CONTENTS

INTRODUCTION

DESCRIPTION OF THE PROBLEM

PLANNING AT THE STATE LEVEL AND THE HIGHWAY SAFETY ACT

Annual Highway Safety Work Program

THE TRAFFIC SAFETY PLANNING PROCESS

FORMULATING GOALS

The Importance of Goals

DATA COLLECTION

The Functional Inventory
Data Collecting Guides
Accident Records and Reporting
Search of Law and Legal Authority
Surveys
Community Disaster Plans

IDENTIFICATION OF PROBLEMS

DEVELOPING OBJECTIVES

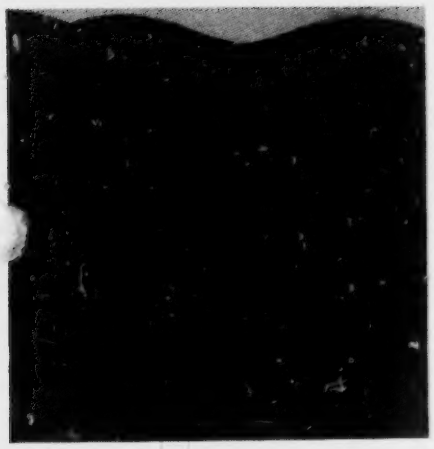
DEVELOPING THE PLAN

PLAN IMPLEMENTATION

PLAN EVALUATION

SUMMARY

PLANNING



INTRODUCTION

The development of an effective community-wide traffic safety program to reduce injury and death is directly related to the ability of public officials and program specialists to plan for the future. Their success will depend largely on their own personal skills and their knowledge of what the planning function is all about.

This guide will discuss some of the basic principles of an effective traffic safety planning program, emphasizing the planning process itself and the various stages of its development. At each stage in the process the guide will attempt to mesh theory with practice by providing practical illustrations of particular principles.

The stages discussed have been highlighted in the following order: the formulation of goals, data collection, identification of problems, developing objectives, the development of the plan, plan implementation, and plan evaluation. The ordering of the stages is presented to facilitate conceptualization of the process. In actual practice stages may be conducted simultaneously or rearranged as new information is fed back into the system.

To plan is to chart a predetermined course of action. It implies a thorough and detailed understanding of the problem and a wide consensus as to the steps to be taken, directed to an awareness of common problems and overall objectives. Planning for tomorrow requires a clear perception of what exists today and an understanding of the available resources at the disposal of a given community, that is, resources that can be utilized as input in the traffic safety system.

In order to plan effectively, each community will have to formulate goals, collect data and identify its problems. There must follow decisions on the best use of available resources in terms of program alternatives and expected gains. From these decisions a plan can be developed to guide the public and private development of the community's traffic safety program.

Before a plan for traffic safety can be developed, community leaders and program specialists (as well as other participants in the planning process) must accurately estimate and measure the long-term trends of community development (i.e., rate of urbanization, public transportation facilities, population growth, highway construction, car sales, etc.), for it is only against this back-drop of change and growth that the properties of an effective traffic safety program can be measured.

Traffic safety planning serves five basic functions:

- Planning identifies traffic safety problems and helps to promote public awareness of these problems
- Planning provides the factual information needed to organize the administrative aspects of a traffic safety program
- Planning provides technological and financial information needed to implement traffic safety programs
- Planning for structuring change and development is in itself stimuli for further change
- Planning provides a basis for program evaluation and feedback

The active involvement of administrators and technicians who will ultimately implement the program is an essential requirement for any planning activity. Such involvement provides support and credibility to the planning policy. To stimulate involvement, the plans themselves should be realistic, amenable to integration and coordination, supported by sound theoretical concepts, innovative, and, above all, addressed to both present and future needs.

DESCRIPTION OF THE PROBLEM

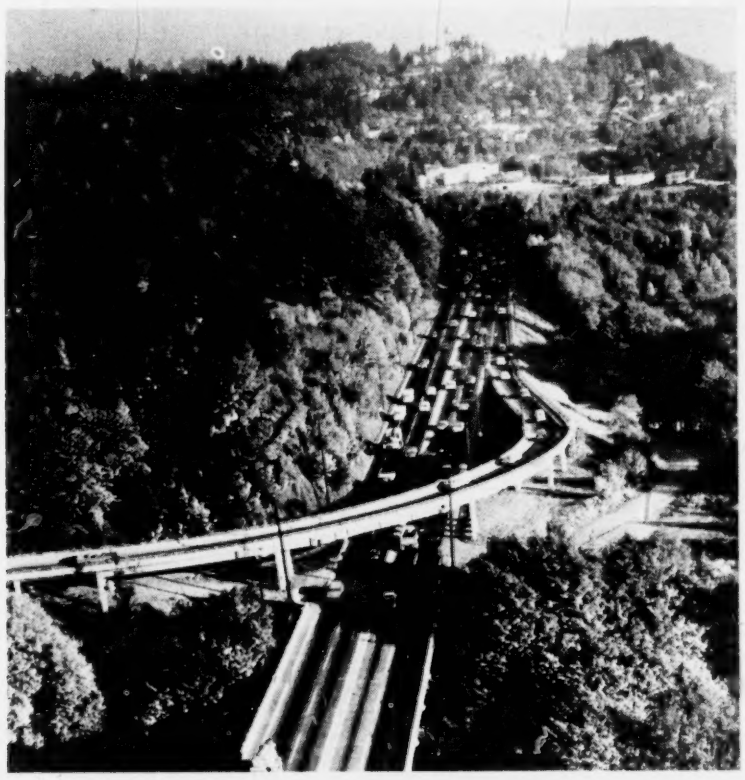
If problems connected with highway safety lacked complexity and demanded only common sense solutions and a limited expenditure of our nation's resources, there might be some excuse, even justification, for the limited emphasis currently placed upon planning in the field of highway safety. Unfortunately, the problems are not easily solved, and even a cursory understanding and perception of the state of this new management science leads most critics to the conclusion that a far greater commitment of national, state and local resources is sorely needed.

A survey of the field reveals its dependence on complicated and diverse fields of specialization (i.e., law,

medicine, engineering, psychology, etc.), and the necessity for systematic thinking and adequate and reliable data.

The growing number of automobiles and the expanding highway system have created a serious traffic safety problem. Generally, highway safety planning has not kept pace with this growth. Safety planning reflects the decentralization along functional lines that characterizes the evolutionary development of safety programs themselves. As a result, safety planning and safety programs tend to develop as discreet, fragmented, single-purpose efforts which are unable to transcend organizational or other boundaries to approach the traffic safety problem in any kind of uniform manner.

Traffic safety planning at the local level is essentially a part-time activitiy; that is, even in those communities where a traffic safety organization has been established, planning is usually an ad hoc function with the city attorney, engineer, county commissioner or mayor etc. assisting the planning group for a few hours a month or whenever their hectic schedules permit.



Continuing study of the frequency of crashes at a given site may cause city officials to implement changes as in the case above where replacing an intersection with an overhead access cut crash rates by 96 percent.

PLANNING AT THE STATE LEVEL AND THE HIGHWAY SAFETY ACT

The Highway Safety Act of 1966 designates the governor as the responsible state official for planning, developing and administering the state highway safety program. These tasks are actually carried out by a coordinator appointed by the governor, however. In order to insure maximum coordination and accountability, it is desirable to place this office of highway safety coordination in the executive office of the governor.

The development of a coherent and viable state program requires the active cooperation and participation of local officials in the earliest stages of the planning process. An effective highway safety plan formulated at the state level must depend heavily on input and implementation from local jurisdictions. Unhappily, because of a lack of understanding or funding, a number of states have not been able to obtain the support of their political subdivisions in the planning process. In some cases, local communities have only been enlisted on paper. In other instances, clear channels of communication have not been established, and local contact with state officials has been infrequent at best.

State legislation is often needed in order to implement a program. Consequently, an initial step to be taken in the planning process is that of determining whether the powers granted by the state to its political subdivisions are sufficient to institute a comprehensive plan that is both workable and flexible to change. (See Guide II: *Legal Authority*).

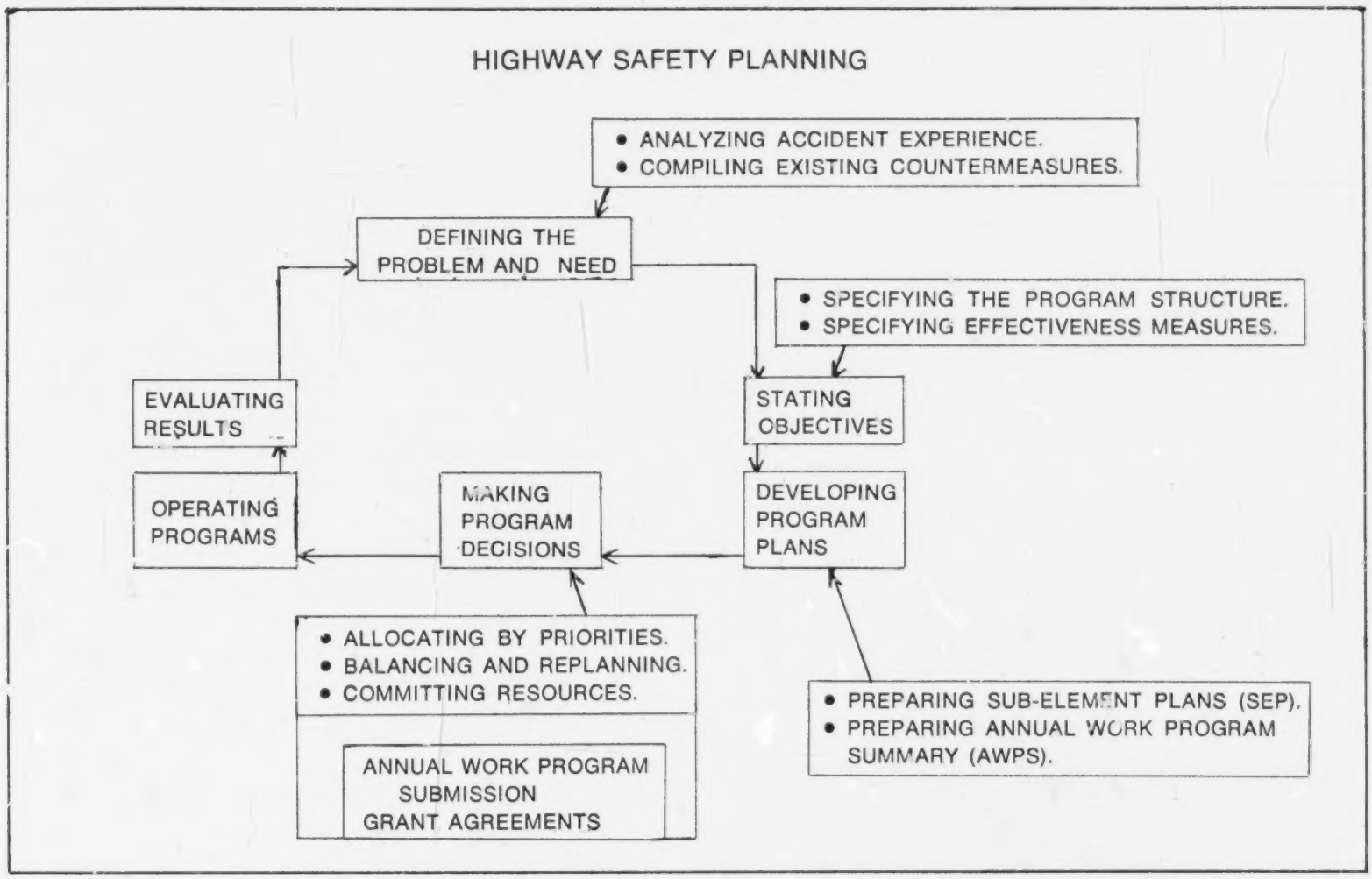
Annual Highway Safety Work Program

Since the passage of *The Highway Safety Act of 1966,* state and local governments were required to utilize individual project applications (Form HS-1) procedures as a means to obtain federal funds to finance their highway safety activities. Recognized as a temporary measure, the procedures have been changed in favor of the *Annual Highway Safety Work Program* (AHSWP).

The National Highway Safety Bureau developed the *Annual Highway Safety Work Program* as a methodology for providing a determination of the overall effectiveness of state activities. Essentially, the program sets forth basic planning and management procedures for state programs. These procedures provide for:

- Preparing an *Annual Highway Safety Work Program* (AHSWP) consisting of the state's overall plan for achieving its objectives for the year of the program and describing the program tasks and resources necessary to satisfy the needs identified in the comprehensive program approved by the Secretary of Transportation
- Executing an agreement between an individual state and the National Highway Safety Bureau covering a program for a particular fiscal year
- Submitting an annual program to serve as the principal basis to determine, before an apportionment is made to any state, that such state is implementing a highway safety program approved by the Secretary of Transportation

The AHSWP was designed to treat highway safety problems on a systems basis so as to permit an assess-



ment of the logic and completeness of a given state's highway safety program. The planning guidelines provide a national frame of reference that facilitates an analysis of the interrelationships of state highway safety activities, the identification of coordination requirements and the effective distribution of resources. The AHSWP offers a method for detailing the specific goals to be achieved, the work to be performed and the resources to be utilized. It sets forth the criteria against which results are evaluated. It eliminates the necessity of federal funding approval for individual state projects although each task is "subject to subsequent Federal evaluation in the context of performance as well as overall progress."

Since the AHSWP provides a sound methodology for state planning the states should similarly encourage local governments to submit local annual *traffic safety work programs* based on the general management principles adopted at the state level. To put it differently, state assistance should be based on the merits of a comprehensive community plan instead of an evaluation of an isolated task or project.

Such a procedure would help stimulate the growth and development of traffic safety organizations at the local level, but would, above all, improve the effectiveness of local programs.

THE TRAFFIC SAFETY PLANNING PROCESS

Planning a traffic safety program is a process which progresses through several stages. Each stage in the process leads logically into the next stage until plans are implemented. At this latter stage, the effectiveness of the program is evaluated, new data is gathered and analyzed, and up-to-date plans are developed which accomodate the needs and changes generated by the program's impact over a period of time.

The purpose of planning is to bring about a certain condition. That condition may be termed the goal or objective of the plan. Goals and objectives, however, do not remain fixed once established. Rather, they need to be periodically re-evaluated in the face of new data and new knowledge. It is for this reason that planning may also be conceived as an on-going process. For the purposes of this guide, planning will be viewed as a process involving a recurring sequence of phases which include the formulation of long range goals; the collection of data; the identification of problems; the establishment of program objectives; implementation of a program to achieve goals and objectives; and an evaluation of the program's effectiveness, which in turn may lead to a re-evaluation and change of goals or program objectives. Various stages of this planning-implementation evaluation process are discussed below.

FORMULATING GOALS

The first step in planning a unified and balanced program for the future is formulating goals. The program performance standards for state governments, issued by the Secretary of Transportation, offer to state and local governments a broad set of guidelines for formulating

goals, but it must be recognized that they are only minimum standards and should not in any sense restrict local officials from establishing goals beyond these essential requirements.

Despite the fact that the overall purpose of any highway safety program is to reduce crashes and fatalities and social and economic losses, a further refinement of goals is necessary if program consistency is to be preserved at all levels of the organizational structure. Effective decision-making, resource allocation, and policy development at the local level require a sound policy as well as *an organization with the authority and capability to implement the plans developed.*

The development of a set of long-range goals that can serve as distant targets toward which planning is directed is a very significant phase in the traffic safety planning process. Since the process is continuous, these goals will be further refined as programs proceed, resulting eventually in *program objectives* of much greater specificity. The methods employed in formulating goals, as well as the means to achieve them, are varied. In all cases, however, goals are intended to reflect what is eventually desired by the community. The purpose of traffic safety planning should not be to express the values of the planner, but to express community goals selected by those who make the decisions concerning traffic safety. Involvement of local elected officials and other policy-making officials in the goal formulation process is therefore essential if plans are to be implemented to achieve desired results.

The Importance of Goals

Traffic safety goals are the achievements which the traffic safety organization sets for itself. They outline the general direction toward which a program should be carried out. In addition, goals are crucial to the planning process for several reasons:

- Goals make effective planning possible by providing targets toward which efforts can be directed. Goals enable decision-makers to plan their actions and generally to understand what they are trying to achieve
- Goals, stated clearly, provide means with which the traffic safety organization can communicate its intentions, expectations, and functions to the community
- Since a basic part of the planning process is a determination of the impact each program makes toward achieving organizational objectives, goals provide standards for evaluating plans.
- Through involvement of local interests, goals may serve to generate support for the program. Explicit, well defined goals provide ideals which inspire individuals to engage in activities they might otherwise never have undertaken.

Goals, then, are expressions of what ought to be. They are general statements of expected achievement.

An important consideration in formulating goals is that individuals rank goals as well as values (on which goals depend) in different orders. Consequently, if a comprehensive traffic safety plan is to be developed, it must make provision for the needs of the total community rather than for those of a particular traffic safety-related agency. To facilitate consensus in goal selection opportunity must be made for various individuals and sectors of the community to express views and exercise influence.

In 1968, the Board of Supervisors of the County of San Diego established the San Diego County Emergency Medical Care Committee. This inter-agency committee was assigned the responsibility for establishing goals for the county's emergency medical care system. Such assignment came with the recognition that an emergency medical care system, if it is to function effectively, must depend on the participation of a number of private and public agencies, all working together toward formulating goals, developing plans, and implementing projects to achieve those goals.

The Emergency Medical Care Committee is chaired by a local physician representing the San Diego County Medical Society. The membership of the committee is inter-disciplinary in nature and represents numerous agencies involved in various facets of emergency health care. These include the County of San Diego, the City of San Diego, the Hospital Council of San Diego County, the American College of Surgeons, Police Ambulance Agencies, County Law Enforcement Agencies, County Fire Protection Agencies, The California Highway Patrol, the American National Red Cross, the United States Coast Guard, Private Ambulance Operators, and a Comprehensive Health Planning Association. The Committee established six subcommittees in the fields of communication, transportation, technical advice, education, hospital emergency facilities, and organization. Meetings are held on a monthly basis.

The inter-disciplinary composition of the Committee was particularly valuable in formulating goals. Complaints arising from the community are immediately channeled through the appropriate subcommittee for investigation and for report back to the full committee.

DATA COLLECTION

The second administrative step in the planning process is the development of a comprehensive data collection system based on complete, adequate and relevant information. Such a system will enable, through data analysis, the identification of problems, the determination of deficiencies, the making of accurate cost estimates and the establishment of priorities and objectives. A detailed inventory of existing traffic safety resources and programs is a primary requisite for such a system.

Highway planning requires not only an analysis of present conditions but also necessitates realistic projections of both the nature and volume of roadway use.

The Functional Inventory

The functional inventory is a useful technique for gathering data. The main advantage of this approach, when employed in the traffic safety field, is its focus on safety activity, as opposed to the particular operation of a given department or agency. Once relevant facts are accumulated, the activity or function can be evaluated. (As an example, a study of a county's emergency medical services activities might include facts relating to the local hospital, ambulance systems, activities of the local medical society, etc.).

Data Collection Guides

Several private and public support organizations have produced fact-gathering manuals to assist state and local governments in reviewing traffic safety programs. Such guides are normally organized according to traffic safety functions and utilize a check-list, outline or questionaire type format which enables the highway safety official to judge the quality of his program. *A Fact Gathering Guide to Assist States in Developing a Highway Safety Program,* developed by the Automotive Safety Foundation, examines twelve traffic safety functions (which generally follow the highway safety program standards) according to the following topical format:

- Title of function
- Scope of function activities
- Germane legislation in the *Highway Safety Act*
- Major components of the function
- Essential information ("key study items" of what must be known about a particular activity to evaluate current and future needs)

A proto-type guide for Wisconsin counties, "*Ajax County" Comprehensive Highway Safety Planning* Guide, prepared by the Wisconsin Office of Highway Safety Coordination, provides for each program standard, a questionaire, a master plan and an implementation schedule. The following excerpt from the traffic courts section of the guide illustrates the questionaire approach:

- *Are uniform rules governing court procedure in traffic cases in effect throughout the county system? Uniform with contiguous counties?*
- *Is a uniform accounting system regarding traffic citations, collection of fines, fees, and costs followed by all courts within the county?*
- *Is there a countywide policy concerning the types of violations for which personal appearance in court is required?*
- *Is there a countywide uniform bail schedule? If countywide, who establishes the schedule?*
- *Do county court personnel regularly attend traffic court conferences?*

The acquisition of data occurs through a variety of means. The selection of data collection technique is influenced by factors such as the type of information desired and the use to which the data will be put. Traffic safety data is often collected through methods or for purposes which involve accident records and reporting, searches of law and legal authority, surveys, and reference to community disaster plans.

Records and Reporting

Traffic data forms the core of any traffic safety planning activity, and, depending on its relevance, completeness, accuracy, timeliness and use, assumes a major role in determining the effectiveness of traffic safety programs. The National Highway Safety Bureau has grouped traffic records into four general classes: data relating to drivers, to vehicles, to highways and to accidents.

The importance of a comprehensive multifunctional record base cannot be overstressed. Such a system is a basic tool used by traffic safety organizations and program directors in evaluating and measuring the effectiveness of their traffic safety systems.

Currently, traffic records in many local jurisdictions are deficient in terms of completeness, adequacy, relevance and validity. For example, a sound traffic accident data collection program must be based on a detailed and accurate reconstruction of the facts which establish whether such factors as mechanical failure, drunkenness, speed, auto design or poor road conditions were partially or wholly responsible for a particular crash.

Local jurisdictions should make a conscious effort to ensure that the type of traffic data they assemble is adequate for the planning needs of their traffic safety programs.

The City of San Jose, California employed a Traffic Accident Prevention Squad (TAPS), composed of two traffic technicians, one police sergeant, and one computer programmer to determine exactly what kind

of information a traffic record system should collect. Over a period of several months TAPS, recognizing that traffic data comes from a variety of sources, interviewed local officials, insurance company representatives, planners, program specialists and department heads, in order to establish acceptable and meaningful guidelines for traffic data acquisition.

In Oakland County, Michigan, a committee of the Traffic Improvement Association, including representatives of state universities, state traffic agencies, local officials, and research scientists has developed a computerized Traffic Data Center that serves as a centralized data bank for the entire county. The system includes a location-referencing scheme which can identify an accident location anywhere within the county within five feet of its actual occurrence. More than twenty communities are now being supplied monthly summaries of highway crash data. Recently the center expanded its activities by including law enforcement data, thus permitting comparisons between accident experience and enforcement activity.

The center has prepared special studies involving the relation of vehicle design to highway crashes, detailed accident studies of 16–17–18 year old drivers, accident analysis at curves by the type and class of road and alcohol-driving data by day of week, time of day and crash severity.

Guidance is often available from state government and private groups in the proper collection of traffic data.

The capability of police to provide traffic services, such as selective enforcement, depends upon the quality of information derived from traffic records.

Search of Law and Legal Authority

A systematic search of all laws affecting pedestrian and motorist behavior as well as those laws creating and regulating agencies or departments responsible for implementing highway safety programs is a basic step to uniformity. Such an inquiry is the responsibility of all levels of government although it is essential that the state provide leadership.

Some states periodically revise their traffic laws to bring them in conformity with the *Uniform Vehicle Code* (UVC), carefully comparing each provisions of the UVC with the appropriate state provision. This procedure, sometimes called a side-by-side comparison, has also been used by city and county attorneys to determine discrepancies existing between a state's model ordinance and a local code. Where no model ordinance exists, the local village, city or county attorney should compare the local code directly with the *Model Traffic Ordinance*, (MTO) drafted by the National Committee on Uniform Laws and Ordinances. Before provisions of the MTO can be adapted locally, a thorough search of state law is required to determine if such action is permitted.

Surveys

A number of states have conducted state-wide surveys of particular traffic safety activities. Such surveys provide a basic yardstick for local officials to use in measuring how their local program compares to national standards and to similar programs within the state.

In 1964 the American Bar Association's Traffic Court Program undertook a comprehensive study of traffic courts in Florida for that state's Judicial Council. The study, *A Study of Florida Courts Trying Traffic Cases*, was based on national standards approved by the National Conference of Judicial Councils, the National Conference of Chief Justices of State Supreme Courts, and the American Bar Association.

It sought to:

- Study the adjudication of traffic cases by various courts throughout the state
- Evaluate the present system of courts available for the processing and disposition of traffic cases
- Recommend changes in the laws establishing and governing these courts, their personnel, housing and facilities

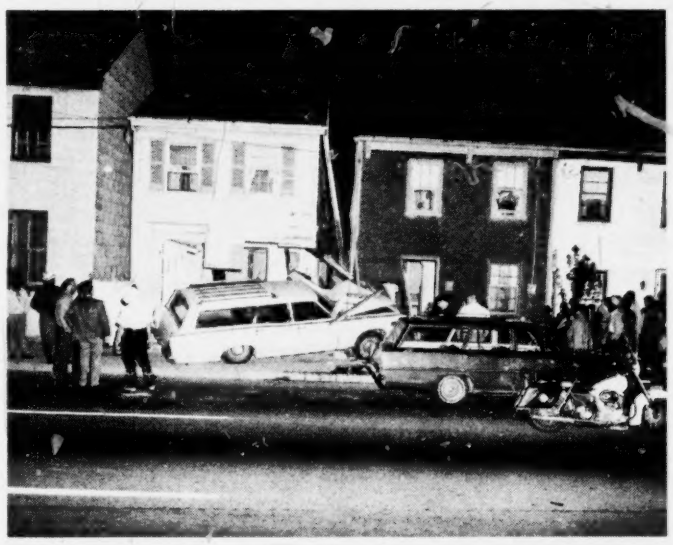
The Idaho Department of Health in 1969 conducted a comprehensive survey of emergency ambulance systems throughout the state, acquiring and compiling data as to the number and types of systems available, hospitals served, types of financing used, and means of communication available, and also to obtain information on personnel skills, training and equipment. Data was collected through personal interviews with individual purveyors.

Community Disaster Plans

Disaster plans frequently outline in elaborate detail the responsibilities of various local departments of government in time of emergency (i.e., flood, atomic attack, hurricane, etc.) and provide a series of programmed alternatives to various forms of emergencies. In terms of accurately predicting and programming

emergency manpower, a bus accident or minor flood may be equally demanding, and poisonous gas drums on a roadway may be just as deadly to local residents as an atomic attack. Community disaster plans are therefore an excellent source of data for planning traffic safety programs. Significantly, a number of communities have elaborate and detailed plans for various forms of natural and man-made disasters but have not similarly planned for the everyday traffic emergency.

In formulating contingency plans, it is often helpful to review "incident" experience to assess the probabilities that a particular type of hazard will reoccur and the seriousness of its consequences. Contingency plans should be based on local features of the environment, including terrain, climate and accessibility. They should be geared to probable danger areas and/or high frequency accident locations and take into account such factors as traffic volume patterns, the location of hospitals and other emergency installations.



Well-planned traffic safety and crash procedures can ensure the immediate coordinated response of responsible agencies.

In the resort town of Minocqua, Wisconsin, a group of local officials and private citizens have formed a Community Emergency Council to plan strategies before emergencies and disasters strike. The council is composed of police and fire department officials, hospital and medical personnel and concerned citizens. In addition to a training course of 20 weeks duration, council workers periodically have the opportunity to take part in disaster rehearsals. Following these simulations data related to such factors as response time of ambulances, availability and adequacy of equipment and special training needs is carefully collected and analyzed.

IDENTIFICATION OF PROBLEMS

Problems may be considered conditions which are wrong or deficient. It is, however, an impossible task to know what is wrong or what is lacking without some conception of what is right or ought to be. Ideas or concepts of what ought to be, may, as noted earlier, be stated in terms of goals and program objectives.

The identification of problems is a major purpose behind the collection of data, for data can be used effectively in analyzing a present condition in relation to established goals. Once formulated, a data profile may be compared to the general goals previously established. Variances between the goals and the data profile can then be identified and eliminated. As problems are identified information is fed back into the system, goals and program objectives are refined or made more specific, and new strategies are developed.

It is not always recognized, for example, that effective police enforcement of traffic laws can significantly reduce the monstrous accident rate on our nation's highways. By scientifically collecting and analyzing accident data, police forces throughout the nation are in increasing numbers carefully selecting dangerous stretches of roadway for concentrated surveillance. With accurate records, they are able to predict not only where a large percentage of the accidents are occurring but also their approximate time and cause.

An important aspect of traffic safety problem identification is determining accident causation. It is not enough, for example, to determine by data analysis that certain stretches of roadways have heavy accident concentrations. Attention must also be focused on why such concentrations exist.

In Rye, New York, the police department sought to establish graphic illustration of the causes of particular pedestrian problems. With the use of moving picture film taken in various parts of the city the department was able to establish that the problems were:

- *Mothers allowing children to leave and enter vehicles facing traffic*
- *Parents crossing streets with their children mid-block between parked cars*
- *Parents and children failing to cross at crosswalk*
- *Parents and children crossing against lights*

Based on this knowledge the department was able to plan a pedestrain support program which concentrated its focus on the parents.

In planning a pedestrain program, dangerous pedestrian practices, such as walking along freeways, should be identified and discouraged. One way to do this is to reduce the need for a motorist to walk great distances to summon assistance.

In Cook County, Illinois, the State Highway Department provides emergency assistance and gasoline to more than 500 motorists each month. This service is viewed as a means for lessening the need for pedestrians to walk along freeways.

Within the context of technological growth and changing patterns in community behavior traffic data must be analyzed in order to determine the necessity for increases in the number of law enforcement personnel, more effective laws, more sophisticated and specialized training, and more accessible facilities and equipment.

Such planning will often involve close coordination and cooperation among adjoining local jurisdictions and between state and local agencies.

On-site inspection tours is just one method by which traffic safety specialists can identify problem areas.

In Johnston, Rhode Island the police department, through analysis of past and present data regarding traffic crashes, the issuance of traffic citations, and requests for police traffic services, learned that the demand for traffic law enforcement in the town was increasing substantially. To determine the proportions of this increased demand, in the context of the total police responsibility, criminal and civil, the department turned to national figures of the cost of traffic crashes, supplied by the National Safety Council, and their own records of police time costs for traffic and criminal activity and average losses due to burglaries in the town. A comparative analysis revealed that during the last six months of 1967 the cost of traffic crashes to the town exceeded the cost of burglaries by an approximate 10 to 1 ratio. This finding was compared to the criminal/traffic allocation of police resources then current in Johnston. Measured against the goal that there be an allocation of police resources in proportion to the extent of individual demands, the comparison revealed a need to restructure the deployment of the Johnston traffic law enforcement effort.

DEVELOPING OBJECTIVES

The identification of program objectives (defined as more detailed statements of general goals that specific projects are directed toward) necessarily develops from data analysis and the subsequent identification of problems. The selection of specific program objectives must be a function of local decision-makers. Initial program objectives may be formulated in a number of ways, primarily through group discussions and meetings among traffic safety related professionals and officials. Traffic safety program objectives are statements of changes to be evolved over a stated period of time. They provide precise specification for plans to achieve goals. To establish objectives, it is necessary to consider available and potential traffic safety resources. These are not limited to budgetary resources alone, but include manpower, equipment and facilities. If adopting objectives is to be more than a written exercise, consideration of the availability and use of resources must be part of the analysis. Thus it will be necessary to rely heavily on available information concerning traffic safety resources before objectives can be formulated. Defined objectives will include criteria by which progress can be measured in proceeding toward the defined goals the organization has set for itself. The objectives will form the basis by which alternative projects may be evaluated as to effectiveness and cost as well as to their priority.

Objectives may be developed in a number of ways. Since goals and objectives are similar, both will be formulated along the same organizational procedures. These organizational devices and formats include public meetings and regular meetings of the traffic safety organization. Public meetings, conducted periodically, provide a forum for injecting an expression of the community's values and needs into the planning process. They provide the planning process with the public feedback necessary to evaluate existing goals and traffic safety programs as community need changes. Public meetings may also serve as a stimulant to greater public suport and involvement.

Another means that may be employed in developing objectives is the use of special committees or task forces. Composed of various representatives from traffic safety related agencies and organizations, these organizational devices are created not only to formulate objectives but also to provide a structure for the continuing coordination of traffic safety programs. The function of such a task force or special committee would be to analyze data and develop recommendations on the selection of objectives. Final decisions on objectives will be made by the organization's governing board or director in consultation with the community's elected officials.

Once objectives have been identified, the next step is the setting of priorities. The purpose of establishing priorities is to concentrate efforts on a series of objectives ranked according to importance. Without a rank-

National meetings on highway safety, attended by representatives from the public and private sectors, offer opportunities to assess the progress of the national highway safety program and to provide a forum to discuss common problems.

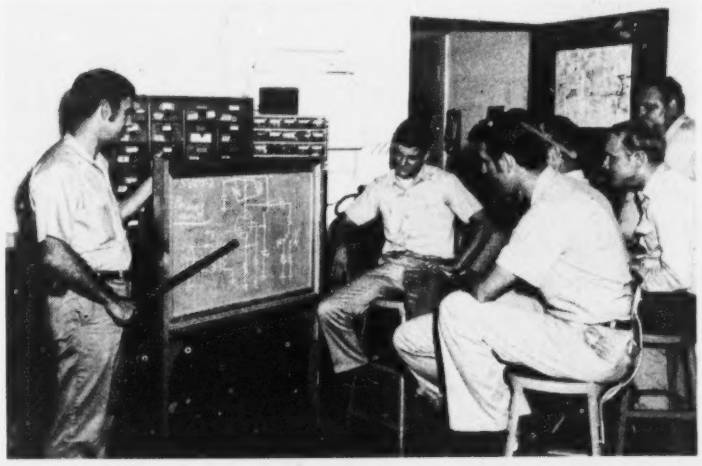
ing of objectives in terms of their importance maximization of effort will rarely be achieved.

Depending on the circumstances, traffic safety organizations may divide objectives into three categories:

- Priority "A" objectives which, if accomplished, would have substantial impact on the program
- Priority "B" objectives which, if accomplished, might have significant impact on the program
- Priority "C" objectives which, if accomplished, might be desirable but might not have any immediate impact on the program

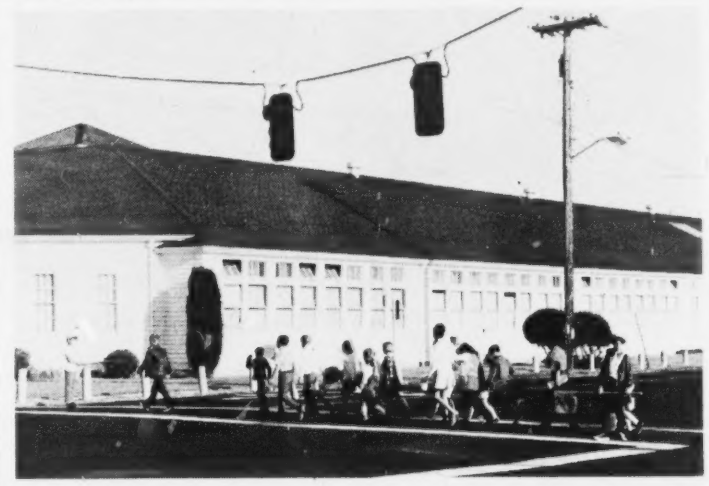
Priority setting is a technique to develop specific targets toward which projects may be directed; it is a procedure which assigns categories of importance in order that appropriate emphasis can be placed on selected highway and traffic safety efforts. The setting of priorities, however, should be flexible. The traffic safety program should not be rigidly bound to the priority system. Emphasis on certain projects, not to mention available resources, may change. Thus priorities should be made with the recognition that future developments may require restructing of objectives and goals.

Involvement of elected local officials is crucial in goal and objective formulation. Participation of local officials in the process ensures a basis for consistent decision-making. Since traffic safety is usually just one aspect of a local official's responsibility, it is neither realistic nor even desirable to expect community leaders to exclude other considerations, such as zoning, convenience, or economy from the planning process. Traffic safety, like air pollution or public housing, should blend smoothly into a comprehensive community plan. Each community program should complement and support the other without severely taxing each other's resources, and should also complement state plans



In-service training is a valuable tool in maintaining a competent work force. Traffic department personnel, above, receive instruction in circuitry.

In Hamilton County, Ohio, as in many other progressive communities, the development of a highway design, construction and maintenance plan was based on, and coordinated with, the master plan for the physical, economic and demographic growth of the county as a whole. The highway plan, as well as the master plan, was developed with the guidance of certain basic considerations, including a reasonable estimate of future population growth and distribution patterns. Objectives of both plans were complementary to each other. Elected official involvement in the planning process ensures this coordination.



Well-marked pedestrian crossings and school safety patrols are means of providing school children with physical protection.

Developing The Plan

After basic data has been analyzed and the problems identified, it is possible to develop a plan for reaching the objectives. The plan should provide a complete strategy to be followed, citing the specific responsibilities of each component of the organization's staff, and if possible, describing the functions of specific ancillary groups and the private organizations concerned. A time schedule of priorities for reaching stated objectives should be included in the plan.

In many cases, it will be difficult to develop a comprehensive plan as described here. Various responsibilities for traffic safety have evolved along functional lines which make planning for all responsibilities within a singular framework a difficult task. Nevertheless, only within such a singular framework can comprehensive safety planning, which is badly needed, become effective. Thus, it is important that the traffic safety plan require that specific safety responsibilities be carried out by specified operational units, such as police departments, ambulance service systems, highway engineers, health officers, and a host of others. It is also important that these groups work closely together as the plan is being developed in order that priorities and respective functions and responsibilities are mutually understood. A spirit of cooperation is, understandably, an essential ingredient of this process.

Priority considerations represent a basic factor in the plan development stage. *In establishing a highway safety plan, officials of Nassau County, New York, have placed its alcohol/traffic safety program in a top priority position. This decision stemmed from compelling evidence that the use of alcohol by drivers and*

pedestrians leads to some 25,000 deaths and a total of at least 800,000 crashes per year in the United States. It also grew from the realization that prevention and rehabilitative countermeasures aimed at the drinking driver had not been adequately evaluated.

Nassau County, therefore, received funds from the National Highway Safety Bureau to develop, implement and evaluate countermeasures in these vital areas. The county hopes that their new experimental plan, in combination with ongoing drinking driver programs, will eventually lead to a significant reduction in alcohol-related accidents.

Plan Implementation

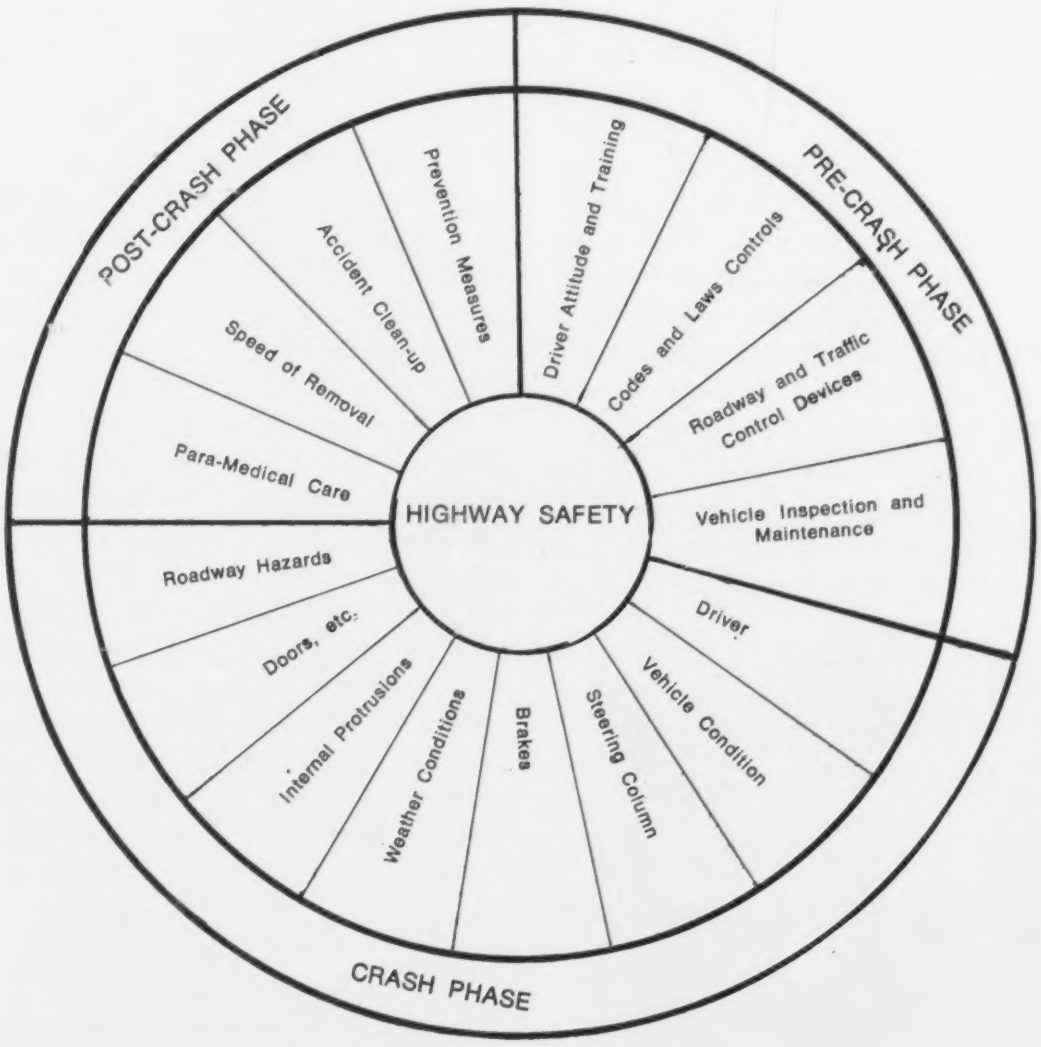
Plans are said to be implemented when they become official policy and when they become operational. Normally, plans become official policy when they are adopted by local legislatures and executives through various kinds of legal procedures, such as administrative rulings, policy statements, legislative enactments, ordinances or by other approved means.

Thus, plan implementation is normally a separate phase within the planning process. Whereas planners and other agencies develop plans, local elected officials are responsible for putting plans into action through implementation procedures. It is important, therefore, that local elected officials be kept abreast of plans as they develop in order that they can make wise decisions with regard to how resources are to be allocated and used. In addition, local officials are often restricted from implementing plans, because state enabling legislation is frequently lacking in many important functional areas.

Although local government officials are responsible for the implementation process, support for any program is best obtained by insuring the knowledge, and cooperation of the entire community.

Such support is, ideally, begun during the planning process and involves not only informing the public of plans, but also involving the public in the planning. Thus community leaders invited to help develop a traffic safety program will be more likely to support the implementation of that program.

For practical purposes, the highway safety problem is divided into three consecutive phases. No program is comprehensive unless it deals with all three. The illustration contains several examples of elements within given phases.



PLAN EVALUATION

Once the plan has been developed and implemented, it is necessary to evaluate the progress the plan is making towards stated objectives. If the planned project is achieving less than the desired results, it is possible that the objectives were not achievable, or that the plan itself requires improvement.

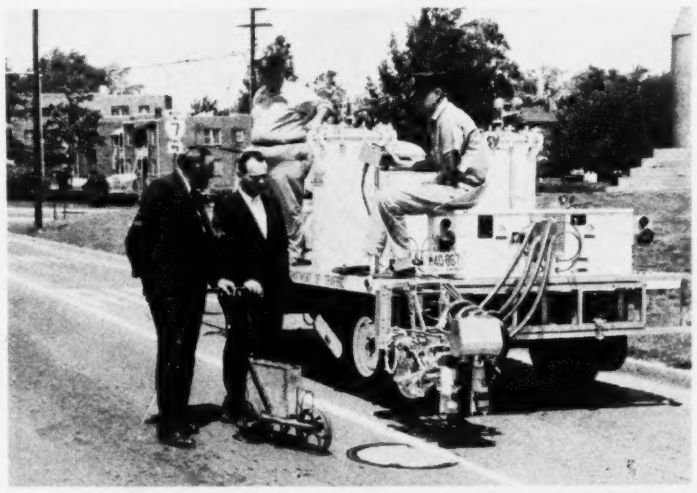
Competent evaluation of plans (as well as an evaluation of the total program) will make it possible to modify the plans to meet new, and sometimes unexpected, safety conditions. Some basic considerations which should be determined by the evaluation procedure include:

- How far has the plan (or program) progressed towards the stated objectives, within the time framework given
- What improvements, both operational and administrative, are needed to make the plan (or program) more effective
- What program needs can be anticipated during the next evaluation period.

Only through an awareness of the history of traffic crashes at particular highway sections can a judgment be made regarding the success or failure of steps taken through traffic or highway engineering to remove the structural causes of crashes.

In order to retain the capability of making such judgments or evaluations the traffic engineering staff of Westchester County, New York, has developed county road section maps, which, by means of a unique symbol method, record the road design, location and type of traffic control devices, the pattern of all crashes which have occurred at the various sections, the data and time of crash occurrence, and the weather conditions which prevailed during the crash. With this information readily available, the traffic engineer and field investigators are equipped to continually evaluate their engineering activities and make modifications where necessary.

Progress in traffic safety and control is shown in the difference between early street liner devices and the most recent line painting equipment.



The Tri-County Educational Research Foundation of Peoria, Illinois has been funded by the U.S. Office of Education to conduct programs in safety education. A major academic program of the Foundation involves the operation and development of the Safety Laboratory Research Center. The basic goal of the program is to teach principles and concepts of pedestrian, bicycle and vehicular safety to elementary youngsters from grade one through eight in a four county area (Peoria, Tazewell, Woodford and Stark—representing 192 school districts). It was the conviction of the Foundation that education is the tool by which attitudes and behavior patterns can be changed, and that this is the long term solution to our highway traffic safety problems of the future.

In evaluating the validity of the programs a bicycle and vehicular safety questionnaire was devised by staff members of the Foundation. Tests were administered before instruction was given and following the completion of the second session of instruction. The students who were post-tested showed an average increase of 40% in retention of subject matter covered in the instruction. As a result of these tests results and supported by favorable evaluations of visiting instructors this program is now being further expanded in the elementary schools.

In order to evaluate any activity, it is necessary to adopt conceptual yardsticks or standards. No meaningful evaluation of a traffic safety program can overlook its performance in relation to its costs.

Cost-effectiveness evaluation is a desirable means of evaluating traffic safety programs, recognizing, of course, that the most effective system is not necessarily the most cost-effective. The aim of such conceptual analysis is to calculate and compare various returns on investment, by outlining program objectives that can be achieved by alternate means for the same cost, e.g., comparing the cost of purchasing a plane to patrol rural roadways against the cost of purchasing a number of patrol cars to achieve the same objective.

The Memphis and Shelby County Traffic Safety Coordinating Committee is the nucleus of an experimental program established to evaluate the effectiveness of a planned multi-agency and multi-jurisdictional coordinated program designed to substantially reduce traffic crashes. One evaluation procedure envisaged in the program, as data is analyzed through continuing cycles, is the implementation of short-term test programs which will be measured from the standpoint of both cost and effectiveness.

SUMMARY

The field of highway safety can be broken down into a number of disciplines and orientations, each with their own language and specialized procedures. There appears to be a general tendency to define highway safety activities rigidly by marking off fixed and precise bound-

1120

aries of relevance, and an apparent propensity on the part of some to reject an interdisciplinary approach in resolving common problems.

Unfortunately, an interdisciplinary approach is frequently viewed as a challenge to one's professional standing in the community or as a threat to one's political power or social prestige. Thus, in a surprisingly large number of communities, it is not uncommon to find physicians totally removed from the problems of emergency ambulance care or a sheriff refusing to have anything to do with the local police or county engineer, etc., as if problems affecting one had no relevance to the other.

The solution to the problem will entail more than merely breaking down the artifical barriers that have been established. It will require a new more generalized orientation that can meaningfully bridge the gap between the various disciplines and spheres of interest. In short, the great challenge facing traffic safety planners and program specialists across the nation will not be met by a narrowing of interest but by a convergency of concern and competence.

Here, traffic engineers are checking for safety features during the construction phase of a new roadway.

An interdisciplinary approach is basic to the development of a sound planning policy. The complexities of highway safety problems are of such magnitude that their resolution requires a close working relationship between program specialists, public officials and academicians.

Comprehensive traffic safety planning is needed because it represents a means by which the serious shortcoming of the conventional fragmented approach can be, at least in part, overcome. Comprehensive planning requires that the many organizations concerned with specific (but limited in scope) aspects of traffic safety be coordinated with one another to achieve a complete design and strategy for all aspects of the safety problem.

Comprehensive traffic safety planning is a complex process which progresses through several stages, and which requires the cooperation and coordination of many agencies and groups within each stage. The planning—implementation—evaluation process includes goal formulation, data collection, identification of problems, developing objectives, formulation of a plan, implementation of the plan by elected officials, evaluation of the plan's effectiveness, and the updating of the plan.

Local highway safety planning, if it is to be comprehensive, must accommodate the subject matter within each of the relevant national highway standards, and it must provide a method by which this subject matter can be planned for on an integrated basis.

The draft of this guidebook was reviewed by traffic safety specialists at the National Assembly of Local Leaders for Traffic Safety, Washington, D.C. April, 1970. The guidebook reflects the concepts and recommendations made by the Assembly participants listed below.

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COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY

I. RESPONSIBILITIES OF LOCAL OFFICIALS:

Description and analysis of the traffic safety problem; The Highway Safety Act; the highway safety program standards; managing traffic safety activities; four organizational models to coordinate local traffic safety programs.

II. LEGAL AUTHORITY:

The authority needed by local governments to implement the national highway safety program standards; authority to regulate, franchise or perform local traffic safety activities.

III. ORGANIZATION AND ADMINISTRATION:

The need for traffic safety organization; the advantages of coordination; methods to achieve cooperation among various functional agencies; description of model organizational structures for organizing and administering traffic safety activities.

IV. AREAWIDE APPROACHES:

The basic considerations involved in the areawide approach to traffic safety management; advantages and disadvantages of the areawide approach; criteria of the areawide approach; intergovernmental agreements and contracts; multi-jurisdictional agencies; councils of government; other methods of intergovernmental cooperation.

V. PLANNING:

The traffic safety planning process; data collection; identification of problems and needs; formulating objectives; developing plans; plan implementation; program evaluation.

VI. STAFFING:

The need for increased training and education; recruitment; compensation; staffing needs for the national highway safety program standards.

VII. PUBLIC SUPPORT:

Definition of public support; the public support process; analysis of public awareness and involvement; the methods of generating and maintaining public support; identification of target populations; public persuasion through the media; involvement of local officials; the role of local leaders and citizens; evaluation of public support program.

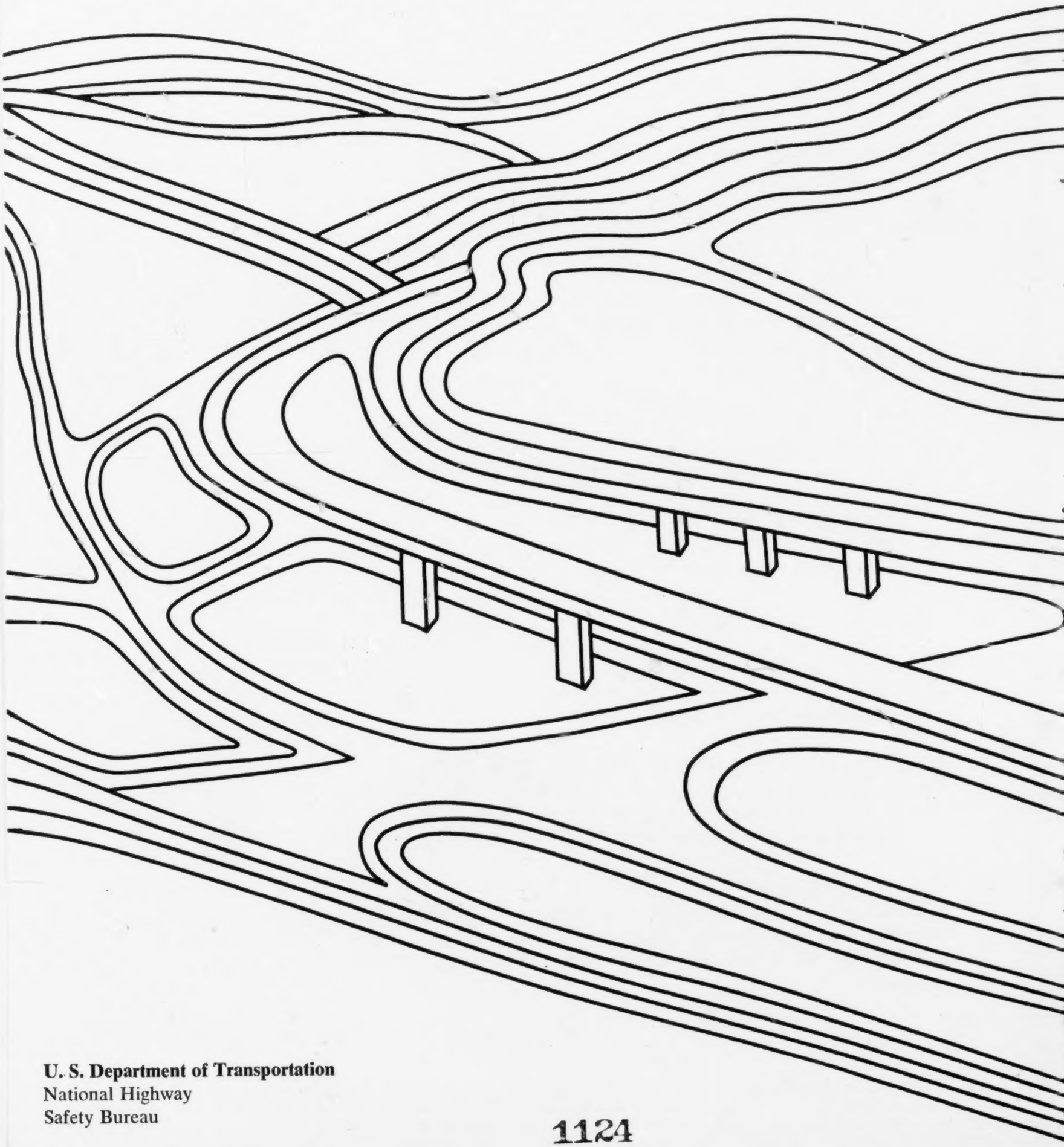
VIII. FINANCIAL AND TECHNICAL SUPPORT:

The need to develop financial resources to support traffic safety programs; survey of revenue sources; the need for full program funding; financing the national highway safety program standards; available technical and financial assistance from the federal, state and private sectors.

IX. ACTION PLAN:

The need for developing action plans for action programs; summary of objectives in previous guides; recommendations for achieving reform in the administration and management of local traffic safety activities; the role of local, state, federal governments and the private sector in instituting action programs.

COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY



U. S. Department of Transportation
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STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS.

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ABSTRACT - THE MAIN PROBLEM FOR THE EDUCATOR HAS BEEN ONE OF SELECTING OR GENERATING DESIRED CHANGES AND THEN IMPLEMENTING THEM IN SUCH A MANNER THAT THEY HAVE MAXIMUM IMPACT ON THE EDUCATIONAL SCENE. THUS, THE SPECIFIC PURPOSE OF THIS PAPER IS TO SUGGEST WHAT MIGHT BE USEFUL STRATEGIES FOR THE IMPLEMENTATION OF EXEMPLARY PROGRAMS AND PROJECTS. AMONG THE STRATEGIES DISCUSSED ARE: (1) EXEMPLARY PROGRAMS AND PROJECTS MUST BE ACCOMMODATED TO THE CUSTOMS OF THE INTENDED RECIPIENTS--AT LEAST INITIALLY AND UNTIL OTHER VALUES AND ATTITUDES CAN BE GENERATED, (2) EXEMPLARY PROGRAMS AND PROJECTS MUST BE POINTED TOWARD REACHING AND IMPACTING UPON "INFLUENTIALS" AMONG THE RECIPIENTS, AND (3) EXEMPLARY PROGRAMS AND PROJECTS MUST EMPLOY CONTACT PERSONNEL WHO HAVE CREDIBILITY WITH THE INTENDED RECIPIENTS. SEVERAL OTHER STRATEGIES AND COROLLARIES ARE INCLUDED AND DISCUSSED. (AUTHOR/JS)

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STRATEGIES FOR IMPLEMENTING EXEMPLARY PROGRAMS AND PROJECTS IN ORDER TO MAKE MAXIMUM CHANGE IN THE EDUCATIONAL PROCESS

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It is both ironic and understandable that vocational educators are concerned with strategies for implementing change. It is ironic because vocational educators, particularly those concerned with changing agricultural techniques, have had dramatic success with invoking change. Too, they have been in the forefront in conducting research into the change process. But is it not also understandable that they should be concerned? The very fact that change has been wrought suggests that those who have been most successful would also be most sensitive to the problems of change -- particularly the problems associated with implanting changes which make a desired difference.

While it has become trite to say it -- nothing is more inevitable than change. Whether evolutionary or revolutionary, change will occur -- it does occur. The main problem for the educator has been one of selecting or generating desired changes and then implementing them in such a manner that they have maximum impact on the educational scene. And it is here that one finds the heart of Exemplary Programs and Projects. It is extremely important that one keep in mind the purpose of Exemplary Programs and Projects -- "... to stimulate, through Federal financial support, new ways to create a bridge between school and earning a living for young people, who are still in school, who have left school either by graduation or by dropping out, or who are in postsecondary programs of vocational preparation, and to promote cooperation between public education and manpower agencies."

Purpose is critically important since our broadly based educational program is conceived to meet many purposes. If the Exemplary Programs and Projects are to keep faith with the intent of the 1968 Amendments, they must demonstrably fulfill the purpose set in the legislation. Grant that there may be peripheral and spin-off gains which have great import for our broad educational program -- but, if the specific intent of the Amendments is not realized, vocational educators will have measurably failed.

The specific purpose of this paper is to suggest what might be useful strategies for the implementation of Exemplary Programs and Projects. It should quickly be added that the writer is not a professional vocational educator. He is a professional educator and one who is especially concerned with strategies and tactics which may be functional in program implantation. In a sense, this paper is a micro-model of its own thesis.

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The writer must establish his own credibility and the relevance of what he has to say. He must be persuasive in arguing that the strategies suggested are, in fact, useful and practical for a real-world application.

And so it is for the vocational educators and others concerned with vocational education who will read and discuss this paper. They too will have to give careful consideration to the givens and the variables which will impact upon their success or failure in carrying out the purpose of the Amendments.

Inherent in a strategy for program implementation is the problem of communication. And when one considers communication he often thinks first of the source. The initial source is, of course, the United States Office of Education which will administer the Act as amended. And there are sources at the state and local levels. Vocational educators in teacher training institutions are also sources. There is no assurance that these sources will agree -- even among themselves -- upon what are Exemplary Programs and Projects. This is one of the reasons why considerable care is taken to define and set guidelines when legislation is enacted and funded. In a sense, the definitions and guidelines say to state and local vocational educators "these are the conditions which must exist if you are to participate in the use of the money." If state and local educators wish to participate in the use of these monies, they must demonstrate that conditions exist which qualify them for access to participation.

And it is precisely at this point that state and local vocational education units may hit their first snag. One of the salient characteristics of vocational education since the inception of federal assistance has been the development of a tightly knit bureaucracy -- a bureaucracy which has been profoundly successful in the development and implementation of programs of vocational education. However, one of the dominant characteristics of a bureaucratic structure is its nearly fanatical resistance to change. One of the specific purposes of organizing a bureaucratic structure is to routinize administration. An immediate byproduct of this is the ritualization of procedures, the stratification of statuses, and the diminishing of discretion extended to individuals within the bureaucracy.

Of course, this is not all bad. While the bureaucratic structure does tend to become quite impersonal, it, at the same time, strives toward being equitable in the administration of its affairs. Much of this administration is done by written policy, rule, and regulation -- and, while this does constrain educators within the organization from freely using their professional judgment, it does tend to keep the organization pointed toward the specific purposes for which it exists.

The problem with source personnel should be apparent. No program or project, exemplary or otherwise, stands to have much chance for acceptance or success unless there is a persuasive assurance that present personnel will not lose status. Statuses are both obvious and subtle. They are obvious in the formal network of organizations (i.e., titles and number of subordinate personnel) and they are subtle in the informal

relationships among personnel (i.e., a staff specialist may have the ear of the director and may, in fact, very much predicate what the director decides to do). From this might be derived a first element of necessary strategy -- EXEMPLARY PROGRAMS AND PROJECTS MUST NOT THREATEN THE ESTABLISHED STATUSES OF PERSONNEL WHO WILL ADMINISTER THEM.

This strategy element is not at all as simple as it may sound. In the first place there will be many people involved with the implementation and administration of Exemplary Programs and Projects. Not only will these people have different statuses within their own organizations but they will represent different groups and they will be geographically separated from one another. The specific triad one thinks of most often in vocational education includes vocational educators in teacher training institutions, state supervisors, and local vocational teachers. Compounding this are the six or more relatively specific areas within which vocational programs are offered. Simply put, within the organizations administering the vocational education program, status moves toward where the money is. What are the implications of this? They are difficult to predict with exactness. However, some general statements might clarify the problem. It is entirely possible that Exemplary Programs and Projects will be effected -- that they will be operational in the field -- before the vocational educators in teacher training institutions are able to institute necessary changes in their curricula which might insure that new teachers entering the field will be able to service these programs and projects. It is also possible that teacher trainers and state supervisors will not be able to augment their programs rapidly enough to provide needed in-service experiences for field personnel who are managing the programs in the schools and communities. In itself, this is potentially threatening and may lead to some foot-dragging among critical personnel -- personnel who must support the programs and projects if they are to be implemented at all.

A subordinate tactic which might be considered at this point involves soliciting the involvement and support of vocational educators who are relatively new in the field -- or, for that matter, personnel who are relatively new in teacher training institutions and state departments of education. The reasoning here is simply that these people who are new to their positions and new in the bureaucracy will be striving for status and they may see that through Exemplary Programs and Projects there is a unique opportunity to open up the system -- an opportunity for them to ascend more rapidly than they might have through the traditional structure of the organization. But, even with this tactic, a caution must be offered. The use of new personnel who are aspiring to higher status must be accompanied by at least the tacit approval and support of high status personnel in the formal structure of the organization.

In a way, the endorsement of present leaders in state education departments, teacher training institutions, and among the field practitioners is a test of the real status these men enjoy. Their endorsement and forceful support of Exemplary Programs and Projects suggest

that they feel secure enough not to be especially threatened by a new order of things.

Nevertheless, it remains that the funding of any Exemplary Programs and Projects means that other activities will not be receiving equivalent support. And, in turn, this means program and project directors must accept that there will be some of their professional colleagues who will not be particularly happy.

The initial focus of these comments has been upon the professional personnel who will identify and implement the Exemplary Programs and Projects. The initial focus was no accident. While Rogers[1] states that "It is the characteristic of a new product not as seen by experts but as perceived by the potential adopters that really matters," it remains that the complex organizational structure which exists to deliver vocational education systems must also desire change before any significant change can be implemented.

Once one has considered the source of communication, he then must become concerned with the message to be transmitted. Again, the purpose stated in the 1968 Amendments makes it abundantly clear what the message is -- "... (to) create a bridge between school and earning a living ..." But this is a broad statement -- and, wisely so since it gives vocational educators a great deal of latitude in devising or selecting programs and projects which are truly exemplary. But it remains for professional vocational educators to designate which programs and which projects are exemplary. While the language of the Amendments specifically states "new ways," one might suggest that there may already exist activities which are exemplary. In fact, one approach to maximizing change might be to capitalize upon some of the very fine program elements which already exist rather than frantically jumping from one change to the next using the premise that change per se is good.[2]

Zander[3] cites the urgency for the message to have clarity when he discusses conditions which are conducive to resistance to change. He states, "Resistance can be expected if the nature of the change is not made clear to the people who are going to be influenced by the change.... Many people fear incomplete information about changes which influence them." One might speculate on how the message pertaining to the 1968 Amendments could be incomplete or confusing -- creating "mixed messages." For instance, are Exemplary Programs and Projects going to require that there be constructed and used a carefully developed linkage system among the many individuals and agencies interested in what is done? Or, will it be possible for the entrepreneur to strive for an exemplary program -- will it be possible for individuals and small groups to work from a base of dedication and commitment when there is no "hard" evidence to suggest that they have a chance to succeed? Or will it be that any program which endeavors to treat the population specified in the Amendments shall be supported?

It also can be asked whether there must be some formal plan for evaluating the consequences of the program or project so that there may be some relatively hard data generated -- data which may serve to improve the liklehood that further funds will be available to increase the possibility that the endeavor is firmly implanted. All these questions are intimately involved with the message that goes out to both the administering personnel -- professional vocational educators -- and to the people who will be the recipients of the programs and projects. As always, there is the risk of over-simplification and over-generalization. The 1968 Amendments can be interpreted in a manner which so constrains application that impact will hardly go beyond "salting" existing programs or, they may be interpreted so broadly that whatever programs and projects are funded will defy administration and may fall prey to the opportunist who in the modern vernacular wants to "do his thing" but, who often has no desire to assume a responsibility for the efficacy of the program or to work toward the integration of the activity within the broadly based educational program of the school-community.

A second element of strategy may evolve from this consideration -- ACCEPTANCE OF EXEMPLARY PROGRAMS AND PROJECTS WILL DEPEND UPON THE EXTENT TO WHICH THEY ARE DESCRIBED IN A STRAIGHT-FORWARD MANNER AND UNDERSTOOD BY BOTH THOSE WHO WILL ADMINISTER THEM AND THOSE WHO WILL BE THE RECIPIENTS. While the analogy is imperfect, it is useful to remember that the United States Department of Commerce has estimated that some ninety per cent of all the new products put on the market fail to succeed within four years of their release.[4] Here is the risk that we may become infatuated with our prolific cultural adaptability -- the risk that we may lose sight of the magnitude of our failures; not because all that failed was really desirable and should have been adopted but because we still lack the technical and procedural know-how to assure that a program of change can be implemented and that it can make a difference over a period of time.

It would seem that the 1968 Amendments are extremely clear on this point -- the intent is that Exemplary Programs and Projects be funded so that they do not fail; so that they will generate maximum change over time in the educational process. However clear and understandable the message may be, it is of little consequence unless appropriate channels of communication are selected for the transmission of the message. Assume for the moment that those who will administer the programs and projects are convinced that they have merit -- how then are the community and the direct recipients persuaded to support and participate? "Ultimately, youth will decide what is relevant and what is not."[5] However, Exemplary Programs and Projects must consider both the short and the long haul. It is not enough to "promise" youth that staying with it will increase their life earnings potential by X dollars. The message and the channel by which it is communicated are essential because if they do not touch youth now, they will not participate in the programs and projects -- they will not be recipients and whatever the future might have held will in reality have no meaning for them.

Might it not be assumed that we have not done a particularly effective job of reaching youth today? Possibly it has been the message; possibly the programs and projects which presently exist are not seen by youth as being particularly relevant to them as they see their lives; and possible we have made an error in strategy when we have resorted to relatively traditional means of communicating with youth. Is it not possible that we must create new channels of communication if we are effectively to reach youth? "What is worthy of belief and who is worthy of belief are key influences in the individual's acceptance or rejection of an idea."[6] A specific case may make the point more didactic. "Water Boiling In A Peruvian Town"[7] was a study of an innovation which failed. Nelida, a change agent, was sent to Los Molinas to instruct the natives in certain health measures. Her specific effort was directed toward getting the natives to boil water so as to sterilize it with the hope that this practice might reduce the high incidence of illness being caused by polluted water. After weeks of effort only five per cent of the families had adopted the practice of boiling water. Some of the factors associated with Nelida's failure were:

1) Most of the peasants associated Nelida with the middle class. The few who adopted the practice were higher status in this community.

2) Those who adopted the practice were not the influentials or opinion leaders.

3) Water boiling as a health measure was not a part of the experience of the villagers. Because the boiling of water in this village was associated only with the sick, those who were not ill at the moment did not perceive a need to boil their water.

4) The change agent was not accepted into the culture of the village. She was considered an outsider.

What does this say about implementing Exemplary Programs and Projects? From this failure to invoke change several strategies are suggested:

EXEMPLARY PROGRAMS AND PROJECTS MUST BE ACCOMMODATED TO THE CUSTOMS OF THE INTENDED RECIPIENTS -- AT LEAST INITIALLY AND UNTIL OTHER VALUES AND ATTITUDES CAN BE GENERATED.

EXEMPLARY PROGRAMS AND PROJECTS MUST BE POINTED TOWARD REACHING AND IMPACTING UPON "INFLUENTIALS" AMONG THE RECIPIENTS.

EXEMPLARY PROGRAMS AND PROJECTS MUST EMPLOY CONTACT PERSONNEL WHO HAVE CREDIBILITY WITH THE INTENDED RECIPIENTS.

Each of these strategies suggests some specific tactics. For instance, where the intended recipients of programs and projects are youth who have already demonstrated that the school environment has alienated them, using a school-based person as the contact with youth may be a tactical error -- it may breed even more hostility and doom a well conceived program before it gets off the ground. Where the school per se

and professional educational personnel enjoy little or no credibility with youth it may be desirable -- even essential -- that Exemplary Programs and Projects be mounted through contact persons who we may call, for lack of more accurately descriptive language, paraprofessionals. When the intended recipients of Exemplary Programs and Projects are indifferent and dissident youth it is even more imperative that vocational educators sense the urgency for entering into whatever may be the "life style" of the participants to be served. Probably nothing can be more deadly than attempting to initiate change from the position that one is going to save youth from the iniquitous future they face. Tactically, this approach punishes youth for what they are and what they have become -- and, at least in part, we are responsible for what they have become. Rather than a "do-gooder" approach, might not it be wiser to accept what youth are and to capitalize upon what are their present interests and aspirations?

Admittedly, we are being judgmental. When the 1968 Amendments speak of bridging between the school and earning a living for young people, they are saying that earning a living is "good" and that it is desirable -- as we see it. But to implement Exemplary Programs and Projects (and, especially for the youth designated) it must be remembered that there are many youth who have had extensive experience with ADC, with "hustling" as an alternative to earning a living, and with both prolonged and incipient indigency. If Exemplary Programs and Projects hope to impact upon these populations they must do more than offer promise and hope. They must offer a viable alternative for the immediate moment.

Tactically, what is being suggested is that Exemplary Programs and Projects must enter the marketplace and vigorougly vie for the lives of these youth. It could be argued at this point that too little attention has been given to the youth who want -- who seek -- avenues by which they can become gainfully employed. The counter argument is that youth who seek this will find it -- either through existing programs of vocational education or outside this sphere. Those who are strongly motivated will find a way --and, it should be remembered that present vocational programs are right now serving no small number of youth who are so motivated. Many of these youth are enduring no small hardship to continue with their education. The problem is less with those have chosen to continue their education than it is with those who have abandoned it.

If the primary concern of the 1968 Amendments is to reach youth -- especially the "hard-to-reach and the hard-to-teach" -- then careful consideration must be given to the channels of communication which are used by these people. For example, there is some evidence to suggest that students presently engaged in pre-service vocational programs have themselves been effective channels of communication. Where the vocational program has been conducted in conjunction with local industry which is a potential employing source -- often, conducted as a "partnership" between the school and the industrial complex -- the student who is in school has demonstrated that he can be an important communications link with older brothers and sisters, other members of his peer group and even with his parents and other adults in the community who may be out-of-work or who

may be very much aware that their present vocational skills are less and less marketable.

Again, this message has relevance only for those who want to work But, for these people the message is clear. The kinds of tasks being performed by salaried and hourly employees are being taught through the vocational program. Teaching specific skills also presents a paradoxical problem for the vocational educator -- and, ultimately, for potential employers or the individual if he becomes self-employed. The paradox lies with the understanding that teaching for specific skills quickly loses efficiency in our complex world of work when re-vocationalization is one of the anticipated consequences of one's being a member of the work force for any period of time.

Facing this problem, vocational educators in conjunction with professional counselors have striven toward developing in students desirable attitudes about work -- attitudes which will make them less resistant to changing tasks as old skills become obsolescent and new skills are required to perform new tasks. But, here is the paradox. Youth must somehow develop some skills for existing tasks if they are to gain their first employment. While industry may be more than willing to teach the specific skills necessary to perform their tasks, hard-to-teach and hard-to-reach youth may not find training for "attitude development" very acceptable to them. And why not? Some of the very reasons why they are hard-to-reach and hard-to-teach result from the values and attitudes which they presently hold.

Corollaries for some of the strategies suggested might be:

EXEMPLARY PROGRAMS AND PROJECTS MUST DEVELOP PRESENT AND POTENTIALLY SALEABLE SKILLS BEFORE UNDERTAKING REMOLDING THE ATTITUDES OF THE RECIPIENTS.

EXEMPLARY PROGRAMS AND PROJECTS MAY REACH MORE "INFLUENTIALS" AMONG THE INTENDED RECIPIENTS WHERE THERE ARE HIGHLY DIVERSIFIED ACTIVITIES AND WHERE AN ATTEMPT IS MADE TO SATURATE THE POPULATION.

RECENTLY EMPLOYED AND PRESENT PRE-SERVICE VOCATIONAL STUDENTS MAY HAVE MORE CREDIBILITY -- AT LEAST INITIALLY -- WITH THE "HARD-TO-REACH AND HARD-TO-TEACH" THAN MIGHT VOCATIONAL EDUCATORS, PROFESSIONAL COUNSELORS, PERSONNEL MEN FROM INDUSTRY, OR THE EMPLOYED INDIVIDUAL WHO HAS "MADE IT BIG" IN THE WORLD OF WORK.

The very fact that Exemplary Programs and Projects propose to "take students and others where they are and as they are" will generate another problem when it comes to maximizing change in the educational process. It must be conceded that there is already some hostility between the so-called academic areas of the school and the vocational training programs. Part of this may be the result of vocational programs demonstrating more immediate and direct relevance for the student as he views his post-school life. The school too is a complex organization and, as such, it is highly bureaucratized. When some relatively

traditional elements of the educational program still require that students perform particular rituals and acquire some specific substantive knowledge, these same elements may become increasingly resistant to programs which permit more freedom for divergence from the usual format. The problem for implementing Exemplary Programs and Projects is especially critical since the invocation of "maximum change in the educational process" necessitates the full support of all personnel in the educational establishment.

One strategy which might be useful in the development of Exemplary Programs and Projects would be to design activities in such a manner that they served more than the youth who are touched by the traditional vocational education program. While unfortunate -- if not tragic -- many K--12 teachers may still look upon vocational education programs as preparatory for what has been thought of as "blue-collar" types of positions. And while this is obviously not true, there is the continuing myth that the only reason a "college-bound" student would take courses in vocational programs would be for the development of skills which he might later employ in his avocational interests. The fact would seem to remain that too many people -- among them many professional educators -- respond to vocational programs in schools as if they were an alternative to the "regular" educational program. Specifically, then, a strategy might be the following.

EXEMPLARY PROGRAMS AND PROJECTS MUST BE PRESENTED AS COMPLEMENTARY, NOT SUPPLEMENTARY, TO THE OTHER ELEMENTS OF THE EDUCATIONAL PROGRAM OF THE SCHOOL.

Again, there are parallel populations for whom this strategy will have to be persuasive; both the professional educational personnel within school systems, teacher training institutions, and state educational departments and the potential recipients of the programs and projects. Either population segment alone is not enough -- changing the educational process requires that both the "doers" and the "receivers" be persuaded that vocationally oriented program elements are, in fact, integral elements in the educational program.

Concern with program and project administrators and recipients is a further stage in the communication process which is so essential to the dissemination and implantation of a desired change. These people are the receivers of the messages sent by sources through the channels which have been selected for maximum impact. There remains in the communication process one other concern. Ultimately, this concern is the heartstone of programs and projects to maximize change in the educational process. The concern is effect. Effect really speaks to the difference between implementation and implantation. With Exemplary Programs and Projects there are a variety of ways by which activities can be started or implemented. But, what of the strategies which will assure that these activities persist through time? Seed monies may get them off the ground but it remains for activities to demonstrate sufficient merit that they will be sustained over a period of time -- and, not just sustained as separate entities rather that they become integral elements of the total educational program.

Effect can be viewed in a broad perspective (i.e., do the Exemplary Programs and Projects significantly reduce the numbers of unemployed or unemployable in a specific geographic region?). And it cannot be gainsaid that this broad view will be important if vocational educators hope to persuade legislators to continue to fund programs and projects. However, there are also other perspectives -- often, perspectives which are much more subtle and which frequently defy careful assessment and quantification. While gross statistical data give something of a national and state picture, in the final analysis Exemplary Programs and Projects will have to "make it" with real, individual people.

Strategy recommendations to this point have attempted to persuade that programs and projects must be acceptable to both those who will administer them and to those who are the intended recipients. And inherent in this may be a problem. Is it not possible that some of the more successful Exemplary Programs and Projects may come to owe their success to the recipients finding the activities especially functional for them as they see their lives? And is it not also possible that these same programs and projects may be unpopular with -- even repugnant to -- legislators because of conflicts between their values and attitudes and those of youth groups which we have already labeled as "hard-to-reach and hard-to-teach?"

In essence, how are we to answer the question of which group is to be served when there are differences of opinion on the worth of programs and projects? A strategy which might at least get at the problem could be the following.

EXEMPLARY PROGRAMS AND PROJECTS SHOULD HAVE AT LEAST A TWO-FOLD GENESIS -- SOME SHOULD BE PURPOSIVE AND THE RESULT OF PROFESSIONAL JUDGMENT AS TO WHAT IS NEEDED AND OTHERS SHOULD BE MORE OF THE "RISK" VARIETY WHERE THE INTENDED RECIPIENTS ARE THE MAJOR ARCHITECTS.

If this strategy is followed, there is the real danger that there will be hidden agenda -- agenda which say, in fact, that evaluation procedures will "demonstrate" that professionally conceived programs and projects have been those which really "worked." Implicit in the strategy of taking some risks with the recipients -- the "hard-to-reach and the hard-to-teach" -- is the notion that they too may have some excellent notions as to how they might move toward making their lives more meaningful. And, it can be argued, if the recipients of Exemplary Programs and Projects do not find their lives to have meaning, no activity professionally conceived or otherwise is going to really carry the day.

If the risk is taken it becomes essential that <u>all</u> parties to Exemplary Programs and Projects -- including potential employers -- actively support these programs as much as they do those which have been professionally conceived and implemented. Unless we wish to take the position that we, as professional educators, have some special omniscience for maximizing change in education (and, our present won-lost record hardly supports such a position) there would seem to be

some room for our carefully observing some "other ways" of getting the job done. And possibly it will be discovered that some of the present vocational programs and projects which we have underestimated in terms of their impact upon the educational program are the very activities which are having the greatest impact upon youth. The point is, do we really know? Until we have some sure knowledge of what are Exemplary Programs and Projects, exemplary in the sense that they are effectively reaching the intended recipients, it would seem that a good tactic might be to keep an open mind.

The question of taking risks and ascertaining effect has yet another dimension which involves strategy. Particularly with high-risk programs and projects (but, certainly not limited to these) there is often a pressing desire -- if not need -- to demonstrate results which tend to agree with the general objectives which were outlined for the activities. The problem is one of latency and measurability. Many of the effects of Exemplary Programs and Projects may be latent -- they may just not appear at the surface and be observable as changes in behavior either among the recipients or within the educational process itself. An example of this is the student who seems to demonstrate no increase in skill activity or remains at about the same level of achievement. He appears to have reached his "limit" or be on a "plateau." Then, often very much to the surprise of the individual himself, at a later point in time it is demonstrated that skill gains have been made and that achievement goes up. Problems of latency are inextricably tied with measurement. Our available tools of measuring "what happens" to youth in an educational process are just not refined to the point where we can immediately tease-out with any great precisions what has happened or what is happening.

Strategically, then:

EXEMPLARY PROGRAMS AND PROJECTS MUST NOT BE PERMITTED TO RISE OR FALL AS A RESULT OF IMPETUOUS DESIRES TO DEMONSTRATE THAT THE INTENDED CHANGES DID, IN FACT, OCCUR.

And, there is a corollary for this strategy:

EXEMPLARY PROGRAMS AND PROJECTS WHICH DEMONSTRATE IMMEDIATE GAINS SHOULD NOT NECESSARILY BE ASSUMED TO HAVE THE CAPABILITY OF DELIVERING INTERMEDIATE OR LONG-TERM GAINS.

This should in no way be construed as an argument for not bothering to assess or evaluate the Exemplary Programs and Projects. The fact that our tools of inquiry are imperfect makes it all the more imperative that an especially diligent effort be made to assess with care. But it must be remembered that these tools are imperfect and that timing is also a variable -- no visible evidence of gains at the moment does not necessarily mean that no gains have accrued.

The 1968 Amendments propose national programs -- but, when conceived, they will probably vary greatly depending upon which region or state is directly administering the program or project. It seems

logical to assume that professional personnel will assess their capability to deliver the particular support systems necessary to invoke Exemplary Programs and Projects. And it is likewise reasonable to expect that local or area data will be used to predicate the nature of the programs and projects. Such variables as the incidence of unemployment, the relative holding power of the schools, the types of employment opportunities which presently exist and which are projected for the immediate future, and an assessment of what are believed to be the necessary characteristics of activities which will provide a linkage between the school and earning a living for youth.

What may be overlooked is the pattern of mobility of particular population segments in the United States. The over-simplified statement is that we have become a highly mobile people, etc. We have and we have not -- it depends very much upon which population segments one is talking about. Obviously, having unemployed persons move from one geographic area to another without yet finding or being capable of gaining employment does little more than shuffle the problem around the nation. And what of the socially alienated youth who choose not to move to an area where they might be able to find employment? What of the potentially employable individual who is unwilling to move to a new area where there may be a critical shortage of personnel possessing the skills he already has? If Exemplary Programs and Projects are to have any real hope for impacting upon the social scene through the invocation of maximum change in the educational process, they must attack the problems at the national and local level simultaneously.

The individual's aspirations and society's expectation that one will somehow become gainfully employed can be made a value taught for by the school only if the school is willing to accept that there are only a short few years during which a major portion of the youth population must be in attendance. If the strategy decided upon is one of waiting until youth are "old enough" to fully comprehend what this value means in our society, the educational process will have failed. It will have failed because the very youth we describe as "hard-to-reach and hard-to-teach" are no longer in school at that point. And the few who may still be in attendance may be so alienated that presenting them with a societal value which runs quite contrary to their own may only serve to increase their alienation.

If Exemplary Programs and Projects in vocational education are to impact upon a broad front, it seems clear that persuasive and meaningful activities will have to be implemented in the early years of schooling -- even the middle, intermediate or junior high school may be too late. It might even be suggested that one of the reasons we have "hard-to-reach and hard-to-teach" youth is because society -- parents, educators, and others -- failed to reach youth effectively and soon enough. Or, could it be that we did reach them and that the message they heard from us assisted in creating the problem? While with older youth it may be necessary to develop some specific work skills before the problem of attitudes toward work can be attacked, with elementary school age youth the possibility exists that attitudes can be attacked first and that

there should be some reasonable hope for success with such a program. Strategically this suggests that:

EXEMPLARY PROGRAMS AND PROJECTS MAY BE ABLE TO EFFECTIVELY IMPACT UPON ATTITUDE DEVELOPMENT IN YOUTH IF THESE ACTIVITIES ARE UNDERTAKEN EARLY ENOUGH IN THE EDUCATIONAL PROGRAM AND ESPECIALLY IF VIGOROUS EFFORTS ARE MOUNTED IN ELEMENTARY SCHOOL PROGRAMS.

Such a strategy also means that a major effort will have to be made to train and make available professional counselor personnel who are specifically prepared to work with youth in the elementary school. Such training programs do exist today but there is a paucity of personnel available to take positions in the field. Possibly some of the Exemplary Programs and Projects in vocational education will represent efforts to creatively link counselor training institutions with vocationally oriented programs in elementary schools. If vocational education is a basic objective of all education and fundamental to each individual's education, such exemplary activities would seem to be very much in order.

One of the reasons for mounting a nation-wide program for improving the impact of vocational education upon the whole educational process is that the problem itself is nation-wide. At the same time, the problem demonstrates similarities and differences -- while many rural and ghetto dwellers may be out of work and may not be employable because of the skills they do or do not possess or because of where they reside, delivering vocational education systems to these people presents quite different problems. If any one thing <u>is</u> clear, it is that our <u>present</u> vocational programs and projects are not proving to be sufficient to meet today's demands -- both the demands of people needing to be employed and the demands of potential employers.

This does not mean, however, that all Exemplary Programs and Projects should necessarily represent activities which have not been tried before. It may mean that if we wish to have a maximum impact upon change in the educational process some of the presently conceived programs and projects -- particularly those which have demonstrated some measure of success (or, promise for it) -- should be more liberally funded. Of course, if this tactic is used, vocational educators will make themselves vulnerable to criticism on the grounds that all they are really doing is "spending more money on the same old programs." But sight should not be lost of the fact that spending more money --or, as some of us might prefer to put it, making a larger investment -- is in itself a change. It is entirely possible that numerous excellent programs and projects are already in operation and that they have failed to have a marked visible impact upon the educational process for the simple reason that they have not yet been adequately funded.

Hence, the following strategy is suggested:

EXEMPLARY PROGRAMS AND PROJECTS MUST IDENTIFY AMONG EXISTING VOCATIONAL EDUCATION ACTIVITIES THOSE WHICH HAVE ALREADY SHOWN A MEASURE OF SUCCESS -- CAPITALIZING UPON THIS MIGHT MEAN AN UP-GRADING OF FUNDING FOR SPECIFIC

ACTIVITIES AND THE BORROWING OF PARTICULARLY SUCCESSFUL ELEMENTS SO THAT THEY MIGHT BE INCORPORATED INTO NEW PROGRAMS AND PROJECTS.

As with most strategies, there are some cautions to be observed. An obvious problem already suggested in conjunction with other strategies involves the matter of funding or, to be more crass, money. While we know that it is necessary to have differential expenditures to reap equivalent outputs -- especially where the treatment groups distinguish themselves by their heterogeneity -- we also are very much aware that emphasis, thrust, prestige, and status tend to gravitate to those programs and projects where the larger amounts of money are being invested. The heart of the problem lies with the fact that people in general somehow expect that there will be dramatic gains where there has been a massive infusion of resources. It is difficult to persuade that one of the reasons for the massive infusion of resources is that the problem being attacked is especially vexing and that as a result of this nominal gains in the comparative sense may be a more signal achievement than one assesses at first glance.

Conversely, and compounding the immediately preceding problem, some Exemplary Programs and Projects may require a comparatively smaller investment (possibly because of the nature of the problem -- i.e., the lack of complexity or the homogeneity of treatment group) and yet may give visible evidence of impacting dynamically upon the educational process. What is the consequence of this paradox in the perception of program and project outputs? One possible consequence is that resources will be diverted to relatively simple problems which can be solved in a manner promising to yield highly visible, positive outputs -- specifically, the types of gains enumerated as "desirable" in the purpose of the 1968 Amendments. This could also be seen as a strategy of "running scared" when one discovers that the really difficult problems do not have simple solutions and tend to produce low yields.

It might be remembered that Congress enacted the 1968 Amendments because the general problem is complex and vexing. It might even be well for us to focus for a moment upon what is the intent of "... maximum change in the educational process." While this may refer to the magnitude of change, it might also allow for a nominal change if that nominal change has great significance. An analogy, while it is imperfect, might serve to make the point clearer. Educators often dote upon measuring or assessing those activities in the educational process which lend themselves to easy quantification -- they are manipulable. But those things which lend themselves to easy measurement may not be the crucial elements of the program. Measurement of some outcomes of the educational program is extremely imprecise -- but, these same outcomes which are difficult to quantify may be among the most important outcomes of the educational process. Simply put, nominal gains in some programs and projects may be extremely significant and estimates of change which appear to be crude and nebulous may have much greater import than highly precise data on less pivotal activities.

The following strategy is, among other things, a test of how secure vocational educators really feel in attacking the specific problems outlined in the 1968 Amendments.

EXEMPLARY PROGRAMS AND PROJECTS MUST BE QUICK TO IDENTIFY DIRECTIONAL CHANGES IN THE EDUCATIONAL PROCESS -- ESPECIALLY WHERE THESE DIRECTIONAL CHANGES SIGNIFY GREATER GAINS THAN DO HIGHLY VISIBLE ACCOMPLISHMENTS WHICH HAVE A LESSER ORDER OF IMPORTANCE.

The persuasion of the foregoing strategies and comments remains to be tested as Exemplary Programs and Projects are identified and implemented. However, there will never be a test unless enough confidence is placed in the strategies to deem them worthy of trial. Many of the strategies are really statements of common sense and, as such, many of them are now in use -- many have already demonstrated their worth to vocational educators. Acknowledging that Exemplary Programs and Projects will be both already established and newly conceived activities, it seems essential that careful attention be given to the critical problem of communication. It cannot be assumed, for instance, because a program or project already exists that it is fully or accurately understood. It is possible that a newly conceived activity may come to be more readily understood and implemented than a counterpart established activity.

It is imperative that Exemplary Programs and Projects gain credibility with intended recipients. However, before concern with recipients can be dealt with, concern must first be given to recruiting the support of those who will administer the activities. Rogers and Jain[8] argue this concern when they state "...relatively little emphasis has been placed upon diffusion within organizational structures." Some of the specific questions which arise include; how shall Exemplary Programs and Projects be identified or conceived -- from within the group of professional vocational educators, from without of this group, from the state level, from individual schools, or from many or all of these sources? If it is not clear from whence programs and projects may emanate, petty bickering and unnecessary competitiveness may replace a unified striving for success. The problem is already enough complex and vexing that we do not need to add to it by creating divisiveness among ourselves.

The educational process will change -- it is changing. Whether vocational educators through Exemplary Programs and Projects will influence the direction of this change will very much depend upon how willing they are to invoke strategies which offer the promise of success. Vocational educators can influence change. The evidence is clear -- the basic data on diffusion and the adoption of new, improved programs have been generated by vocational educators. It would be tragic indeed if the very group which has seen so much success in influencing change were to be the one which failed when challenged with the implementation of Exemplary Programs and Projects.

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1. Everett M. Rogers, Diffusion of Innovations, New York: The Free Press, 1962, p. 123.

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3. Alvin Zander "Resistance to Change -- Its Analysis and Prevention" in Warren Bennis, Kenneth Benne, and Robert Chin (ed.), The Planning of Change, New York: Holt, Rinehart and Winston, 1961, p. 544.

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5. Samuel A. Moore, II, "Youth Will Become: With or Without Schools" The National Elementary Principal XLVIII, 3, (January, 1969) 42.

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7. Edward Wellin, "Water Boiling In a Peruvian Town" in Benjamin Paul (ed.) Health, Culture, and Community (Documents Diffusion Center, East Lansing, Michigan, Michigan State University, 1955).

8. Everett M. Rogers and Nemi C. Jain, "Needed Research on Diffusion Within Educational Organizations," (A paper presented at the National Conference on the Diffusion of Educational Ideas, East Lansing, Michigan, March 26-28, 1968) p. 28.

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WRIGHT, AMOS W.; WIGGINS, MELVIN C.
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AMERICAN DEVELOPMENT AND PROGRAM ASSISTANCE CORP., BOCA RATON, FLA.
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IDENTIFIERS - TITLE III

ABSTRACT - THE PURPOSE OF THIS TITLE III PROGRAM IS TO CREATE WITHIN THE FRAMEWORK OF THE SCHOOL ENVIRONMENT AN OCCUPATION-RELATED PROGRAM DESIGNED TO LEAD YOUTHS TOWARD ULTIMATE INDEPENDENCE AS ADULTS. SPECIFIC OBJECTIVES, UPON WHICH THE FEDERAL GRANT WAS GIVEN, INCLUDE EFFORTS TO: (1) TO ESTABLISH AN ADVISORY COUNCIL, (2) TO PROVIDE AND EQUIP FACILITIES TO SERVE AS COMMUNITY CENTERS, (3) TO PROVIDE A PROGRAM THAT WILL ENABLE PEOPLE OF THE COMMUNITY TO IDENTIFY THE EDUCATIONAL PROBLEMS THAT ARE PECULIAR TO THEM, AND (4) TO DEVELOP A CURRICULUM THAT WILL PERMIT YOUTHS TO BENEFIT FROM THE EDUCATIONAL AND WORK EXPERIENCES PROVIDED THROUGH A COOPERATIVE PROGRAM. THERE IS A PROGRAM FOR ADULTS, ONE FOR PRESCHOOL CHILDREN, AND ONE FOR CHILDREN ENROLLED IN SCHOOL. ALTHOUGH THIS EVALUATION IS FOR THE FIRST OF THREE YEARS OF DEMONSTRATION FUNDING, ONE CONSULTANT NOTED THAT THE PROGRAM HAS BEEN SUCCESSFUL DURING THIS FIRST YEAR. (GEB)

VT 013 736

TEACHING and LEARNING FOR OCCUPATIONAL INDEPENDENCE

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TITLE I ESEA

CENTRAL CITY PROJECT

JACKSON PUBLIC SCHOOLS
Jackson Mississippi

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JUL 23 1969

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FIRST PHASE EVALUATION
1968 - 1969

E V A L U A T I O N

Phase I

ESEA TITLE III-CENTRAL CITY PROJECT

JACKSON PUBLIC SCHOOLS

JACKSON, MISSISSIPPI

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Conducted by

AMERICAN DEVELOPMENT AND PROGRAM ASSISTANCE CORPORATION

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TABLE OF CONTENTS

PREFACE - i

INTRODUCTION - - - - - - - - - - - - - - - - - - 1

OBJECTIVES - - - - - - - - - - - - - - - - - - - 2

DESCRIPTION OF CENTRAL CITY COMMUNITY - - - - - - - 7

DESCRIPTION OF PROGRAMS- - - - - - - - - - - - - 9

SUPPLEMENTING THE CURRICULUM - - - - - - - - - - 15

EVALUATION - - - - - - - - - - - - - - - - - - - 17

Observation of Project Consultant - - - - 21

Letters from Project Area Principals,
BRL Consultant & Director of Curriculum 22

APPENDIX

Charts: - P. E. R. T. - - - - - - - - - - - - - 31

- Organizational - - - - - - - - - - - - 32

Census Form - - - - - - - - - - - - - 33

Schedule of Remedial Reading Classes - - - 37

Central City Newsletter

News Clippings

ADPAC

American Development And Program Assistance corp.

1155 S. W. 5TH STREET
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PHONE (305) 395-0577

To: Dr. Kirby Walker, Jackson City Supt.
: Mississippi State Dept. of Education
: U.S. Office of Education

It has become the common professional practice to submit and publish an evaluation report for each Title III E.S.E.A. Project. The enclosed Evaluation is for the first phase of the Jackson, Mississippi, "Central City Project".

To read this evaluation report and feel that you understand the project is a misconception. It is impossible to put into words, what this program is doing for the Central City Area.

Not only is this "Central Cities Project" meeting its objectives, but it is also designing a plan that could very well be the national model for Head Start, Adult and Vocational Education.

Dr. Kirby Walker, Superintendent and Dr. H.S. Kirshman, Ass't. Superintendent, are to be lauded for their forsight in the development of the project, the selection of Mr. Amos Wright as Director and then allowing the staff the freedom to proceed on its successful course.

A. D. P. A. C. is presently involved in over thirty major Educational Programs throughout the country, and to say the least, this "Central City Project" ranks on the top for a first year project.

Respectfully submitted,

James E. Brannigan

James E. Brannigan
President

JEB/j

JUN 30 1969

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P R E F A C E

As a reader, you are about to project yourself into the Evaluation of the first phase of the Jackson, Mississippi, "Central Cities Project," which is funded under the auspices of Title III, Public Law 89-10 of the Elementary Secondary Education Act and the Mississippi State Education Department.

This evaluation is for the first, of three years of demonstration funding. It is expected and anticipated that this project will have demonstrated its value and importance during the first three years and that additional monies and methods will make it available to the entire city school system.

This work has been a joint effort by the staff of the Central Cities Project, under the leadership of Mr. Amos W. Wright, Director, Mr. Melvin Wiggins, Assistant Director, and the American Development and Program Assistance Corporation, directed by Mr. James Brannigan.

Cooperation has excelled during the first year of operation, and it is expected that the project will take a "giant step" forward due to this feeling of success and cooperation.

One might expect more statistical and analytical information. This will be forth coming during the operation of the second cycle. Information that is enclosed is basic, first phase evaluation studies and materials.

I. INTRODUCTION

The general purpose of the Jackson Public Schools Central City program is to create within the framework of the school environment an occupation related program designed to lead youths toward ultimate independence as adults. To accomplish this general goal, pupils must be provided as much individualized instruction as possible, with plenty of sincere encouragement from all adults who share any responsibility for their training. Central City seeks also to provide this special encouragement.

One of the most serious needs of the economically deprived child is recognized as being a more desirable home background with sufficient parental interest to motivate him toward more concern and desire for academic success. To devise and develop, in a setting away from the school, a program involving activities that will lead toward the fulfillment of this need is another important purpose of this project.

Attempts are being made to attract parents to the centers by fostering programs that involve sewing, embroidery, art crafts, and other activities that appeal to them. Once they form the habit of frequenting the centers, efforts will be made to gradually direct their attention and interest toward the schools and the educational welfare of their children.

It is anticipated that more parental concern for and interest in the school program in general will elicit from parents the identification of other educational needs which they think the school should seek to satisfy through a revised or innovative curriculum.

Although Central City's is not a "Headstart" program, there is a phase designed for the preschool age children of parents that can be attracted to the centers. And, if an appreciable reduction in the number of these children that would otherwise become dropouts can be accomplished, the time and money devoted to the project will have been well spent.

II. OBJECTIVES

A. Basic Objectives

"Teaching and Learning for Occupational Independence" is the theme of the Central City Project and is certainly recognized as one of the ultimate goals that public school education seeks to support and facilitate. Several objectives, submitted with the original proposal, were approved as being necessary for laying the foundation of the project and getting it underway. Most of these objectives, being immediate or short range goals, have already been accomplished, and the others are being met as the project gathers momentum. The objectives, upon which approval and a federal grant were given and which are recognized as the initial steps required to reach the major purpose expressed in the theme of the project, appear on the following page.

1. Establish an advisory council composed of a membership that will be representative of the entire school district, with a majority of members being from the Central City area.

2. Provide and equip facilities to serve as community centers, originally referred to as "storefront museums," in a setting away from the school to give community residents and patrons a less formal and more social atmosphere in which to meet and work than in the school.

3. Establish within the system a program that will provide an opportunity for the people of the community to identify the educational problems that are peculiar to them and their situation, with some provision for them to share in the study, analysis, and attempts toward the solution of these problems.

4. Prepare a scope and sequence chart showing graphically a design of the program the project will follow in its attempt to lead youths toward ultimate independence as adults. The chart will picture some major duties of the project personnel and some of the activities to be pursued.

5. Develop a curriculum sufficiently flexible to permit youths to benefit from the varied educational and work experiences that can be provided through a cooperative program involving the school, the home, the community, and nearby business firms.

6. Provide, as needed, special training for project personnel to enable them to fulfill their responsibilities in the development of the program. The project personnel includes the professional and para-professional staff of the centers, indigenous workers, the advisory council and certain classroom teachers of the school in the project area.

7. Conduct a census to obtain certain information in regard to the characteristics of the families in the project area. Such information as the number of families headed by women, by relatives other than parents, and by legal guardians should be of inestimable value for providing the empathic understanding required to develop an effective program.

B. Supplementary Objectives

Since most of the original seven objectives have been met, it becomes quite clear that they do not give a complete picture of the desired outcomes. An advisory council has been appointed; community centers have been established; an operational chart has been designed; and a census has been conducted. Yet, these initial steps, expressed as objectives in the original proposal, are the basis on which administrative approval and federal funding were granted.

With the project well underway, its administrative personnel are now in a better position than at the outset to chart the course that will hopefully lead to the gradual accomplishment of the project's major purpose. They are now better prepared to list the long range objectives, which as supplements to the original ones, describe the desired behavioral changes they hope to affect in the characteristics of those whom the project seeks to help. The long range or supplementary objectives are:

1. Get more parents to demonstrate a greater interest in the school program and the educational welfare of their children. Adults, particularly parents of pre-school and school age children, will be attracted to the centers by planning a program of varied activities that appeal to them. The program is to be established and operated in a less formal environment away from the school, and will include sewing, embroidering, various kinds of arts and crafts, and some phases of family education.

2. Help more children to learn earlier in their lives the advantages of being well trained for some occupation and develop such an appreciation for education in general as to inspire in them a greater determination to attend school regularly and to work more diligently. This will be done by providing in-service training for appropriate project personnel to extend some guidance services to elementary school children and to enhance

such services already available to secondary students. Such services might conceivably include administering and analyzing both pre-test and post-tests, interpreting and evaluating community characteristics revealed in the survey, making observational appraisals, and counselling students.

3. Help children to earn better grades in school by providing more individualized instruction. Efforts will be made to develop a program, based on ability level testing, the use of non-graded educational materials and out-of-school experiences that will enhance self confidence in each child.

4. Enhance the learning readiness of preschool age children through a program that provides social experiences with other children and permits them to benefit from a variety of activities that inspire in them a desire for learning.

5. Reduce the degree of absenteeism and the number of school dropouts by identifying the grade levels that show the highest frequencies of these undesirable situations. A study will be made to learn the major causes of this negative attitude toward education with the view of developing a corrective program.

III. DESCRIPTION OF CENTRAL CITY COMMUNITY

Central City comprises a subsystem of the Jackson Municipal Separate School District and is served by five of the fifty-six (56) schools or attendance centers of the district. Approximately 2,451 elementary school children, 1,047 junior high pupils, and 714 senior high pupils are enrolled in the five schools as follows:

Isable Elementary	985
Martin Elementary	303
Reynolds Elementary	1169
Blackburn Junior High	1047
Hill Senior High	714

Table I below shows important statistical data regarding project community.

TABLE I

SCHOOL	GRADES	ENROLMENT	% NOT PROMOTED 1968	% of POVERTY
ISABLE	1-6	985	3	76
REYNOLDS	1-6	1169	8	26
MARTIN	1-6	303	10	95
BLACKBURN	7-9	1047	11	40
HILL	10-12	714	4	40

Percent of poverty is based on number of families having an annual income of less than $2000.

According to the 1968 records, the five schools of the project area served 2451 (about 6.4%) of the 38000 pupils enrolled in the entire school district.

The statistical data chart shows school communities of various degrees of poverty, with the Martin community reflecting the highest percent (94.5),and Hill and Blackburn the lowest (40%). The average of the five school communities is 59.3%.

Although the northern edge of the project area--defined by the school districts that form its northern boundary--includes a few homes of whites, Central City is practically in an all-Negro community that includes Jackson State College,one of the several state institutions of higher learning.

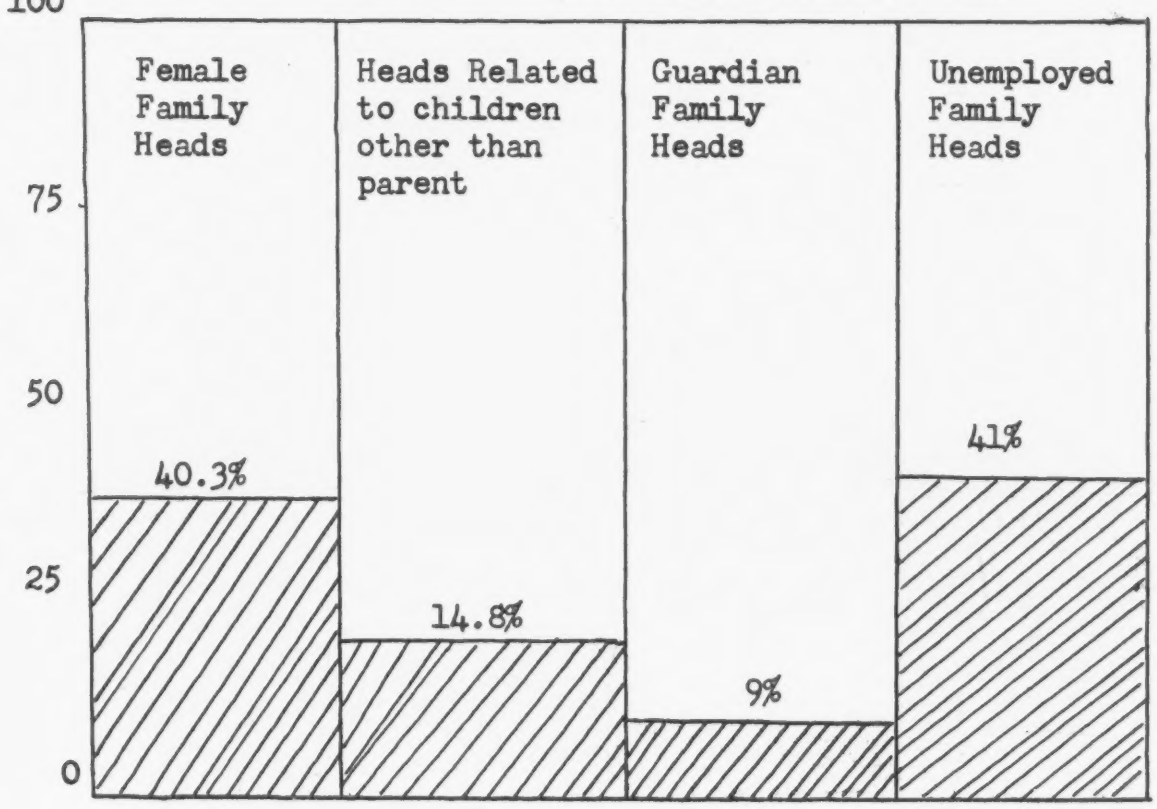
Since many of the dropouts come from broken homes, where the mother is left with the responsibility of providing the family income, a survey was made of 1224 homes of the project community to ascertain the number of such homes and to acquire information about other neighborhood conditions that generate negative attitudes toward the school and its program. As the first planned activity for the project personnel, the census revealed the number of guardian family heads, unemployed family heads, the number of preschool age children, the number of school age children not in school, and other such information needed to plan an effective program.

Specifically, the census revealed the following facts: number of homes surveyed,1224; families headed by females,594; families headed by relatives other than parents of children, 11; families headed by legal guardians, 181; unemployed family heads, 508; number of preschool children 382; children with

observable physical defects, 8; children in parochial schools, 12; school age children not enrolled in school, 222.

The graph below pictures in percents some of the more important information stated above.

GRAPH I - TOTAL HOMES SURVEYED 1224



IV. DESCRIPTION OF PROGRAMS

Designed with the idea of helping the child to acquire the training and experiences that will gradually develop him into an occupationally secure adult, the program of this project includes three distinct components. One phase is for parental participation; another is for the preschool child; and the other is planned for the child already enrolled in school.

A. Program for Adults

It is generally believed that a major reason for the economically deprived child's lackadaisical attitude toward the school and academic success is insufficient parental encouragement and interest. Central City seeks to devise a program that will develop in parents an awareness of this important need and will inspire them to become more concerned about motivating and training their children.

The first step in this direction is to find a way to reach the parents. Experience has shown that too often those parents who most need to be regular participants in the parent-teacher organizations of the schools are the ones who seldom, if ever, attend. Likewise, they hardly ever show any interest in other programs or take time to visit the school except when some problem involving their children demands their presence at school.

It is believed that the major reason for this lack of interest in some parents is personal embarrassment over their own shortcomings. Because of their inferior training, they feel uncomfortable among teachers and educators;therefore, they visit the schools mostly when it becomes necessary. That is why the Central City program is established and developed in community centers away from school in an environmental setting to enhance, rather than discourage, parental interest and participation.

Parents, especially mothers, are attracted to the centers through a program of various types of arts, crafts, and needle work. Although they are not restricted to any schedule—being permitted to come at their convenience—most of them, especially mothers of preschool age children, meet during the morning in a social atmosphere with their peers. They sew, knit, crochet, upholster, or engage in other forms of handicrafts according to their interests, while the teacher aides are working with their children.

It is amazing to see the variety, quantity, and quality of items that have been produced thus far. To name a few, they include: dresses, aprons, sofa cushions, stuffed animals, place mats, curtains, pot holders, and other items classified under arts and crafts. Some have even refinished and re-upholstered old pieces of furniture.

Though this is good in itself, it is not the sole nor the major purpose of the program. This is used as a drawing card, a successful means for attracting parents to the centers, with plans under development for securing their participation in the more academic phase of family education. Dr. Sullivan's Behavioral Research Laboratories Program, the "Why Work" series for adults, is being used for this purpose. This program is highly recommended for improving the reading ability of adults and enhancing their interest in and appreciation for the independence and security in holding steady jobs.

B. The Program for Preschool Children

Through its program for preschool children, Central City seeks to provide some of the background experiences that all children need to enhance their readiness for learning, experiences that are woefully lacking in the early childhood of so many economically deprived children. Only those children whose parents bring them to the centers are generally accepted.

The readiness phase of the Behavioral Research Laboratories program, which includes many desirable learning concepts for preschool children, is used. Without subjecting them to any undue pressure to learn, they are provided the opportunity to learn, among many other ideas, up and down, left and right, various colors, number concepts, alphabets, and new words.

The short attention span of four and five year old children is taken into consideration, and they are kept in these classes no longer than 30 minutes at one session. The rest of the time is used for storytelling, games,filmstrips, coloring, and other activities that appeal to children of this age. Though quite similar in purpose and other aspects, this program is different from the well known "Headstart" program; no lunch is provided for Central City's children, and they are presently limited to a two hour stay at the centers.

C. Program for Children Enrolled in School

A limited number of the most retarded readers among the pupils enrolled in the five project area schools are being provided special help through the use of the BRL program, which has provisions for individualized instruction, permitting each child to work at his own ability level. This service is being extended to include even the two secondary schools of the area.

In elementary schools fourth, fifth, and sixth grade pupils are being used in the program, and seventh through tenth grade students participate in the secondary schools. A breakdown giving the number of pupils served in each school shows: Blackburn Junior High School, 90 (7th, 8th, 9th grades); Hill High School, 60 (10th grade); Isable, 180 (4th, 5th, 6th grades); Martin, 55 (4th, 5th, 6th) grades; and Reynolds, 180 (4th, 5th, 6th grades).

As another benefit to children enrolled in school, a limited number on a voluntary basis are given some guidance and help in an after school study hour conducted at the centers. In cooperation with the National Youth Corps, 40 students in the two secondary schools of the project area are being used as aides. They perform work chores in the school lunchroom, library, gymnasium or other places about the school and receive some financial remuneration for their services.

Plans are in the making to secure the cooperation of local industries to provide on-the-job training for high school youths while they are enrolled in school. Another possibility for extending vocational training to high school youths is through a cooperative effort with the Adult Education Program of the system. How to incorporate the services of this program and any others that might be available is presently being considered.

The program of the project also includes provisions for employing skilled workers of the community, referred to as indigenous aides,to teach their skills to interested high school students (and adults) in after school or evening classes.

D. Spark Plug of the Program

Like any program that is successful, the key to the success of Central City lies in the quality of the personnel employed to operate its centers. Carefully selected on the basis of their proven ability to work well with others, the project counselors, with one exception, are certificated teachers who were formerly employed in the system. One was previously employed as a counselor in a secondary school, another was a certified teacher in special education, and one was previously engaged as a teacher of English and speech. The other counselor,

being employed in the system for the first time, is trained in home economics.

The persons responsible for contacting the neighborhood adults are the block chairmen, who are highly respected residents of the community. Though all have some high school training, the criteria for selecting block chairmen are not restricted to academic standards. Instead, they are based on familiarity with the neighborhood, respect in the community, and ability to work with and influence others. They get the people to the centers, and the counselors keep them coming back.

Then, there are the teacher aides, who are required to have at least a high school education—most of Central City's aides have two or more years of college training. Under the supervision and guidance of the counselors, the aides teach preschool children and assist with the after school study program for pupils enrolled in school.

V. SUPPLEMENTING THE CURRICULUM

Like other ESEA Title III projects, Central City seeks to discover new or innovative methods, programs, and/or materials to stimulate children, especially those of low-socio-economic background, to learn. It is hoped that whatever program emerges will prove to be so successful as to affect

a change in the existing curriculum, either as an addition or an enrichment.

If the BRL Program, with its built in designs for enhancing readiness, stimulating parents, and raising the performance levels of retarded readers, proves to be as effective as it is reputed to be, one or more phases of the program could conceivably occupy a place in the curriculum of every school in the system.

There is a further possibility of enlisting the services of several local industries and convincing them of the feasiblity of cooperating with the project to provide on-the-job training for a few high school students. After graduation these young people, who had no original plans for attending college, would receive full-time employment with the industries that had afforded them the training.

USING OTHER FUNDS, MATERIALS, AND SERVICES

Whenever possible, Central City draws upon the Title I reading project, already operating in this school district, and upon other agencies within the system for funds, equipment, and materials to help develop its program. Audio-visual aids acquired under Title I for use in the project area schools are being used in the centers with reading programs for children and adults. The sum of $9000

was also acquired from Title I as a special grant to obtain equipment and materials not provided in the original budget.

To strengthen the vocational and adult educational phases of the program plans are being considered for acquiring additional funds for equipment, materials, and services from the Adult Education Program of the system.

As an additional boost to the program, we have secured the services of Mrs. Lola M. Ducksworth, a state home economist, who consults regularly with the project counselors, suggesting ideas and activities on home beautification, good health habits, and economical food buying practices for their consideration as a means of maintaining parental interest. Although she is scheduled to meet with each counselor once a month, she will consult with them at any time upon request.

VI. EVALUATION (Adults)

At this stage of the project, just short of a year's operation, it is rather difficult to give a complete appraisal of what has been accomplished thus far. In the words of the project's chief consultant, James E. Brannigan, of American Development and Assistance Corporation, "One would have to see it in operation to appreciate it fully." Therefore, this appraisal, an attempt to describe in detail the designs of the program, is more expository and less delineated.

As stated in the objectives, this program seeks to get more parents to manifest greater interest in the school program and to show more concern for the academic welfare of their children. It purposes to help them to realize that their children need their encouragement above all else and that the empathy of teachers alone is not enough. So, the first step was to attract parents to the centers by fostering a program of activities that appeal to them. A daily attendance record of adults and children has been kept, and Tables II and III below show the average daily attendance of adults and children for each month since the beginning of the project.

TABLE I

NUMBER OF ADULTS AND CHILDREN SERVED MONTHLY AND AVERAGE DAILY ATTENDANCE AT COMMUNITY CENTERS, September,1968-February, 1969

NUMBER OF PERSONS SERVED MONTHLY				A D A		
MONTH	ADULTS	CHILDREN	TOTAL	ADULTS	CHILDREN	TOTAL
September	Census Taken	538	538	1.1	28.3	29.4
October	114	579	693	5.5	16.2	21.7
November	414	974	1388	5.9	14.0	19.9
December	242	792	1034	4.0	13.3	17.3
January	519	1172	1691	6.5	15.0	21.5
February	675	1399	2074	8.5	17.5	26.0
TOTAL	1964	5454	7818	5.2	17.4	22.6

TABLE II

CENTRAL CITY'S PROGRAM FOR BOYS AND GIRLS ENROLLED IN SCHOOL

	Blackburn	Hill	Reynolds	Martin	Isable	Total
REMEDIAL READING PROGRAM	90	60	180	75	180	585
NEIGHBORHOOD YOUTH CORPS	20	20	-	-	-	40
TOTAL	110	80	180	75	180	625

To ascertain the extent to which the project has been able to affect the desired change in the attitude and behavior of parents toward their children's schooling will require a longer period than a year's operation. However, principals of the project area schools are already noting better attendance at PTA meetings and more parental ccoperation in general.

PRESCHOOLERS

Another important purpose of the program is to enhance the readiness of preschool age children by providing them with a variety of learning and social experiences. During the first six months of the project, the counselors planned their own kindergarten program, which was pursued with the assistance of teacher aides. Early in January the Sullivan's B R L readiness program, reputed to be quite effective, was initiated in all of the community centers. Just how well this program has brought about the desired behavioral change can hardly be measured at this stage. However, it can be noted by observation that practically all seem to enjoy the activities and the learning experiences to which they are being subjected.

At the Martin Elementary School Center,which is located on the school campus in a portable classroom, a group of slow first graders who had hardly exhibited any favorable responses in their regular classes, are being taught 30 minutes each day in the center with the Sullivan's readiness program. It is almost amazing to note the favorable responses these children are already making after having been exposed to the program for just a two-week period. Several who were completely nega-

tive before are now responding to questions and are learning right from left, up from down, colors, and many other readiness concepts entailed in the program.

Another goal of the project is to reduce the number of non-readers in both elementary and secondary schools. Again, the BRL program is being used in all project area schools with a limited number of retarded readers. As a basis for measuring progress at a future date, all children participating in the program were tested with the Stanford Achievement Test to ascertain their current reading levels. Just how effective the BRL program will be for improving the reading skills of extremely slow readers will be determined by their performances on different batteries of the same instrument during future testings.

Even at this stage, just several weeks since the beginning of the program, it is significant and encouraging to observe what their teachers regard as "renewed interest in reading." They begin each session with anxiety and are reluctant to close their books at the end of the period.

The phase of the BRL program that is claiming considerable interest and study is that being used in the secondary schools, where for the most part, instruction in reading is normally discontinued. It is hoped that by providing some effective instruction in reading for the poorest readers in high school (except for juniors and seniors) the number of dropouts will be considerably reduced. Time will tell if the present optimism for the Sullivan's program can be justified.

OBSERVATION OF CONSULTANT

As one looks back to the summer of 1968 it is unbelievable to think of roaming through neighborhood after neighborhood with Mr. Amos W. Wright in search of facilities. They were impossible to find. Mr. Wright has been very systematic in his planning and operation.

The approach that has been used to work in each individual neighborhood,with people living within that structure as contacts, is one of the most important features in the success of the project.

In many projects similar to this one, adults will come to the centers once or twice and will then fade away or they will expect a stipend. It is amazing to return to these centers month after month and not only find the original adults in attendance, but also friends that they have brought with them.

The vocational aspect has gone far beyond expectations. The adult participants are ready to supply gift shops and variety stores with the products that they have produced.

Again, it is impossible to describe the preschool program in the same working area with adults. These youngsters have been given the necessary confidence to achieve, and this is the result of having their mother near-by.

In the case of the Jackson Central Cities project, success is breeding success and the most feasible recommendation to make at this time is to proceed in the same manner, full speed ahead.

JACKSON PUBLIC SCHOOLS
Jackson, Mississippi

MEMORANDUM

TO: Amos W. Wright, Director
ESEA Title III - Central City

FROM: Isable Elementary School

SUBJECT: Evaluation of BRL Program

Based on teacher observation and pupil interest, we feel that the following generalizations can be made about the operation of the BRL Program in our school:

The Program has served to:

1. Create and/or stimulate interest in reading generally
2. Foster independent study
3. Give all pupils an opportunity to succeed
4. Give non-readers a sense of achievement that they had not enjoyed before
5. Increase classroom competition
6. Aid children in learning to follow directions

The following weaknesses have been noted in the program.

1. The placement test tends to place some pupils in groups higher than their true readiness
2. Class loads are too large to give individualized help needed
3. Not enough variety in activities

Recommendations:

1. Hire teacher aides
2. Purchase listening stations and tapes

Cleo McGee
Principal

April 22, 1969

THE EVALUATION OF THE SULLIVAN READING PROGRAM

Martin Elementary School

April 22, 1969

The Behavioral Research Laboratories Sullivan Reading Program seems to be the awaited hope of educators across the nation. The program is stimulating, challenging, and lends a very necessary sense of achievement and accomplishment on the part of students, who for the most part have been denied this very important aspect to academic security and attainment.

The children manifest a seemingly, never ending enthusiasm to the simple, easy to follow, well designed program. The materials are consecutive, with no special instructions necessary after the completion of the first book. The techniques which the students use to make their responses and check them remain the same throughout the series.

Remedial students of Martin school in the fourth through sixth grades have been working in the program approximately two months. The results at this point are very encouraging. Children are beginning to read words and simple sentences who have done little or no reading before.

The program has one distinct disadvantage in our situation, which is the inability of the teacher to give the individual attention that the program requires. This evaluation is based on the opinions of the teachers concerned. No standardized testing has been done at this point.

Recommendations

For a more effective program, it is recommended that:

1. Teacher aides be used to help the teachers.

2. Materials be readily available.

3. The maximum number of students be decreased for each class.

John D. Rhodes

John D. Rhodes
Principal
Martin Elementary School

JACKSON PUBLIC SCHOOLS
Jackson, Mississippi

A BRIEF EVALUATION OF THE SULLIVAN READING PROGRAM

REYNOLDS ELEMENTARY SCHOOL

The Sullivan Reading Program was started in Reynolds School, February, 1969. Before the beginning of the program most of the students did not enjoy reading class at all. These pupils had a hard time reading because they could not attack new words or sound the words out on their own. Because of this the students were not able to recall what they had read and the reading had no meaning for them.

Now that we are studying from the Sullivan Program, we find that the students are more interested in reading class. They enjoy reading from the text and they are able to recall what they have read.

The students seem to have gained self confidence in reading from the basal reader. Some of the students still do not sound new words correctly, but now we find more students trying to sound out new words. As of yet the students do not enjoy their basal reading class as much as they do the Sullivan Program.

The students are learning letter sounds, and by taking away and adding letters to words, they are learning how letters and letter sounds help to form new words.

A final judgment on whether this program is really a breakthrough in reading cannot be determined at this early date, yet results appear highly favorable.

Certainly, enthusiasm and self confidence among teachers and pupils alike have increased, and the teacher feels that individual needs and individual attention are truly being realized.

While the program has proved to be very demanding on the teacher in a classroom of thirty pupils, the reward of seeing success replace failure more than compensates for the work involved.

The program has not been without any problems for the teacher in effectively dealing individually with a class of thirty pupils progressing at their own rate, but optional and supplementary exercises and games are gradually causing them to diminish and disappear.

We eagerly await the results of standardized or more formal measures of progress which I hope will take place in the spring.

Respectfully submitted,

James B. Smith

James B. Smith, Principal
Reynolds Elementary School

4/25/69

JACKSON PUBLIC SCHOOLS

Jackson, Mississippi

April 22, 1969

AN EVALUATION OF THE SULLIVAN REMEDIAL READING PROGRAM

General Objectives:

1. To locate the reading levels of individual students in order that they may be instructed on their particular levels.

2. To aid the students in gaining proficiency in reading through the study of phonics, word recognition, words in context.

Content: The Sullivan program contains placement examinations, progress tests, programmed workbooks, correlated readers, and instructor's manual.

Activities: Various activities include oral exercises in phonics, word games, storytelling.

Achievements: This program has taught phonetic sounds, students have learned to attack new words and spelling has been improved.

Other Noteworthy Items: We consider this program to be excellent because it catches the student at his level and helps him to develop from that point. Many programs previously used have made no provision for those not ready to read. These materials begin with readiness without which a large number would not have had any help at all.

Recommendations

We recommend that each English teacher would have the aforementioned materials, tapes and recordings to use with all classes containing problem readers.

Programmed material of this nature involving the science and social studies contents would be quite helpful also.

Submitted by: Emmitt Hayes

Principal
Blackburn Junior High

EVALUATION OF THE SULLIVAN READING PROGRAM

JIM HILL HIGH SCHOOL

Response to the Sullivan Reading Program has been good at Jim Hill High school. Three classes are being conducted two days a week, and all three classes are moving full speed ahead. This is a clear indication that the program can benefit students in high school.

Because of certain complexities of scheduling many of our more needed students were not able to participate which will affect the over-all progress in terms of testing for advancement in reading levels.

The BRL program, by far, is one of the most individualized reading program we have ever experienced and we are looking forward to an expansion of the program and certainly to get an earlier start next school session. The follow-upness in the program with training sessions has been quite helpful to the teachers involved.

There definitely is a renewed interest on the part of participating students in reading.

Luther J. Marshall

Luther J. Marshall, Principal

April 22, 1969

P. O. Box 265
Clinton, Mississippi
May 2, 1969

Mr. Amos W. Wright
Director of Title III, Central City Project
Jackson Public Schools
P. O. Box 2338
Jackson, Mississippi 39205

Dear Mr. Wright:

From the time that you and your staff expressed an interest in the BRL Sullivan's remedial reading materials, I have conducted four workshops and made several visits to individual classrooms within the schools using these materials.

At the outset all of your professional personnel have expressed a genuine interest in the BRL programmed linguistic reading materials. The workshops have been conducted in an informal manner with emphasis on the structure, implementation, and utilization of the reading materials. The classroom visits have been and are being done for the benefit of answering special and specific questions pertaining to the utilization of these materials in each classroom.

Based on the workshops, classroom visitations, principals' comments, and the director's and assistant director's statements and comments, I feel that the BRL Sullivan's programmed linguistic reading materials are being utilized quite effectively. All personnel are interested in the program, working hard with the materials, and are noticeably enthusiastic. The students are elated as they work in their books, since there is a built-in motivational factor within the materials. Teachers say that children look forward to their reading period with great anticipation. Some common expressions by children are: "I like this book, I don't want to stop." "Can't we work longer."

Without any doubt interest and enthusiasm is very high among professional personnel and students. This phase of the Central City project, in my estimation, is very effective toward occupational independence.

Very truly,

Swinton Hill

Swinton Hill

B R L EVALUATION

My evaluation of B R L materials is somewhat limited as well as being primarily subjective.

A visit to the Vicksburg Public Schools and Jackson schools revealed the following advantages of the program:

A. There seems to be a definite high motivation factor with these materials for all pupils without exception, who appeared to be interested in what they were doing.

B. The material is individualized for instruction in that each pupil works at his own rate of speed.

C. The vocabulary of the program is not as formal as is true in the traditional mathematics series.

D. The materials seem to be at their best for usage in the elementary division rather than for junior and senior high. This may be due to difficulty in proper placement of pupils within booklets in the program as well as insufficient interest of secondary teachers where the materials were used.

E. There is an ease in administering tests for placement of pupils.

If there are disadvantages in using the material they would seem to be in the following areas:

A. The unusual demands made upon the teachers in servicing pupils for testing in booklets.

B. The limitations of materials available in certain levels.

C. There may be some rote learning procedures developed unless the teacher is very much aware of each pupil's ability. In other words, this material would not be used at its best with disinterested teachers.

It is my opinion that a carefully written evaluation should be made with pre and post-testing with standard material in modern mathematics to insure adequacy of these materials as a program of developmental reading.

One can easily get excited about B R L Mathematics because I observed that pupils have an interest that they did not have before and the individualized aspect insures accomplishments throughout. It is the degree of accomplishment that I believe needs careful evaluation.

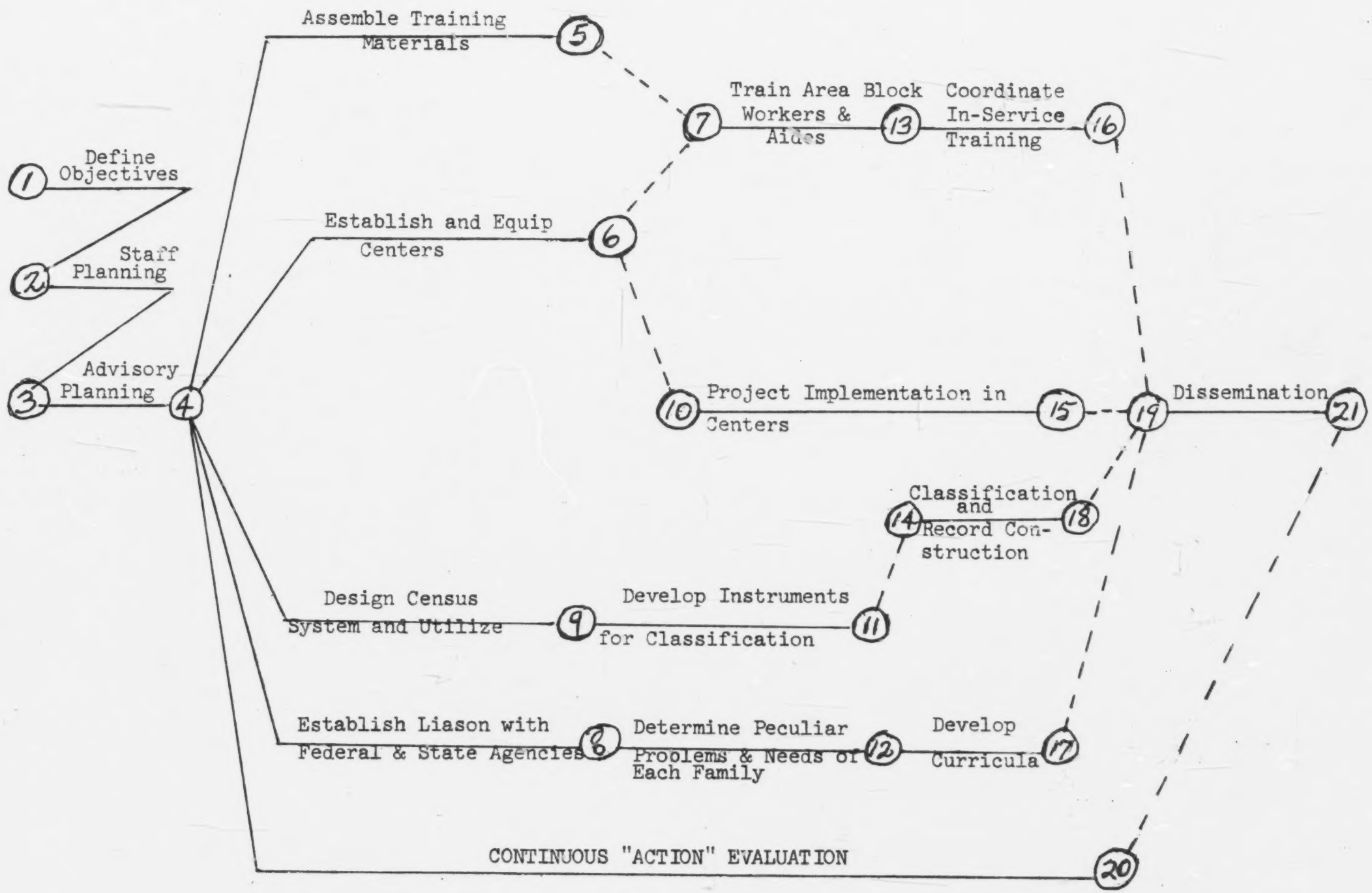
As a summary statement it is my opinion that this material has merit and bears further investigation and evaluation.

R. B. Layton
Director of Curriculum
Jackson Public Schools
May 1, 1969

A P P E N D I X

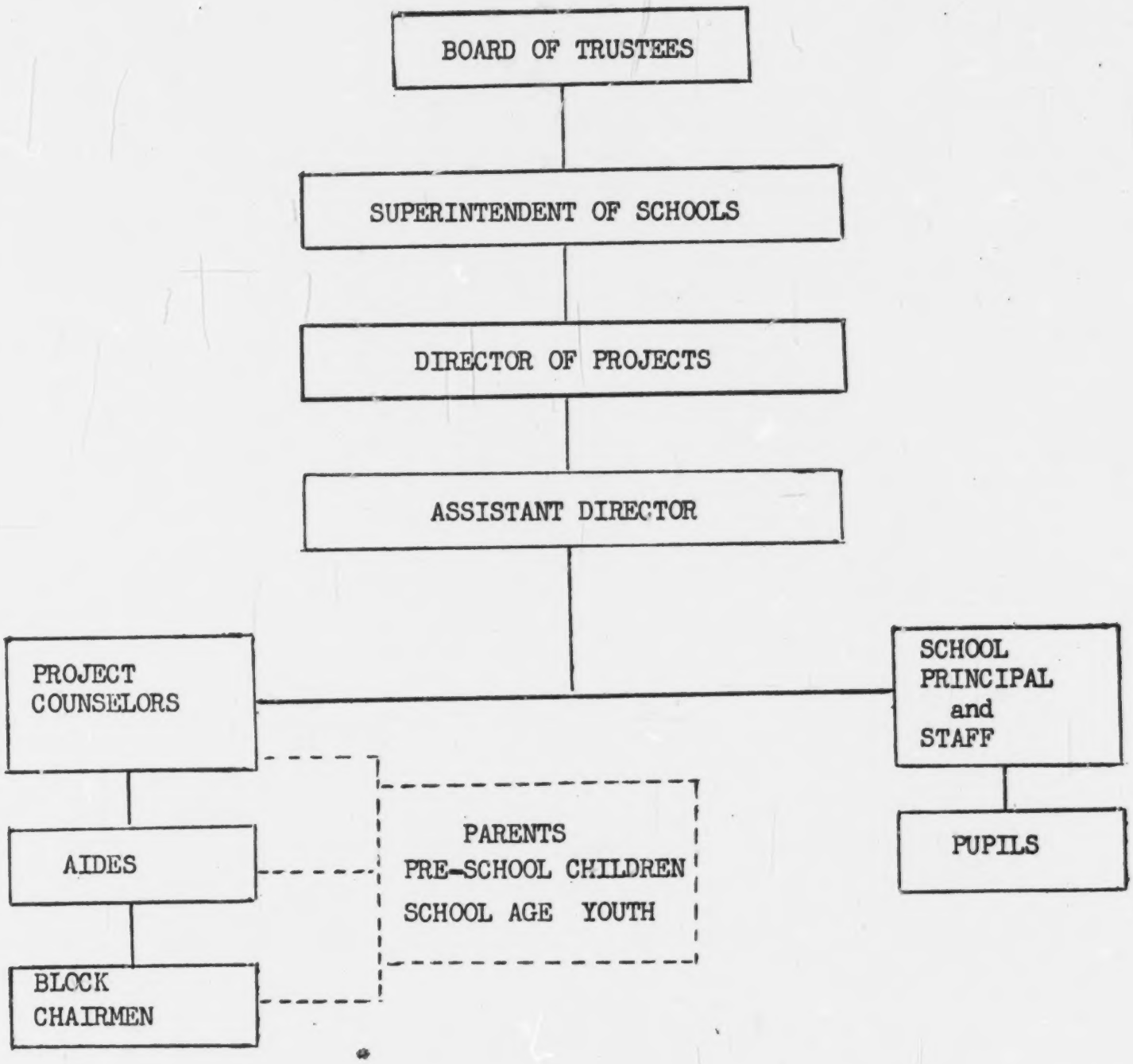
P. E. R. T. CHART

Following is a diagram outlining a technique for determining chronologically the step-by-step progress the Central City Project is making toward the accomplishment of its major objectives. Called P. E. R. T., an abbreviation for Program Evaluation Review Technique, the chart provides the staff and any professional visitor with a comprehensive design of the activities of the project.


1 Define Objectives
2 Staff Planning
3 Advisory Planning
4
5 Assemble Training Materials
6 Establish and Equip Centers
7 Train Area Block Workers & Aides
13 Coordinate In-Service Training
16
10 Project Implementation in Centers
15
19
Dissemination
21
14 Classification and Record Construction
18
9 Design Census System and Utilize
11 Develop Instruments for Classification
8 Establish Liason with Federal & State Agencies
12 Determine Peculiar Problems & Needs of Each Family
17 Develop Curricula
20 CONTINUOUS "ACTION" EVALUATION

JACKSON PUBLIC SCHOOLS
Jackson, Mississippi

ORGANIZATION CHART
TITLE III - CENTRAL CITY PROJECT



JACKSON PUBLIC SCHOOLS
TITLE III, ESEA - CENTRAL CITY PROJECT CENSUS
1968-69 Session

TRACK_____
AREA_____

HEAD OF HOUSEHOLD:
Name_____ _____ _____ 1 Male_____ 2 Female_____
Last First Middle
Street Address_____
Date of Birth _____ _____ _____ Social Security Number_____
Month Day Year
Highest grade completed _____Last school attended_____
Presently employed: 1 Yes _____ 2 No _____
Martial Status_____ _____ _____
1 Single 2 Married 3 Divorced

_____ 1 inside city
_____ 2 outside city
_____ 3 out of state

Relation to children

_____ 1 Father
_____ 2 Mother
_____ 3 Relative
_____ 4 Friend
Welfare
_____ 5 Guardian
Legal
_____ 6 Guardian
_____ 7 Other

SECOND ADULT:
Name_____ _____ _____ 1 Male_____ 2 Female_____
Last First Middle
Date of Birth _____ _____ _____ Social Security Number_____
Month Day Year
Highest grade completed_____Last school attended_____
Presently employed: 1 Yes_____ 2 No _____

_____ 1 inside city
_____ 2 outside city
_____ 3 out of state

Relation to Family Head

_____ 1 Husband
_____ 2 Wife
_____ 3 Son
_____ 4 Daughter
_____ 5 Brother
_____ 6 Sister
_____ 7 Other

FIRST CHILD:
Name_____ _____ _____ 1 Male_____ 2 Female_____
Last First Middle
Date of Birth _____ _____ _____
Month Day Year
Pronounced Physical Defect or Subnormal Health Condition_____
If Other
Explain_____

School Attending Grade
____ 1 Pre-school ____
____ 2 Parochial ____
____ 3 Blackburn ____
____ 4 Hill ____
____ 5 Isable ____
____ 6 Martin ____
____ 7 Reynolds ____
____ 8 None

SECOND CHILD:
Name_____ _____ _____ 1 Male_____ 2 Female_____
Last First Middle
Date of Birth _____ _____ _____
Month Day Year
Pronounced Physical Defect or Subnormal Health Condition_____
If Other
Explain_____

School Attending Grade
____ 1 Pre-school ____
____ 2 Parochial ____
____ 3 Blackburn ____
____ 4 Hill ____
____ 5 Isable ____
____ 6 Martin ____
____ 7 Reynolds ____
____ 8 None

Code for Physical Defects or Subnormal Conditions of Health

0 - None
1 - Underweight
2 - Overweight
3 - Crippled limb
4 - Bad teeth
5 - Poor eyesight
6 - Defective hearing
7 - Defective speech
8 - Low mentality
9 - Other

J A C K S O N P U B L I C S C H O O L S
J A C K S O N, M I S S I S S I P P I

BLOCK CHAIRMAN'S DAILY WORK SHEET -- CENTRAL CITY PROJECT, TITLE III

NAME OF ADULT CONTACTED _____ ADDRESS _____ TELEPHONE _____

HIGHEST GRADE COMPLETED _____ _____ _____
Elementary High School College

SPECIAL SKILL(S) _____ EMPLOYED _____ UNEMPLOYED _____

NUMBER OF CHILDREN ATTENDING SCHOOL _____ GIRLS _____ BOYS _____

LIST GRADES OF CHILDREN _____ NO. OF PRESCHOOL AGE CHILDREN _____

NAME OF SCHOOL CHILDREN ATTEND _____ IF MORE THAN ONE AND DO NOT ATTEND THE SAME SCHOOL

ENTER NAME OF SCHOOL ON THIS LINE _____

CHURCH AFFILIATION (ADULTS ONLY) _____

CHECK ACTIVITY IN WHICH ADULT IS INTERESTED: (1) Family Education _____ (2) Flower Arranging _____

(3) Crafts: (Sewing, Knitting, Drapery, etc.) _____ (4) Mosaic _____

(5) Others _____ _____ _____

WHAT DO YOU FEEL IS NEEDED MOST IN YOUR COMMUNITY TO HELP YOU AND YOUR FAMILY EDUCATIONALLY? _____

_____

HOURS AVAILABLE FOR ADULT(S) TO VISIT THE STOREFRONT ACTIVITIES _____ CHILDREN _____

DATE: _____ BLOCK CHAIRMAN _____
Signature

NAME OF STREET SERVICED _____

10/18/68-2000

JACKSON PUBLIC SCHOOLS
Jackson, Mississippi

ESEA TITLE III - CENTRAL CITY PROJECT

BLOCK CHAIRMAN'S RECORD SHEET OF DAILY COMMUNITY CONTACTS

NAME OF CENTER _____ DATE _____

NAME (PERSON CONTACTED _____

STREET ADDRESS _____ TELEPHONE _____

HAS THIS PERSON BEEN CONTACTED BEFORE? YES _____ NO _____

REMARKS _____

_____

NAME (PERSON CONTACTED) _____

STREET ADDRESS _____ TELEPHONE _____

HAS THIS PERSON BEEN CONTACTED BEFORE? YES _____ NO _____

REMARKS _____

_____

NAME (PERSON CONTACTED) _____

STREET ADDRESS _____ TELEPHONE _____

HAS THIS PERSON BEEN CONTACTED BEFORE? YES _____ NO _____

REMARKS _____

_____

NAME (PERSON CONTACTED) _____

STREET ADDRESS _____ TELEPHONE _____

HAS THIS PERSON BEEN CONTACTED BEFORE? YES _____ NO _____

REMARKS _____

_____

4/21/69-2000

JACKSON PUBLIC SCHOOLS
Jackson, Mississippi

ESEA TITLE III - CENTRAL CITY PROJECT

DAILY ATTENDANCE REPORT FORM Month_____

Date	Children	Adults	Date	Children	Adults

2-28-69/100

JACKSON PUBLIC SCHOOLS
Jackson, Mississippi

ESEA TITLE III - CENTRAL CITY

Sullivan's Reading Readiness Program

(Schedule of Classes)	(B R L)	
Blackburn:	Grade 7	8:30 - 9:25
	Grade 8	2:19 - 3:15
	Grade 9	2:19 - 3:15
Hill (Tuesday & Thuraday)	1st Period	8:30 - 9:25
	5th Period	1:17 - 2:17
	6th Period	2:17 - 3:15
Isable	Grade 4 Tuesday, Wednesday & Thursday	10:30 -11:30
	Grade 5 & 6 (Daily)	9:00 - 9:45
Martin	Grade 4 - Monday, Wednesday Friday	10:00 -10:30
	Grade 5 & 6 " "	9:00 - 9:40
	Grade 5 " "	1:40 - 2:20
	Grade 6 " "	1:40 - 2:20
Reynolds	Grade 4	9:30 - 10:20
	Grade 5	1:00 - 1:50
	Grade 6	1:30 - 2:15

Signed: A. W. Wright
Director of Title III
Central City Project

Revised: 3/31/69

NEWS OF TITLE 7 ESEA CENTRAL CITY PROJECT

JACKSON PUBLIC SCHOOLS
Jackson Mississippi

NO. 1 JACKSON, MISSISSIPPI DECEMBER, 1968

During First Six Months

CENTRAL CITY SHOWS PROGRESS

SUBSYSTEM'S OFFICIAL BEGINNING

Although several months transpired between the first written proposal and its final approval, Jackson Public Schools "Central City," a Title III, ESEA Project, began operating officially on July 15, 1968. Developing a program entitled "Teaching and Learning for Occupational Independence," this subsystem of Jackson Public Schools includes Reynolds, Martin, and Isable elementary schools; Blackburn Junior High School and Hill Senior High School.

BRIEF PURPOSE OF PROJECT

One of the most serious needs of the econonomically deprived child is generally recognized as being a more desirable home background with sufficient parental encouragement to motivate more interest in academic success. To devise and develop, in a setting away from the school, a program involving activities that will lead toward the fulfillment of this need is the major purpose of the project.

The original proposal stipulated storefront museums to serve as community centers, where arts and crafts developed by community patrons could be displayed to the public through plate-glass windows. With no such buildings being available, other facilities different in structure had to serve the purpose. Consequently, there are four centers in operation with displays that must be viewed from the inside.

TRAINING PERSONNEL

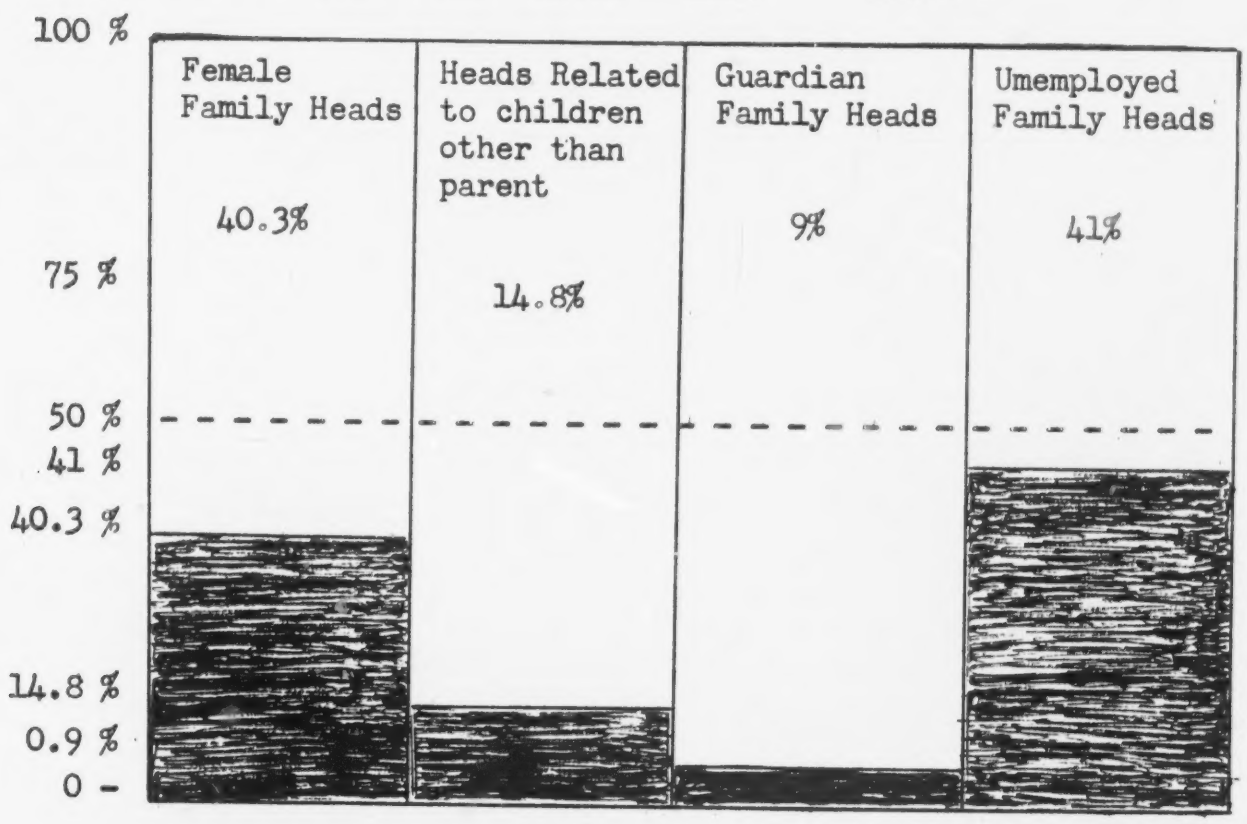
A few days before the beginning date of the project, the person appointed to serve as assistant director, along with two classroom teachers, responded to an invitation and enrolled in a six week NDEA Institute on "Inner City Studies" at Northeastern Illinois State College. During the month of October the director of the project, the assistant superintendent in charge of educational administration, one of the four project counselors, one elementary school principal, and a parent of the subsystem attended a three-day workshop in Detroit, Michigan, studying inner-city programs and problems.

As the program progresses and new phases requiring additional training of personnel are introduced, workshops and discussions for staff orientation are planned accordingly. On Tuesday, October 22, a group including the director of curriculum, project director, supervisor, counselors, and reading supervisors motored to Vicksburg, Mississippi, to observe the Sullivan's Behavioral Research Laboratory program in operation at Jefferson Junior High School and Bowman Elementary School. The group was favorably impressed, and upon the strength of its recommendation, Central City was granted administrative approval to use the program for family education and remedial reading instruction in elementary and secondary schools.

At the beginning of the program, a survey was made of 1224 homes in the Central City area, and the following information was obtained: the number of families headed by females, 594; families headed by relatives other than parents of children, 383; school age children not enrolled in school, 222; and the number of children with subnormal health conditions, 8. This was done to learn something about the characteristics of the neighborhood and to discover the most serious educational needs, which Central City might seek to correct. The graph below pictures the same information in percents:

Out of the first community effort developed an interest in sewing as well as other arts and crafts requiring or involving needle work. Until the centers can be equipped with sewing machines, project counselors and women of the community are lending the use of theirs. It is amazing to see the variety, quantity, and quality of items that have been produced thus far. To name a few, they include: dresses, aprons, sofa cushions, stuffed animals, place mats, curtains, pot holders, and a variety of other items classified under arts and crafts. One mother is in the process of refinishing and reupholstering a set of chairs under the instruction of a professional upholsterer who lives in the community.

TOTAL HOMES SURVEY - 1224 GRAPH I



VARIETY OF ACTIVITIES

The first activity that involved the participation of neighborhood women was to decorate the interior of the buildings obtained for project use. The way they came—some upon invitation and others out of curiosity— and the cooperative spirit they exhibited certainly boosted the morale of the center personnel. Fortunately, among them was one skilled in the art of curtain and drapery making, who volunteered her time to teach others eager to learn and help as they made and hung the curtains for the centers.

ACTIVITIES INVOLVING CHILDREN

As the mothers come to the centers to pursue their interests in sewing and crafts, some bring their preschool age children, who are supervised and taught by the teacher aides. With from one to three years of college training, these aides are rendering a much needed service to the community while they make the necessary financial preparations for resuming their own college training at a later date. Presently they are using whatever materials they can

collect and make themselves. They are also borrowing from the schools nearest them record players and filmstrip projectors to help enhance the pre-school program. Perhaps early in January, 1969, the BRL program will be available for use, and the aides will be provided sufficient orientation for using the readiness phase of this program.

After school hours, children of elementary grades come to the centers to study under the supervision of counselors and teacher aides, who provide whatever assistant they can. As the project progresses, plans are under development for the involvement of more school age children in an out-of-school setting. Through a cooperative effort with the Neighborhood Youth Corps, 37 secondary students in the Central City area are receiving financial assistance for serving as various types of aides at school.

PLANS FOR THE IMMEDIATE FUTURE

An important step toward meeting one of the project's major objectives, family education, will be initiated with the introduction of Sullivan's BRL program early in January, 1969. This program will be used in each school of the subsystem, as it is highly recommended for continuing reading instruction in high school. In elementary schools it will serve for both developmental and remedial reading instruction. The readiness and the "Why Work" series of the program will be used in the four centers with pre-school age children and adults respectively.

FAVORABLE IMPRESSION

Open house at the Booker Street Center, the first to be activated, was so successful as to attract considerable attention in the general locality of the Central City area. Upon invitation the Jackson Clarion Ledger ran a feature article on the project in one of its Sunday editions, devoting approximately 50 column inches, including pictures, to the story.

The first quarterly evaluation report by ADAPS Corporation, dated October 14, 1968, is quite favorable and is on file at the centers and the Central Office. Highly significant in the report is the "Pert Chart" which is a suggested guide for developing the project. The report also compliments the deep insights of Dr. Walker, Dr. Kirshman, Mr. Layton and others closely connected with the project.

Apparently impressed with the project and its potentials for contributing to some of the needs of the community, a Jackson State College professor, a social worker of the State Welfare Department, and the directors of adult education and driver education of the city system, all would like to cooperate with Central City with some adaptable phase of their programs.

NEWS OF TITLE 7 ESEA

CENTRAL CITY PROJECT

JACKSON PUBLIC SCHOOLS
Jackson Mississippi

NO. 2 JACKSON, MISSISSIPPI MARCH, 1969

CENTRAL CITY ATTRACTS ATTENTION AND VISITORS

The Evaluation Committee appointed by the State Department of Education to appraise the ESEA Title III Projects in the state made its first official visit to the Central City project early in January.

Headed by W. O. Best, state coordinator ESEA Title III and composed of a cross section of educators from over the state, the committee included: James M. Marble, assistant state coordinator; Mrs. Tommie Lou Rigdon, speech pathologist, Meridian; Dr.Eric Gunn, chairman, Department of Curriculum and Instruction, University of Southern Mississippi; Edwin Mullen, principal, Johnson Elementary School, Jackson; Sister Mary Joel RSM, teacher, St. John's High School, Gulfport; T.L. Reeves, superintendent, Long Beach; Dr. Elaine Witty, professor of education, Jackson State College; Miss Mary Love, director, Mississippi Library Commission, Dr. Merrill Hawkins, assistant dean, Mississippi State University; L. O.Atkins, superintendent, Forest; and James E. Brannigan, Central City's American Development Corporation consultant, Boca Raton, Florida.

Following the visit to the project's four community centers, commonly referred to as "storefronts," the committee met in conference with Dr. H. S. Kirshman, assistant superintendent educational administration, Jackson, and the project directors Amos W. Wright and M. C. Wiggins. Apparently surprised at the progress attained, the committee voiced the consensus of a favorable impression over the project's accomplishments and potentials.

Another group of school persons,connected with the Inter-Institutional Cooperative Program for College and Public School Teachers for Disadvantaged Pupils also visited the project in January. The identity of this special group and their institutions of employment are Mrs. Lois Breland, University of Southern Mississippi; Dr. Donald Locke, counselor Mississippi State University; James Jones, Tougaloo College; Luther Marshall, principal, Jackson; Mrs. Hazel T. Jones,counselor, Jackson.

ADVISORY COUNCIL

Convening in the first meeting of the year on January 28, the Advisory Council gave its stamp of approval to the selectees for the recently formed School-Business-Labor Committee, who have accepted the responsibility of giving consultation and advice in regard to employment opportunities for youths in the project area. The identity of the new group and the Advisory Council is as follows:

- **Mendell M. Davis**, Executive Vice President, Jackson Chamber of Commerce
- **Jim Fitzgerald, Jr.**, Director of Personnel, Vickers - Sperry Rand Corporation
- **Mrs. Emily Hall**, Jackson State College
- **Herman Hines**, Deposit Guaranty National Bank
- **Vern Lang**, Personnel Director, Presto
- **Henry L. Martin**, Mississippi Employment Commission

SCHOOL-BUSINESS-LABOR CONTINUED.

- Mrs. C. C. Mosley, Mosley Enterprises
- Fred Nolan, Director of Jackson Urban League
- Paul Pybos, American Can Company
- C. B. Rutledge, Mississippi Products Industries
- Leland Smith, Zinsco Electrical Product
- W. O. Stanley, Communication Workers of America
- Mrs. Lottie Thornton, Assistant Professor of Education, Jackson State College
- Dr. Elaine Witty, Head of Department of Teacher Education and Field Services, Jackson State College

The Advisory Council Members are:

Mrs. Barbara Barber	Mrs. Esther Marshall
Mrs. Willie Bell Berry	Mrs. Lois Moncure
Otis Chambers	Mrs. Ezzie Randall
Mrs. Lucy B. Davis	Bennie Richard
Mrs. Doris Hall	Mrs. John Varnado
Mrs. Mayne Higgins	Mrs. Itmia Walls
Mrs. Mable Latham	Mrs. Evelyn Washington
Mrs. Bessie Lewis	Mrs. Barbara Williams
Mrs. Floree Lewis	

A highly important and interesting item on the agenda of the Advisory Council's January meeting was a demonstration on the use of Dr. Sullivan's Behavioral Research Laboratories Program with preschool age children. Miss Gloria Mason, the teacher aide at the Lynch Street Center, conducted the demonstration class of several 3, 4, and 5 year old boys and girls, who had been exposed to but three weeks of instruction prior to the meeting.

Various members of the Board, seeing this program in operation for the first time, praised the teacher and expressed amazement at the enthusiasm with which the children responded.

Mrs. Sarah Lang, one of the counselors at the Booker Street Center, explained the program for adults giving the details of the various scheduled activities that claim their interests and described the vast variety of items produced under handicrafts. In support of her explanations, there was on display an exhibit showing a variety of items from all four centers.

EVALUATION WORKSHOP

The project directors attended a two-day workshop on evaluation under the supervision of W. O. Best, state coordinator of Title III projects, with Dr. Edward G. Barnes, Southeastern Educational Laboratories serving as chief consultant. How to express objectives in a way as to point out the desirable behavioral changes or outcomes, how to appraise the extent to which desirable outcomes have been attained, and the major points to be considered in culminating the first year of the project were the major topics of discussion.

Representatives of Title III projects from over the state were the participants in this the second such workshop during this session.

MATERIALS ARRIVE

At the beginning of the project, materials to be used in the program for adults were furnished by the women themselves, and some were solicited from several local firms. During January some of those items that had been approved by the Board for bids began pouring in.

With a good supply of materials on hand to be used with various kinds of handicrafts, adult interest and participation were enhanced and it became necessary to plan a schedule of activities to obtain optimum use. Following is a suggested schedule of activities developed by the project counselors.

Embroidery	3 - 4 Weeks
Decoupage	3 - 4 Weeks
Basket Making	3 - 4 Weeks
Mosaics	4 - 6 Weeks
Cryst-L-Craze	1 - 2 Weeks
Dressmaking	12 - Weeks
Drapery	4 - 6 Weeks
Upholstery	6 - 8 Weeks
Miscellaneous Sewing	2 - 3 Weeks
Carpet Burlap	3 - 4 Weeks

Continue on Page 3

Scheduled Activities Continued.

Candle Making	1 - Week
Molding Plaster	1 - 2 Weeks
Antiquing	2 - 3 Weeks
Slapstick Activities	4 - Weeks
Leathercraft	1 - 2 Weeks
Weaving	1 - 2 Weeks
Tray Group Pak	1 - Week
Cork Animals	
Tiki Medallion	1 - 2 Weeks
Flower Arranging	1 - 2 Weeks

PROJECT AIDES EMPLOYED

A step toward meeting one of the major objectives of the project was taken when two professionals of the community, persons with salable skills and referred to as project aides, were employed to teach their skills to others in the community.

Steven Tyner, a professional upholsterer, is teaching a class of adults in the mornings and a class of high school students in the evenings at the Martin Center. At one of the Booker Street centers, Mrs. House is teaching dressmaking and sewing to a class of women. Within a few days project aides will be employed at the other centers.

CENTRAL CITY MAKES IMPACT ON PTA GROUP

Showing how many useful household items can be made from "throw aways" that are common accumulations in every home, Central City counselors staged displays at PTA meetings at Isable Elementary School and Walton Elementary School. Included in the exhibit were such items as umbrella holders and cannister sets fashioned from coffee cans covered with burlap, rugs, purses and matching hats, aprons, samples of decoupage art, and many other attractive articles.

The PTA group at Walton, which is not one of the project area schools, expressed amazement at the quality and quantity of products of Central City and commended the counselors for the caliber of work being done.

SULLIVAN'S REMEDIAL READING PROGRAM

The Sullivan's Behavioral Laboratories Program, a well developed plan for programmed instruction in remedial reading, was put into operation early in January as a step toward accomplishing one of the major goals of the project.

Under the supervision of Dr. Swinton Hill of Mississippi College, who is the BRL consultant in this area, the staff of the project and the teachers of the project area schools who are working with the program were given the necessary training for teaching children the BRL way. Following the orientation workshops for teachers, the school age children selected for the program were tested to determine their reading levels and establish a basis for measuring progress with future testing. The schools and the number of pupils being accommodated in each are as follows:

Blackburn Junior High, 90, grades 7,8,9
Hill High School, 60, grades 10 and 11
Isable, 180, grades 4, 5, 6
Martin, 55, grades 4, 5, 6
Reynolds, 180, grades 4, 5, 6

Although this program has built-in designs for teaching reading on all grade levels from preschool through the eleventh grade, the first to be used was the preschool program in the project centers. At this stage the complete program has been inaugurated, and each project area school, including the secondary schools, is serving a limited number of students.

At the Martin Elementary School, a group of slow first graders who had hardly exhibited any favorable response in their regular classes, are being taught each day with Sullivan's readiness program. It was amazing to note the favorable responses these children were making within but a two-week period. Several who were completely negative before are now responding to questions and are learning right from left, up and down, various colors, and many other readiness concepts entailed in the program.

Those who observe the program in operation in the project area schools are immediately impressed with the enthusiasm of the pupils, which stems from being able to experience success, because each is working at his own level of ability.

General comments from teachers include: "We love the program." "We have long needed a program of this type." "It keeps me moving through the entire period, but it is so rewarding." Generally pupils ask to keep going beyond the allotted time. This program also has a phase for adults, which will be started in the near future.

EXPANDING SERVICES

With limited facilities and materials the project can serve only a limited number of persons, but plans for extending services wherever possible are being studied. Specifically, approval is being sought for the purchase of additional units of the BRL program so remedial reading instruction can be extended to more pupils. This would be done by using funds that were originally budgeted for other, but less important services.

Project Attendance - The chart that follows shows the average daily attendance of children and adults for the first several months of this school year.

NUMBER OF ADULTS AND CHILDREN SERVED MONTHLY AND AVERAGE DAILY ATTENDANCE AT COMMUNITY CENTERS, SEPTEMBER, 1968 - FEBRUARY, 1969

	Number of Persons Served Monthly			Average Daily Attendance		
Month	Adults	Children	Total	Adults	Children	Total
September	Census Conducted	538	538	1.1	28.3	29.4
October	114	579	693	5.5	16.2	21.7
November	414	974	1388	5.9	14.0	19.9
December	242	792	1034	4.0	13.3	17.3
January	519	1172	1691	6.5	15.0	21.5
February	675	1399	2074	8.5	17.5	26.0
Total	1964	5454	7818	5.2	17.4	22.6

CENTRAL CITY'S PROGRAM FOR BOYS AND GIRLS ENROLLED IN SCHOOL

	Blackburn	Hill	Reynolds	Martin	Isable	Total
REMEDIAL READING PROGRAM	90	60	180	75	180	585
N Y C PROGRAM	20	20	-	-	-	-
TOTAL	110	80	180	75	180	625

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SCHOOL ENDEAVOR

Project Evaluation Committee Is Busy

Evaluation is the process of appraising by examining, judging, and estimating the relative value of, for example, an educational endeavor. Such has been undertaken recently in the Title III Central City Project of the Jackson Municipal Separate School District.

A committee under the direction of the State Department of Education examined the local project titled, "Teaching and Learning for Occupational Independence," directed by Amos W. Wright and assisted by Melvin C. Wiggins. This is one in a series of periodic evaluations of the 15-month project of a proposed three-year program involving about $666,000 of which $277,441 is budgeted for 1968-69.

Orienting the group, Wright pointed out that "Central City" is described in this project as an area of pronounced density of low income families served by a subsystem of schools encompassed by a radius of one and a half miles. Schools in this area are Blackburn Junior High School, Hill Senior High School, Isable, Martin, and Reynolds Elementary Schools.

"The general purpose of this project is to create within the framework of school environment a program designed to lead indigenous youths toward ultimate occupational independence as adults," Wright reviewed for the committee. Wiggins added that, in essence, the program is to get parents more involved in education.

The midweek agenda included introductions by W. O. Best, State Coordinator ESEA Title III; welcome by Dr. H. S. Kirshman, Assistant Superintendent, Educational Administration, Jackson Public Schools; explanation of project by director Wirght; questions and answers; visitation of storefronts at Booker, Lynch, and Reach comments.

In each center visited, the committee observed such activities as adults "busily engaged" in a variety of art crafts including sewing, knitting, and making other household items such as waste baskets, unbrella holders an cannister sets utilizing coffee cans, sofa pillows, wall plaques, bulletin boards, tote bags (purses), flowers, and aprons with burlap.

Teacher aides were instructing preschoolers using Sullivan BRL Readiness Program.

It was noted that several extremely retarded children were involved in meaningful learning experiences. "These children are too retarded to participate in regular classroom activities or special education classes," Wiggins pointed out.

Wright commented that actually by getting parents involved the projects reach children who are in need of educational opportunities not available in a regular program of instruction in the classroom. Interest is created on the part of parents in what their children are involved in school curriculum.

Others involved in the evaluation activity included: Mrs. Tommie Lou Rigdon, speech pathologist, Meridian; Dr. Eric Gunn, Chairman, Department of Curriculum and Instruction, University of Southern Mississippi; Dr. J. E. Brannigan, American Development Corporation, Boca Raton, Florida; Edwin Mullen, Principal, Mary E. Johnson Elementary School, Jackson; James M. Marble, Assistant State Coordinator, ESEA Title III; Sister Mary Joel RSM, teacher, St. John's High School, Gulfport; T. L. Reeves, Superintendent, Long Beach; Dr. Elaine Witty, Professor of Education, Jackson State College; Miss Mary Love, Director, Mississippi Library Commission; Dr. Merrill Hawkin, Assistant Dean, College of Education, Mississippi State University; and L. O. Atkins, Superintendent, Forest.

Wright and Wiggins commented that the committee was "favorably impressed" with the local project. "A written report from the committee, as soon as formulated, will be submitted to the State Department of Education," Wright concluded.

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JACKSON CLARION LEDGER
APRIL 10, 1969

Central City Youth Helped

In a progress report to the board of trustees of the Jackson Public Schools covering six months of the $277,441 Title III ESEA Central City Project director, commented, "The project is showing favorable progress as evidenced by additional staff members, more instructional materials, and expanded services.

"The general purpose of this projects is to create within the framework of school environment—Blackburn Junior High School, Hill Senior School, Isable, Martin, and Reynolds Elementary Schools—a program designed to lead youth toward ultimate occupational independence as adults," Wright noted.

Wright said that one of the most encouraging aspects of the program is to see the remedial reading programs in operation in the project schools and the readiness phase of this program at work with pre-school children in the community centers.

"With more materials available, adult attendance at the centers has increased considerably. In fact, capacity for adult participation in the mornings has almost reached capacity. Expanded plans for afternoon and evening participation are being studied," commented Wright.

Wright pointed out that two projects aids have been employed to teach upholstery and sewing to adults and youths in the project communities.

"Looking toward evaluating the project after the first year's operation," Wright continued, the project directors attended two workshops on evaluation at Columbia and Jackson."

Of a recent visit by the state evaluation Committee, Wright said: "Composed of both teachers and administrators from over the state, the committee appeared to be impressed favorably with what they saw."

PRESCHOOL AID FOR HANDICAPPED SOUGHT BY BOARD

A proposal to apply to the Mississippi State Department of Education for $24,000 in Title III ESEA funds to plan a preschool program for handicapped children in the Central City area of Jackson during the 1969-70 school year was authorized by the board of trustees of the local school system on Monday.

According to Amos Wright, director of the Central City Project, the objectives of the planning grant are: to identify children of preschool age who posses any avident handicap to normal growth, physically or psychologically; to provide preprimary programs for these children and their parents; to provide a plan of operation that will fit into designs of Central City's program; 2nd to plan and develop a program for the handicapped that provides for interagency and local business and industrial participation.

"If the planning project is funded then each child identified will be given a physical examination and a psychological test. The American Development and Program Assistant Corporation services are available with qualified specialists to aid in such a planning grant," Wright concluded.

Forge Educational Magnet In Central Cities Project

By BILLY SKELTON
Clarion-Ledger Staff Writer

A formidable objective has been set for a project in a subsystem of the Jackson City Schools where an effort is being made not only to close the generation gap but to narrow the gap between school and home.

Undertaken under Title III of the Elementary and Secondary Education Act, the Central City Project is entitled "Teaching and Learning for Occupational Independence."

"The crux of it," said Melvin Wiggins, associate director of Title III projects, "is to get parents more involved in education."

Working with families to increase the backing the children receive from home is "striking at the heart of it," added Amos W. Wright, project director.

The project is the only one of its kind in Mississippi and one of only 24 in the United States, the nearest being at New Orleans.

LAUNCHED IN AUGUST

Launched in August, it has been in operation on a community level for about six weeks.

It represents the beginning of a three-year program which will cost about $666,000 in Title III funds.

"The purpose of the project is to create within the framework of a school environment an occupational program designed to lead youths toward ultimate independence as adults," Wright said.

A major feature of this project is the "storefront" center, actually a workshop in the heart of the community where parents as well as pupils can meet in more of a social setting and engage in diversified educational activities.

"Storefront" is a Washington term which doesn't fit the three centers in Jackson, because efforts here to secure former stores (with front windows through which, presumably, the populace could view the activities within) were unsuccessful.

PUBLIC INVITED

The public is invited to visit the local centers located at 1531 Booker Street (two are located at this address,) 1320 Lynch Street and 555 South Roach St.

The center on Booker Street is a community center, the one on Lynch Street is a former residence and the one on South Roach Street is a portable classroom on the campus of Martin Elementary School.

A distinguished phase of these centers is that the parent may be engaged in activities at the same time a child is receiving instruction in the same center.

This is currently under way at the four centers where kindergarten pupils are being taught in one part of the building while a few feet away their mothers are engaged in crafts, sewing, weaving, painting and the making of such things as stuffed animals, pillows and wall mosaics.

Each center has a project counselor, block chairman and teacher aides.

"Central City" as a term applied to the project is described as an area of pronounced density of low income families. Schools in this area are Blackburn Junior High School, Hill High School and Isable, Martin and Reynolds Elementary Schools.

In the Martin district, for example, the per cent of poverty is placed at 94.5, based on the number of families having an annual income of less than $2,000.

This same school has a nonpromotion percentage of 10.

PARENT INTEREST

Parent interest and participation, sometimes lacking even in districts where middle and upper income families live, is sadly deficient in the poverty areas.

However, the new project indicates that luring the parents into the "storefronts" or community centers has been easier than previous efforts to get them to the school.

"You almost have to set it down in their laps," said Wright, which helps explain why the project was devised.

The school environment is moved into the social context of the community, and local citizens are given more opportunities to participate in the management of the facilities.

Project personnel, which total about 16 at this time, seem to be able to work with the local citizenry on a closer basis than has been accomplished in the traditional school setting.

The project counselors, being former teachers are able to preserve the academic link.

The centers are open from 8:30 a.m. to 5 p.m., with the kindergartens being in operation from 9 to 11 a.m.

After school hours, children who do not have suitable study opportunities at home may come to study with supervision and help.

MAY ADD ADULTS

Occupational training in the evening for both high school sudents and adults may be established later. Drapery making and wood working are two possibilities.

Another part of the program consists of the National Youth Corps activities in which about 25 students at each Hill and Blackburn Schools and about 15 at Central are paid for work at school — in the custodial department, luncheon and li

Still another element is family education with the emphasis on the reading skill and interest of parents, the reasoning being that if the parent reads the child will pick up the habit. It also is expected to stimulate the interest of parents in the school work of their children.

There will also be remedial reading training for pupils in all the grades.

Still another part of the program will be talks in which representatives of various occupational fields will explain to parents the employment opportunities toward which the youngsters might be steered.

Dr. Harry S. Kirshman, assistant superintendent for educational administration, believes parents in the project areas are more likely to come to the centers and talk to the counselors and thereby get an insight into the school program than they are to visit the schools. He thinks these visits will help the parents gain a better understanding of how they can help at home.

The community response so far has been good, he reported.

He said that community surveys on the educational attainment of parents and on the number of children in the family and in school are in the process of being made.

The parents also are being asked what they need to help their families educationally.

Project leaders are hopeful that the project will raise the aspirations of people in the poverty areas and convince them that they — and their children — can become wage earners.

JACKSON PUBLIC SCHOOLS
ESEA TITLE III - CENTRAL CITY PROJECT

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7/68

VT 013 744
REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER (MOSCOW, USSR, AUGUST 31-SEPTEMBER 11, 1970).

UNITED NATIONS ECONOMIC AND SOCIAL COUNCIL, NEW YORK, N.Y.
INTERNATIONAL LABOUR ORGANISATION, GENEVA (SWITZERLAND).
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DESCRIPTORS - *CONFERENCE REPORTS; DEMOGRAPHY; EMPLOYMENT PROBLEMS; MANPOWER UTILIZATION; *MANPOWER DEVELOPMENT; *WORLD PROBLEMS; WORLD AFFAIRS; POPULATION GROWTH; *DEVELOPING NATIONS; ECONOMIC DEVELOPMENT; RESEARCH NEEDS; LABOR FORCE; *INTERNATIONAL PROGRAMS; MEASUREMENT TECHNIQUES; MANPOWER NEEDS
IDENTIFIERS - UNITED NATIONS

ABSTRACT - FORTY-TWO PARTICIPANTS FROM AROUND THE WORLD ATTENDED A SEMINAR CONVENED BY THE UNITED NATIONS IN ACCORDANCE WITH A RESOLUTION OF THE ECONOMIC AND SOCIAL COUNCIL. THE OBJECTIVE OF THE SEMINAR WAS TO PROVIDE A FORUM FOR THE CONSIDERATION OF DEMOGRAPHIC ASPECTS OF EMPLOYMENT, UNEMPLOYMENT, AND UNDER EMPLOYMENT, WITH PARTICULAR REFERENCE TO PROBLEMS OF MEASUREMENT AND ANALYSIS. TOPICS DISCUSSED AT THE MOSCOW CONFERENCE INCLUDED: (1) DEVELOPMENT AND IMPROVEMENT OF THE DATA NEEDED FOR DEMOGRAPHIC ANALYSIS OF MANPOWER DEVELOPMENT, (2) DEMOGRAPHIC ANALYSIS OF MANPOWER DEVELOPMENT, (3) RELATIONSHIP BETWEEN POPULATION GROWTH AND GROWTH OF LABOR FORCE WITH PARTICULAR REFERENCE TO DEVELOPING COUNTRIES, (4) RELATIONSHIP BETWEEN POPULATION AND MANPOWER PROJECTIONS WITH PARTICULAR REFERENCE TO MANPOWER SUPPLY, AND (5) DEMOGRAPHIC RESEARCH NEEDED FOR MANPOWER PLANNING POLICY. A MAJOR RECOMMENDATION OF THE SEMINAR WAS THAT RESEARCH FACILITIES AT BOTH INTERREGIONAL AND REGIONAL LEVELS BE STRENGTHENED IN ORDER TO ASSIST DEVELOPING COUNTRIES IN THE APPLICATION OF DEMOGRAPHIC KNOWLEDGE ON MANPOWER PROBLEMS AND IN THE FORMULATION OF MANPOWER POLICIES AND PROGRAMS. (AUTHOR/JS)

VT 013 744

UNITED NATIONS
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Sixteenth session
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REPORT OF THE INTERREGIONAL SEMINAR ON DEMOGRAPHIC ASPECTS OF MANPOWER, HELD AT MOSCOW FROM 31 AUGUST TO 11 SEPTEMBER 1970

CONTENTS

		Paragraphs	Page
	Introduction	1 - 9	2
I.	Development and improvement of the data needed for demographic analysis of manpower development	10 - 14	4
II.	Demographic analysis of manpower development	15 - 38	6
	A. Factors affecting the size and composition of the labour force	15 - 28	6
	B. Factors affecting the structure of the labour force	29 - 34	10
	C. Manpower utilization	35 - 38	12
III.	Relationship between population growth and growth of labour force with particular reference to developing countries	39 - 53	14
IV.	Relationship between population and manpower projections, with particular reference to manpower supply	54 - 58	17
V.	Demographic research needed for manpower planning policy	59 - 69	20
VI.	General suggestions and recommendations	70 - 77	23

ANNEXES

I. List of participants
II. List of documents

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INTRODUCTION

1. The Interregional Seminar on Demographic Aspects of Manpower was held at Moscow from 31 August to 11 September 1970. It was organized, with the assistance of the Government of the Union of Soviet Socialist Republics, by the United Nations with the collaboration of the International Labour Organisation (ILO).

2. The Seminar was convened by the United Nations in accordance with resolution 1486 (XLVII) of the Economic and Social Council, endorsing the programme of the United Nations Population Commission for 1970-1971. The objective of the Seminar was to provide a forum for the consideration of demographic aspects of economically active population, employment, unemployment, and underemployment, with particular reference to problems of measurement and analysis and with a view to making recommendations on demographic aspects of manpower for future service to Member States. The Seminar was a continuation of the work being carried out by the United Nations, in co-operation with the ILO, on demographic data required for the study of manpower, methods of analysing such information and techniques for making projections.

3. Forty-two participants from countries in Africa, Asia and the Far East, Europe, Latin America, the Middle East and North America, as well as the Union of Soviet Socialist Republics took part in the Seminar. They served in their individual capacity as specialists. The meeting was also attended by representatives of the regional economic commissions, a regional demographic centre, FAO, WHO and of several intergovernmental and non-governmental organizations. The list of participants is given in annex I.

4. The Seminar considered a document prepared by the Secretariats of the United Nations and the ILO, entitled "Demographic analysis of manpower development with particular reference to developing countries" (ESA/P/SDAM/CP.2), and tabular material and charts prepared by the ILO. A number of papers were submitted by the experts of the Central Statistical Board of the Union of Soviet Socialist Republics and by country participants and participating organizations, being understood that the views expressed in the papers were those of the authors. A list of the documents presented at the Seminar is given in annex II.

5. The working languages of the Seminar were English and Russian.

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Opening of the Seminar

6. L. M. Volodarsky, First Deputy Director, Central Statistical Board, Union of Soviet Socialist Republics, acting as representative of the host Government, opened the Seminar. He stated the importance attached to the topics dealt with by the Seminar and expressed the spirit of co-operation that existed between his government, the United Nations and the International Labour Organisation in connexion with the work being carried on in the field of demographic aspects of manpower. M. Shumaev, the representative of the Union of Soviet Socialist Republics State Committee on International Economic Relations, delivered the greeting address. The Associate Director of the United Nations Fund for Population Activities and the Chief Statistician of the International Labour Office welcomed the participants on behalf of the United Nations and the International Labour Organisation, and expressed their appreciation for the generous support of the Government of the Soviet Union.

Agenda

7. The Seminar adopted the following agenda:

1. Election of officers
2. Adoption of the agenda (ESA/P/SDAM/CP.1)
3. Development and improvement of data needed for the demographic analysis of manpower
4. Demographic analysis of manpower development
5. Relationship between population growth and growth of labour force with particular reference to developing countries
6. Relationship between the population and manpower projections with particular reference to manpower supply
7. Demographic research needed for manpower policy
8. Research facilities needed to strengthen the application of demography and demographic knowledge to manpower problems
9. Other questions pertinent to demographic aspects of manpower

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10. Adoption of the report

11. Closing of the Seminar

Election of officers

8. The following officers were elected unanimously: Chairman, L. M. Volodarsky (Union of Soviet Socialist Republics); First Vice-Chairman, C. Arretz (Latin American Demographic Centre (CELADE)); Second Vice-Chairman, S. F. Mina (United Arab Republic); Rapporteur, S. P. Agarwal (India).

Adoption of report

9. The report of the Seminar was unanimously adopted at the closing session of the Seminar on 11 September 1970.

I. DEVELOPMENT AND IMPROVEMENT OF THE DATA NEEDED FOR DEMOGRAPHIC ANALYSIS OF MANPOWER DEVELOPMENT

10. The Seminar emphasized the necessity of developing and improving the data needed for demographic analysis of manpower development from the point of view of projecting the integrated system of social and demographic statistics. The Seminar recognized the importance of making full use of all appropriate sources of information for the analysis of the demographic and related economic, social and cultural aspects of the economic activities of the population. It was noted, however, that the availability of adequate data needed for the demographic analysis of manpower development varied considerably from country to country. It was also noted that seasonal variations of the economic activity of the population would necessitate all monthly or quarterly data being made available. Although remote from demographic analysis, data related to wage accounting and similar information at the enterprise and national level could throw some light on the complex mechanism of the economic activity of the population. In that connexion, great importance should be given to the study of levels of living of the population.

11. It was pointed out that the tabulation of the data relating to demographic aspects of manpower was as important as their collection, whether the data were

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obtained from general inquiries such as censuses, or from sample surveys. Too often, insufficient attention was paid in some countries, in the planning of surveys and even censuses, to the tabulation and analytical part of the undertaking, with the result that data were often collected but not processed and made available to the users in the form required by them. The importance of cross-tabulation of manpower characteristics with education characteristics and urban-rural residence was particularly stressed.

12. The Seminar showed considerable interest in the information on availability of relevant manpower statistics for the world and each continent according to the census statistics for 1955-1964 and international migration statistics.[1/] It was agreed that a similar tabular presentation based upon the population censuses to be taken around 1970 would be most useful not merely to show the availability of data in the current round of censuses but also for the study of the developments which had taken place in that regard in recent years. The hope was expressed that data on geographical and household characteristics, personal characteristics, characteristics of the economically active population and inactive population relevant to the study of manpower development would be obtained to the greatest extent possible by the developing countries in accordance with the international recommendations for the 1970 rounds of population censuses.

13. Considerable attention was paid to the problems of the definition and classification of unpaid family workers, and to the difficulties being encountered in many countries in the implementation of suitable definitions of unemployment and underemployment. The Seminar recognized that, in developing countries, underemployment was the major issue, rather than unemployment. The Seminar was informed that there was no need for defining unemployment in the Union of Soviet Socialist Republics and other CMEA countries, because there was no unemployment in those countries.

1/ Presented in document ESA/P/SDAM/CP.2, annex 3, on percentages from the tabulations available from national sources computed on the 1964 estimated population of the world and each continent, as well as percentages of the tabulation of international migration computed on the 1967 estimates.

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14. It was stressed that full use should be made in so far as possible of existing data for the analysis of the demographic aspects of manpower, taking into consideration their limitations, if any, in coverage, scope and accuracy. It was noted that manpower planners often lacked basic statistical information required for their work and that that gap was often a serious handicap in the implementation of technical co-operation projects on manpower planning requested by developing countries. Where it would be necessary - as was often the case - to undertake new manpower surveys, it would be preferable to set up regular surveys designed to produce current manpower data, since those provided more suitable information than do ad hoc surveys the purpose of which is only to obtain the data specifically needed for manpower planning. Moreover, such ad hoc surveys would generally be excessively expensive in terms of financial and human resources.

II. DEMOGRAPHIC ANALYSIS OF MANPOWER DEVELOPMENT

A. Factors affecting the size and composition of the labour force

15. The Seminar considered the effects of fertility, mortality and migration upon the age-sex structure of population in both developed and developing countries. It was observed that, in the long run, changes in the level of fertility could be expected to have a greater effect on age structure than changes in mortality of the same magnitude. The effect of migration, it was noted, varied greatly from country to country, permitting little generalization. All of those demographic phenomena were considered in their economic and social context.

16. The Seminar examined the standardization techniques whereby differences between two countries or regions with respect to their aggregate or crude activity rates could be assessed apart from the effect of differences in their age-sex distribution. In recognition of the fact that the particular population chosen as the standard could influence the results, techniques for minimizing such bias were discussed.

17. Alternative measures of dependency ratios were discussed as well as the implications of the fact that those ratios might be expected to remain

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approximately constant in the developed regions over the next decade, whereas they were expected to increase in the developing regions. Particular attention was paid to the challenge posed by the preponderance of children among the dependents of the developing regions, and the strains imposed on educational facilities by heavy dependency.

18. The Seminar examined the evident trends in developing regions in the increasing average age of entry into the labour force which generally accompany the process of industrialization and economic development. The increased availability and duration of schooling, social legislation restricting the economic participation of children, and the increase in the number and proportion of occupations requiring relatively long periods of formal education and training were cited as important factors in that regard. However, the continued existence of child labour in some countries was recognized as a problem in arriving at realistic estimates of the labour force, inasmuch as the use of definitions which exclude children from the labour force might produce distorted estimates.

19. It was noted as a general finding that the average age of retirement from the labour force tended to be lowered with the advance of the economic development of a country. This was attributed to the following three basic factors: (a) the decline in the proportion of workers engaged in agricultural pursuits or in small-scale cottage industry; (b) the establishment of formal contractual relationships between individual workers and the establishments where they were employed, whereby the conditions and duration of service were fixed, and specific retirement rights were established; and (c) the establishment of a variety of social security and pension provisions for the older persons who were no longer able or expected to work.

20. The Seminar noted that the determination of the size and characteristics of the labour force of a country or region required particular attention to the classification of several categories of the population whose attachment or relationship to the labour force was tenuous or highly variable. In some countries, the most important of those categories were the unpaid family workers whose numbers might be quite large, especially in regions where both agriculture and small-scale "cottage" industries constituted a primary source of livelihood. Despite the adoption of international definitions and recommendations in that

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respect, there remained considerable variation from one country to another and lack of specificity in determining which persons should in fact be counted as unpaid family workers, and thereby included in the labour force. Other marginal groups difficult to classify included new entrants to the labour force who might also be students, older workers who might work only intermittently or seasonally, persons not actively looking for work because they believed no work was available, and persons who were underemployed either in terms of the amount of time worked or because they were employed in occupations where their skills were not fully utilized.

21. Attention was called to the considerable variations from one country to another in the activity rates of women as reported in population censuses. Those variations were partly due to differences in definitions and operating procedures, but they also reflected real differences due to social, economic and cultural factors. In many societies, customs and traditions concerning the appropriate role of women inhibited their economic activity. Urbanization and industrialization were generally accompanied by a rapid increase in clerical, secretarial and semi-skilled factory jobs, which, combined with the extension of facilities for formal education, served to create both a demand and a capacity for the active participation of women; late marriage and reduced natality, which generally accompany industrialization, also facilitated the movement of women into the labour force. Among the developing countries, the economic activity rates of women were particularly low in Latin America and in most Moslem countries, but relatively high in western and central Africa. Among developed countries, the range of activity rates of women was also great. The rates were particularly high in the Union of Soviet Socialist Republics and Eastern Europe, reflecting the emphasis of the socialist countries on full utilization of labour resources and a policy of promoting equality of the sexes in employment opportunities.

22. The Seminar also discussed the female age-specific activity rates which showed much variation from one region to another, but tended to follow certain patterns. In countries heavily dependent upon agricultural activities, the general pattern was one of early entry, followed by a broad plateau of nearly constant rates of participation from ages 20 to 55 or 60, followed by a gradual decline with advancing age. In those countries, early marriage, high fertility and limited

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access to formal education tended to reduce economic activities of young women, except as unpaid family workers.

23. A second pattern, observed in countries which had attained a certain degree of industrial development and urbanization, showed a marked peak in participation around age 20, immediately followed by a rapid decline to a considerably lower rate by about age 30, and a fairly constant rate thereafter to about age 60, when the rate declined rapidly. In those countries, girls customarily entered the labour force upon leaving school and worked until they married or until after their first child was born.

24. A third pattern observed in some highly industrialized countries was characterized by the appearance of a second peak of economic activity centred around age 50, reflecting the fact that child-bearing tended to be completed during the earlier years of marriage, when the women returned to the labour force.

25. In the Union of Soviet Socialist Republics and Eastern Europe, partly due to various provisions for the care of young children making it easier for mothers to remain in the labour force, high and nearly constant activity rates were maintained throughout the whole working age span.

26. Considerable importance was attached to differences in labour force participation patterns in urban and rural areas. The working life cycle of men in urban areas was characterized by later entry into the labour force and earlier withdrawal from it, as compared with that of rural males. That pattern of urban-rural differences in activity rates occurred both in developed and developing regions, and might be attributed in part to the differences in the nature of the occupations which were available in urban and rural areas, quite apart from the underlying stage of economic development of the country in question. Alterations in the occupational structure in both urban and rural areas which accompanied economic development, and the increasing availability of formal education facilities, were eventually reflected in reduced rates of economic activity at the lower and upper ages of the working life span. Such changes, it was observed, usually occurred earlier and were more pronounced in the urban areas, though their impact extended into the rural areas as well. Those conclusions were supported by the finding that urban males in developed countries displayed a pattern of later entry into the labour force and earlier retirement than did their

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counterparts in developing regions, and a similar differential existed between rural males in countries at different stages of development.

27. Both international and internal migrations had had a significant effect upon the size and composition of the labour force in countries where the volume of such movements had been large in relation to the size of the total population. The predominance of young adult males in migration streams had in some cases at times been sufficient to alter significantly the sex ratios of the population and to increase the dependency ratio in the region of out-migration, while reducing it in the principal regions of in-migration. However, those effects generally declined in importance if the migratory stream was prolonged in duration; the first migrants, once settled, tended to establish normal family units whose members, drawn in large part from their home regions, were likely to be more representative of the general age-sex distribution of the population.

28. The effect of migration on the occupational distribution of indigenous workers, as referred to below, might also be pronounced in some areas. In developed regions, large-scale migration might generate an increase in occupational mobility as most migrants had to take over the less desirable, lower-paid occupations, while the workers they displaced moved into higher-level positions. A further effect on the structure of the labour force might be felt where the migrants possessed particular occupational or professional skills which were in short supply in the regions to which they migrated. The resultant "brain drain" was recognized as a growing problem for many of the countries of emigration or areas of out-migration, particularly when they suffered from similar shortages of the same skills.

B. Factors affecting the structure of the labour force

29. A comparative picture of the sectoral distribution of the labour force in the developed and developing regions was presented to the Seminar. According to estimates for 1960, nearly three fourths of the labour force in the latter regions was engaged in agriculture, whereas the corresponding figure for the former regions was less than one third. Developments were also considered within the non-agricultural sectors of the developed and developing regions during the 1950-1960 decade. It was noted that a more rapid rise of the industrial sector as compared

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with the service sector characterized trends in the developing regions, while in developed regions, employment in the two sectors rose at about the same rate. While manufacturing was commonly regarded as the key sector in economic growth, the proportion of workers engaged in that sector varied very widely from country to country and was not by itself a reliable indicator of a country's stage of industrial development. It was indicated that, past a certain stage in development, that ratio may tend to stabilize or even decrease.

30. The distribution of workers by occupation was of much value in providing a rough indication of the actual skills of the labour force that were being utilized in a given country. However, the available data for assessing occupational trends and differences in occupational distribution between countries were somewhat limited, and the scope of the data on that subject needed to be broadened. There was some evidence to suggest that a shift from a highly agricultural economy to a more industrialized one was accompanied by an approximately parallel expansion of "white collar" and "blue collar" occupations. In that connexion, it was observed that long-term trends in a number of developed countries were rather divergent. In the countries which were still highly dependent upon agriculture at the current time, little could be concluded concerning the probable mix of occupations likely to accompany development.

31. It was desirable that the targets of industrial distribution of the labour force which were commonly established for planning purposes should be supplemented by estimates of the optimal occupational distributions within each sector, in order that the latter might serve as guidelines for educational and training programmes. Attention was called to the wider dispersion of "white collar" workers - a group requiring longer years of education - among the different industrial sectors in countries at higher states of development.

32. In considering occupational mobility and its underlying causes, the Seminar noted that intergenerational occupational mobility could be studied by tracing selected cohorts of workers from one census to the next. However, intergenerational occupational mobility usually required a special survey in order to examine differences between occupations of fathers and their sons or mothers and their daughters.

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33. It was also noted that countries with a relatively youthful labour force might have an advantage in achieving the occupational shifts required to meet their development goals in view of the fact that younger workers were generally more mobile than old ones. However, that advantage might be offset if the available capital was insufficient to provide adequate training and equipment for the labour force.

34. Other important shifts in the structure of the labour force which tended to accompany economic development relate to the proportions of own-account workers, employees and unpaid family workers. The available evidence suggested, however, that the percentage of unpaid family workers tended to decline with advances in economic development. The range in the proportions of the labour force consisting of unpaid family workers was very wide in the developing regions, reflecting both the heterogeneity of populations with respect to that kind of work and differences in the definitions and concepts used. In the developed countries, there had been a distinct trend towards a decline in the proportion of own-account and unpaid family workers in the non-agricultural sector. With the increasing mechanization of agriculture, there had undoubtedly been a parallel reduction in the farm sector as well.

C. Manpower utilization

35. International comparisons of the measurement of manpower utilization from the demand side, in terms of worker productivity, was beset by fundamental problems of comparability. Nevertheless, available data indicated that certain countries had been able to achieve very rapid increases in productivity in recent years, the gains being generally higher in the industrial sector than in the economy as a whole. In view of the many problems involved in obtaining reliable estimates of productivity, the Seminar was of the opinion that greater efforts were needed to gain insight into the various factors affecting productivity.

36. Several participants also observed the existence of labour shortages in their countries which might be overcome either by transferring workers from agriculture or by attracting additional women, at present economically inactive, into productive work. It was agreed that there was a need for further research on the non-economic factors which motivate or inhibit the entry of women into the labour force, and on

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the particular training which would best ensure their fuller utilization in the future.

37. The attention of the Seminar was focused upon the problems of measurement of the phonomenon of unemployment and underemployment in countries and regions at different stages of economic development. Some consideration was given to various measurement problems, including the comparability of measures of unemployment used in different countries, and to their applicability in different situations. The Seminar also considered the possibility of estimating the extent of underemployment by comparing the number of workers actually engaged in producing a given output with the numbers of workers who would be needed to achieve the same output if they were fully utilized at given levels of productivity.

38. In order to utilize available manpower resources in the most efficient manner, it is desirable to compare the current distribution of labour with the distribution that would be required to meet certain specific development goals. The Seminar considered the manpower balance-sheet technique, which had been used extensively for the purpose in the Union of Soviet Socialist Republics and several other Eastern European countries.[2/] It was noted that the usefulness of such balance-sheets was enhanced if they could be prepared at fairly frequent intervals. For that purpose, decennial census data would have to be supplemented by information derived from sample surveys. An opinion was expressed that the methodology of labour resources balances could be improved by means of cohort analysis, although collection of such information was expensive. While the manpower balance-sheets

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2/ On the supply side, the method calls for a detailed classification of the entire able-bodied population, including the distribution of the economically active population by branch of activity and other demographic and socio-economic characteristics, as well as the distribution of the population not economically active according to significant categories, such as full-time students, housewives, pensioners and the like. It thus covers potential labour reserves in addition to the present supply of manpower. On the demand side, a correspondingly detailed description is prepared of the desired distribution of manpower by sectors of the economy. Comparison of the actual situation with the goal may reveal shortages in certain branches, the need to transfer workers from one branch to another or to draw additional labour reserves into productive work, and the need to initiate or expand training programmes to supply specific skills.

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were considered to be a useful tool for manpower analysis in the highly developed countries, they were less applicable in the developing countries at the current time in view of the quantitative and qualititive limitations of data in those areas.

III. RELATIONSHIP BETWEEN POPULATION GROWTH AND GROWTH OF LABOUR FORCE WITH PARTICULAR REFERENCE TO DEVELOPING COUNTRIES

39. The discussion on the subject was focused on the following two main points. The first dealt with the impact of population changes, in particular those which would result from declining fertility, on the labour force, as well as the effects of labour force size and structure on the components of population growth. The second concerned the importance of demographic and socio-economic factors in determining the growth and composition of the economically active population.

40. The demographic conditions in a number of developing countries were described by the participants in the Seminar. In most of them, fertility was high and more or less constant, and mortality was decreasing rapidly and was at the current time at a moderately low level; therefore the growth rate of population usually attained values of around 3 per cent per annum.

41. Some participants pointed out that social economic development in those countries did not advance sufficiently to solve problems of unemployment and underemployment. The current rapid rates of population growth were in many of those countries considered as a serious handicap in their efforts to promote economic growth and social progress. It was noted that Governments of developing countries had increasingly in recent years formulated and implemented national policies to cope with their population problems. Thus, more than thirty countries, covering about two thirds of the population of the developing countries, had adopted population policies with the aim of moderating fertility and the rate of population growth.

42. Other participants expressed the point of view that active economic development of the countries, as a result of social and economic reforms, produced basic effects upon all processes in those countries, including demographic processes.

43. It was recognized, however, that population measures, if any, were not considered as a substitute in any way for economic and social efforts to improve living conditions and that they actually mutually supported each other.

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44. The influence of fertility decline, as an effect of population policies and of economic and social development in general, upon the size, composition and quality of the labour force was discussed in some detail. It was pointed out that a decline in fertility would initially bring about a reduction of the dependency burden, particularly by reducing the proportion of young persons in the population, while, at the same time, the number of persons in the working ages, at least in the first fifteen years, would not be affected. Such a development would imply a higher average capital investment per worker and therefore higher productivity. Various population models had shown that the dependency ratio could be reduced in that way by around one third within a generation. Changes in the age structure which resulted from fertility decline would also tend to increase labour input per capita, assuming that the age-specific labour force participation rates remained constant. Attention was called to a United Nations study which had showed that a reduction of fertility by one half would tend to increase labour input per capita by one fifth, given the male activity rates prevailing in developing countries.

45. It was reported from the experience of the USSR and other Eastern European countries, that the active economic development of a country created conditions for implementing programmes directed at raising fertility, due to the more rational employment of persons in social production.

46. In examining the qualitative aspects of the labour force, the view was expressed that a fertility decline permitting a higher rate of investment would provide opportunities for better education, health and social conditions in general. While better-educated young workers would contribute to higher productivity of the labour force, a possible negative effect was noted, namely, that with a declining number of young entrants into the labour force in the future, the older and less educated workers would constitute a larger proportion of the total labour force, using capital which younger workers could emply more productively.

47. Other participants stressed that improving health care, social insurance and education was the vital condition of the active social and economic development of a country and would require additional skilled manpower.

48. While the number of persons in the working ages generally would not be affected in the first fifteen years following a reduction in fertility, the size of the

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labour force might be affected in two different ways which might have a counterbalancing effect. First, a decline in fertility would be likely to increase the participation of women in the labour force, particularly if such a decline resulted from a rise in the age of marriage and postponement of the first child. On the other hand, the delayed entrance of young people into the labour force resulting from longer years of schooling, would of itself tend to reduce somewhat the size of the labour force.

49. In analysing the long-term effect of fertility decline, it was pointed out that, within a generation or so, such decline would tend to lead to a reduction in the rate of growth of the labour force. Population models showed that, with rapid declining fertility, the rate of growth of working age population could after sixty years be reduced to about half of that prevailing in a population with constant high fertility. The Seminar recognized, however, that those trends, considered over such a long period of time, might be modified by the intervention of non-demographic factors as well.

50. The impact upon manpower trends of migratory trends was also considered. It was noted that, due to rural-urban migration, the rate of growth of urban areas in developing countries was often twice the rate of growth of the total population in the country, or higher. It was emphasized that while direct measures to influence internal migration had met with little success, socio-economic and other policies had indirectly played a considerable role in most countries in affecting migratory movements. The aim of official policies would not necessarily be to stop rural-urban migration, or impede regional movements, but rather to bring about a population distribution which was as far as possible in accordance with availability of resources, economic opportunities and social services. Implementation of such policies required that due attention be given to the influence upon labour force participation of rural-urban migration and other internal movements.

51. It was reported that the USSR had had many years of experience with planned implementation of migration in accord with the needs of the country which had been conducive to both the national distribution of productive forces and to a fuller utilization of labour resources.

52. With respect to the effects of size and composition of the labour force upon population growth and its components, it was pointed out that a fairly close

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negative association existed between female employment and fertility in most countries. However, in different countries that phenomenon operated in different ways. It was still unsettled whether a woman's participation in economic activities reduced her fertility or whether a small family size induced her to work. For developing countries, it was difficult to draw any definite conclusions in that respect: there were some countries with high fertility levels and with high participation rates, and there were others with moderately low fertility levels combined with high participation in economic activities.

53. During the discussion on the second major point - the effects of demographic, social, economic and other factors on the labour supply - analyses were presented to the Seminar which permitted the study of the impact of demographic and other factors separately. By applying the 1950 participation rates to the 1960 population by sex and age, a hypothetical labour force for 1960 had been calculated for all countries in the world, which indicated the size of the labour force in 1960 if the social, economic, cultural and other (SECO) factors had remained constant during the 1950-1960 period. The differences between the population for the 1960 hypothetical labour force and the actual labour force in 1950 indicated the effects due to demographic factors, namely, the size and sex-age structure of population. On the other hand, the difference between the actual 1960 labour force and the hypothetical one might be attributed to changes in social, economic, cultural and other factors. The principal findings of the analysis showed that the net demographic changes accounted for 89 per cent of the total change during 1950-1960 in the world labour force, and only 11 per cent was accounted for by SECO factors. Similar results were also valid for each sex considered separately. In the developing countries, demographic factors had contributed to a larger share of the total change than in the more developed countries, especially in the case of females.

IV. RELATIONSHIP BETWEEN POPULATION AND MANPOWER PROJECTIONS, WITH PARTICULAR REFERENCE TO MANPOWER SUPPLY

54. The Seminar recognized the close relationship between labour force projections and projections of population. The development of population projections constituted the initial step in the preparation of labour force projections. The second step was to estimate and project age- and sex-specific rates of economic

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activity to be linked with the projected population in the working ages. It was stressed that the rate of growth of the labour force in a particular country would frequently differ from that of its total population. Such differences were to be expected, since changes in fertility, mortality and migration had a different impact, and with a different timing of that impact, on the sex and age structure of the population as a whole than on that of the labour force component of the population. In addition, any changes in the age and sex specific activity rates would affect only the labour force, and not the total population.

55. The methodology recently adopted by the ILO for preparing labour force projections, by age and sex, for a large number of countries and world regions was discussed. The models developed for that purpose were based essentially on the empirical relationship observed between the proportions of the male labour force in three main economic sectors - agriculture, industry and services - and the age and sex specific activity rates in the respective countries. A ranking of each country or area on the basis of the proportion of the male labour force employed in two of the three sectors - agriculture and industry - was found to be highly correlated with a number of conventional indicators of the level of economic development, such as GDP per capita, school enrolment, infant mortality rates, and the like. It was also found that the countries and areas so ranked could readily be classified into five broad groupings, reflecting different states of economic development. The characteristic patterns and trends in the age and sex-specific activity rates of those groupings were then used to obtain projections of activity rates for the countries and areas classified in each group. It was felt that that procedure was superior to the separate extrapolation of the age and sex-specific activity rates at the two census dates of 1950 and 1960, since the latter procedure would frequently yield implausible rates for future dates. It was also noted that an important consideration underlying the adoption by the ILO of the grouping method was the fact that it relied upon data that were generally available for most of the developing regions of the world, and did not require the types of data that were commonly available only in the developed regions.

56. The test of the efficiency of those models was also considered. In that test, the 1960 data for major world regions and for a number of individual countries were projected backwards to 1950, and the results were compared with the observed

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census results in 1950, as well as with the results obtained by holding activity rates constant. Those comparisons proved to be most satisfactory, particularly with respect to the global activity rates among men, and were considerably superior to the results obtained by the constant rates method. It was reported that the on-going ILO research in that area would continue to seek improved methods of projection, when the richer bodies of data to be obtained from the 1970/71 censuses became available.

57. The methodology employed in the USSR and other countries of Eastern Europe for preparing both current (intercensal) estimates and projections of the population was also discussed in detail. The importance of such estimates and projections for planning purposes was fully appreciated in the USSR. Estimations of population for urban and rural areas, and the components of population change (fertility, mortality and migration) were available for every major administrative subdivision of the country, totalling about 8,500 units. Data on the age and sex composition of population in urban and rural areas were available for the USSR, the Soviet republics, economic regions and some large cities. Data on population were frequently cross-tabulated with information on selected social and economic characteristics. Information on "mechanical movements", relating to migration between villages and towns, as well as migration across major administrative subdivisions, was obtained from the compulsory registration system together with data on fertility and mortality.

58. Comparisons of the 1970 population estimates for the USSR with the results of the 1970 census had not revealed any significant discrepancies. The 1970 census had also been used to compare the reporting of infants in the census enumeration with the registration of births during the year preceding the census data; that comparison had not revealed any significant discrepancies, and had indicated a considerable improvement in the completeness of birth registration in those areas, where some shortcomings had been observed in 1959. It was stressed that the methodology of population projections was being continuously improved in the USSR. Those projections had taken into consideration expected future trends in fertility and mortality, as well as the planning needs with respect to internal migration. The influence of urbanization and of expanded employment opportunities for women upon fertility, and of the continued improvement of health facilities on mortality,

were also being considered in order to improve the accuracy of the projections. It was stressed that the projections for the Soviet republics had been constructed on the basis of the individual projections for their component parts.

V. DEMOGRAPHIC RESEARCH NEEDED FOR MANPOWER PLANNING POLICY

59. The main goal of manpower policy in developing and developed countries alike was to ensure the most effective use of their human resources. To meet that objective, it was necessary to achieve and maintain a balance between manpower supply and manpower demand, in qualitative as well as quantitative terms. For that purpose, demographic research would need to aim at providing not only a fuller and more accurate description of the structure and characteristics of the population and labour force but also to increase the knowledge and understanding of the interplay of demographic variables and the changes they bring over time in the size, structure and characteristics of both the population as a whole and of its economically active components.

60. Several participants stressed the importance to manpower planners of both current estimates and projections of the size and composition of the labour force. Such estimates and projections, at both national and sub-national levels, were needed in order to co-ordinate educational plans and employment objectives so as to achieve national development goals. It was recognized that, in addition to global estimates and projections of population and labour force, there was a great need for the developing countries to develop similar projections for smaller economic and administrative areas, and for particular sectors of the economy. In particular, it was necessary to develop projections of population and labour force for urban and rural areas separately, in view of the fundamental differences in their rate of growth, in the social and economic characteristics of those components of the population, and the greater urgency of the employment problems currently encountered in urban areas by young persons, especially those who had attained considerable formal education.

61. The need to improve our knowledge of the phenomenon of rural-urban migration was recognized. It was noted that migration data were not available in most of the developing countries, and that the absence of such data made it extremely difficult to prepare either current estimates or projections of sufficient accuracy.

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It was agreed that the developing countries should carry out comprehensive studies of the phenomenon so as to improve their knowledge of the characteristics of the migrants, particularly their skills, occupational preferences, employment experience both prior to migrating and after migration, and the reasons underlying those movements of the population.

62. A number of the participants summarized the findings of recent demographic studies carried out in their respective countries, with particular reference to the impact of changing fertility and mortality levels on manpower resources. Recent improvements in the quality of the labour force resulting from improved health conditions and facilities were also noted.

63. It was recognized that if demographic research was to be fully useful in the formulation of manpower policies and programmes, such research would need to be organized as an integral part of a continuous programme of research. Single-time surveys, formulated on an ad hoc basis, could not be expected to provide an adequate substitute. An important feature of the kind of integration that was called for was the improvement in the internal consistency of the concepts and procedures employed both in the collection of information and in the classification of the results obtained. Such uniformity in concepts and classifications, it was felt, would minimize the unnecessary duplication of research efforts. It was also agreed that considerable attention should be paid to a systematic linkage between decennial censuses and periodic intercensal sample surveys and other sources of manpower data. In particular, the censuses should be carefully designed so as to provide both a sampling frame and a data base which the sample surveys could utilize as a point of departure. Such periodic surveys would, in turn, enable the developing countries to modify their manpower policies and programmes in accordance with the information obtained on a current basis, so as better to ensure the achievement of their economic objectives.

64. The rational utilization of labour resources was a basic requirement for maximizing economic growth in developing and developed countries; the need for detailed studies of available labour resources, classified by geographical location, level of education and skill, or by particular types of training received, was stressed. Such information should be matched with projections of the expected demand for workers with particular types of skill in each sector of the economy, in order to assist vocational counsellors and manpower planners. Under

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conditions of rapid technological progress, attention would also need to be paid to the provision of facilities for retraining workers, including highly trained technical and professional personnel, in occupations which had become redundant, and transferring them to new lines of work for which there was an emerging demand.

65. The Seminar was informed about the use made in the USSR of data from biennial surveys on the number of specialists available in various fields by age, sex, nationality, level of education, occupation and branch of activity. That information was used to assess both the current status of the occupational mix in the various branches of the economy in relation to trends in the productivity of those sectors, and to estimate future needs for training and retraining, so as to be able to meet emerging requirements for workers with new skills. Supplementary information relating to the numbers and characteristics of new entrants, total enrolment of students and trainees, and recent graduates was also provided by secondary and higher educational institutions throughout the country.

66. The Seminar recognized that the rapid technological and scientific development in a modern economy was giving rise to a concurrent demand for additional training of workers, requiring continuous expansion of technical and vocational training institutions, supplemented by on-the-job training. It was agreed that knowledge of anticipated labour resources classified by age, sex and type of level of skill, was essential for determining the future supply of labour and for detecting possible imbalances of manpower which might in turn impede the attainment of national development goals.

67. Taking into account the interdisciplinary nature of demography, the Seminar considered the various kinds of research facilities which were needed in order to improve the application of demographic knowledge to manpower problems in the developing countries, at both national and sub-national levels. Such research was currently carried out in a wide variety of statistical and labour departments, planning organizations and universities and non-governmental research institutes. The various difficulties currently experienced by those different research facilities included, in general, problems related to financial support: the widespread shortage of adequately trained personnel; and the lack of communication sometimes observed with policy-making bodies.

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68. It was evident from the discussion that the developing countries should themselves endeavour to improve the co-ordination of their research efforts in order to make the most effective use of their scarce resources and to obtain the greatest possible benefit from the technical assistance programmes of the United Nations and its specialized agencies concerned. In addition, it was felt that improved channels of communication between technical experts engaged in demographic and manpower research and persons in policy-making positions should be established, possibly by the organization of interdisciplinary seminars.

69. The current activities of the United Nations, its regional economic commissions and the ILO in that direction were described. They included the provision of training and advisory services and the preparation of a wide variety of training manuals and research monographs. In that connexion it was noted that the Multilingual Demographic Dictionary,[3/] which has been prepared under the United Nations auspices and had appeared in about twelve different languages, might be revised and expanded in the future. The Seminar commended those efforts, but agreed that much more remained to be done in order adequately to meet the pressing needs of the developing countries.

VI. GENERAL SUGGESTIONS AND RECOMMENDATIONS

70. Having discussed the demographic aspects of manpower and having considered the specific areas of research, training and information required, the Seminar agreed on the following general suggestions and recommendations.

71. The experience gained at the interregional level through the Seminar should provide a background for regional follow-up meetings taking into account the particular features and needs of each region concerned. Meetings at the country level, such as workshops, were also recommended, and the possible utilization of the country participants in the Seminar and at the regional meetings as discussion leaders or co-ordinators was suggested.

72. Measures should be taken at the country level to promote better utilization of existing statistics in the field of demographic aspects of manpower, including

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3/ United Nations publication, Sales No.: 58.XIII.4.

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processing, tabulation, analysis, interpretation and dissemination to the widest possible extent of relevant data from censuses, surveys and other sources of information, to enable agencies dealing with manpower problems to benefit fully from such information for the formulation of national manpower policies and programmes.

73. The United Nations and the ILO should strengthen research facilities at both interregional and regional levels in order to assist developing countries in the application of demographic knowledge on manpower problems and in the formulation of manpower policies and programmes.

74. With particular reference to the needs in the developing countries, it was recommended that special attention should be given at the international and national levels to:

(a) The extension and intensification of studies on interrelationships between rapid population growth and employment, under-employment and unemployment;

(b) Comprehensive studies, including intercountry studies, on internal migration in relation to manpower development and problems of employment, under-employment and unemployment in both rural and urban areas;

(c) Studies on the choice of occupation and on occupational mobility in relation to economic, social, cultural and ethnic characteristics of the population;

(d) Studies on economic activity of females, youth and aged population, as related to demographic variables, including in particular research on the relationship between economic activities of women and marriage and family building.

75. The United Nations and the ILO should assist Governments, upon request, in the preparation of demographic projections by sex, age, economic activity, urban-rural residence, educational characteristics and of households and families.

76. Training on the application of demography to manpower development should be intensified at existing regional demographic centres, and consideration should be given to providing training opportunities at the interregional level. The United Nations and the ILO should assist, upon request, in strengthening national training programmes, through fellowships, advisory services and the provision of teaching materials.

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77. The Multilingual Demographic Dictionary prepared by the United Nations in collaboration with the International Union for the Scientific Study of Population should be revised and expanded, particularly since the terminology in the field of population, including demographic aspects of manpower, had undergone considerable changes in recent years.

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Annex I

LIST OF PARTICIPANTS

A. Participants nominated by Governments

Argentina	Alberto Minujin Technical Adviser Instituto Nacional de Estadistica y Censos
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Guyana	Basil Henry Senior Labour Officer Manpower Research Division Ministry of Labour and Social Security
India	Satya P. Agarwal Chief Manpower Economics and Statistics Division Institute of Applied Manpower Research

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Iran	Ali Madani Professor of Statistics Department of Manpower and Statistics Ministry of Labour and Social Affairs
Iraq	Mohammed Hassan Al-Allak Economic Researcher Central Statistical Organization Ministry of Planning
Malaysia	Yan Kwoy (Yew Kong Chan) Statistician Department of Statistics
Panama	Hildebrando Araica Adviser in Demography Contraloría General de la República
Peru	Carlos Basan-Gutierres Technical Officer Demographic Unit Oficina Nacional de Estadística y Censos Presidencia de la República Primer Ministerio
Philippines	Bernardino A. Perez Acting Director National Economic Council
	Irenea Tienzo Economist, Labour Statistics Service Department of Labour
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	Anna Dragan Head General Office of Manpower Ministry of Labour
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	Mousa Ibrahim Manpower Officer Ministry of Labour

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United States of America	F. Leedy Manpower Expert Bureau of the Census
Uruguay	Martha Hoffmann Economist Oficina de Planeamiento y Presupuesto

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B. United Nations-assisted demographic training and research centre

C. Arretx
Professor of Demography
Latin American Demographic Centre

C. United Nations Secretariat

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Economic Commission for Africa

S. Hashmi
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J. Berent
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Chief, Population Unit
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D. Specialized agencies

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E. Intergovernmental organizations

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	Mr. Tyrchinsky Economist, Analysis Section
Organisation for Economic Co-operation and Development	P. Richards Development Centre

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F. Observer

Population Council	L. Dean Associate Director Demographic Division

G. Seminar Management

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First Deputy Director
USSR Central Statistical Board

E. Ostrovsky
Foreign Relations Division
USSR Central Statistical Board
(Administrative Director)

H. Conference secretariat

Director of the Seminar	H. Gille Associate Director United Nations Fund for Population Activities UNDP
Technical Secretary	A. Kusukama Population Division Department of Economic and Social Affairs United Nations Secretariat
Representative of the International Labour Office	H. Lacroix Chief Statistician

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Annex II

LIST OF DOCUMENTATION

A. Documents submitted by the United Nations and the International Labour Organisation (ILO)

United Nations	Provisional agenda (ESA/P/SDAM/CP.1)
United Nations/ILO	Demographic analysis of manpower development with particular reference to developing countries (ESA/P/SDAM/CP.2)
ILO	Supplementary tabular materials and charts (agenda items 5 and 6)

B. Documents submitted by country participants

Argentina

Alberto Minujin	Demography and employment in the Argentine Republic

Bolivia

Rene Ledezma	Demographic characteristics of labour force in Bolivia

Bulgaria

Parashkev Popov	On some problems of demographic development and forming labour resources in the People's Republic of Bulgaria

Chile

Boris Chacon	Demographic aspects in Chile

Cyprus

Costas Paschali	Total and economically active population projections in Cyprus

Guyana

B.G.C. Henry	Some demographic and other aspects of manpower in Guyana

India

S.P. Agarwal	Demographic aspects of manpower in India

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Iran

Ali Madani	Review of demographic aspects of manpower in Iran

Iraq

M.H. Allak	Country paper

Malaysia

Chan Yan Kwoy	Demographic aspects of manpower

Panama

Hildebrando Araica	Some data concerning manpower statistics in Panama

Philippines

I.V. Tienzo	Some demographic characteristics of Philippine manpower
Bernardino A. Perez	The demography of manpower in the Philippines

Peru

C. Basan-Gutierres	Report on Demographic Aspects of Manpower in Peru

Romania

A. Dragan and I.M. Copil	Demographic analysis of manpower in Romania

Thailand

P. Panichpakdi	National experience and activities on demographic aspects of manpower

Union of Soviet Socialist Republics

A.Y. Boyarski and A.Y. Kvasha	Demographic characteristics of labour in USSR population censuses
K.G. Ilyina	Women in national economy and culture
G.M. Kharatian and R.I. Zhukov	Statistics of training and availability of specialists with higher and specialized secondary education
P.I. Labok	Major indicators of the composition of employed in the USSR
P.P. Litvyakov	Methodology of planning balance construction on labour resources in the USSR

Union of Soviet Socialist Republics (continued)

G.M. Maximov	Demographic characteristics of manpower: number, composition, occupational and branch structure
N.S. Shoubina	Population and labour resources: calculation of their number and composition today and respective
A.F. Ulyanova	1. Organization of labour and wages statistics in the USSR
	2. Methodology of accounting balance construction of labour resources in the USSR
L.M. Volodarsky	Socio-economic statistics in the USSR
A.M. Vostrykova	Organization of current population statistics in the USSR
R.I. Zhukov	Statistics of training and upgrading workers' skills in the USSR

United Arab Republic

S.F. Mina	Demographic aspects of manpower in the United Arab Republic

Uruguay

M. Jauge Hoffmann	Population and manpower in Uruguay

C. Documents submitted by United Nations regional economic commissions

Problems of measurement of the economically active population in the African countries: Economic Commission for Africa

Los Recursos Humanos en El Desarrollo de America Latina: Instituto Latinoamericano de Planificafión Económica y Social, Serie II - Núm 9, Santiago de Chile, 1969

Some demographic aspects of labour supply in Europe, 1950 to 1980: Economic Commission for Europe

Activities of the Conference of European Statisticians relating to demographic aspects of manpower: Economic Commission for Europe

Changes in the structure of employment in Europe, 1950-1980: Economic Commission for Europe

An analysis of active population in the Arab countries of the Middle East, based on census results: United Nations Economic and Social Office in Beirut

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VT 013 762
RESEARCH, DEVELOPMENTAL AND EXEMPLARY ACTIVITIES IN VOCATIONAL AND TECHNICAL EDUCATION.

ILLINOIS RESEARCH AND DEVELOPMENT UNIT, SPRINGFIELD.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - JUN71 55P.

DESCRIPTORS - *VOCATIONAL EDUCATION; *RESEARCH COORDINATING UNITS; *EDUCATIONAL RESEARCH; *PROGRAM EVALUATION; *PROGRAM DESCRIPTIONS; TECHNICAL EDUCATION; ANNUAL REPORTS; EDUCATIONAL CHANGE; EDUCATIONAL INNOVATION; STATE PROGRAMS; EDUCATIONAL COORDINATION
IDENTIFIERS - ILLINOIS

ABSTRACT - THE ILLINOIS RESEARCH AND DEVELOPMENT UNIT IS PLAYING AN INCREASING ROLE IN THE DEVELOPMENT OF VOCATIONAL EDUCATION IN THE STATE OF ILLINOIS. AS A MEMBER OF THE RESEARCH COMMUNITY, THIS UNIT HAS INITIATED A SERIES OF INNOVATIVE ACTIVITIES DESIGNED TO STIMULATE, ENCOURAGE, AND ASSIST FEDERAL, STATE, AND LOCAL PROGRAMS. AN EFFORT HAS BEEN MADE TO PLAN FOR MEASURED CHANGE BY FOLLOWING PLANNED ACTIVITIES. THIS REPORT COVERS THE HISTORICAL DEVELOPMENT OF THE RESEARCH AND DEVELOPMENT UNIT AND SUMMARIZES THE MAJOR ACCOMPLISHMENTS DURING THE PERIOD JULY 1, 1970 TO JUNE 1, 1971. TOPICS COVERED IN THE REPORT INCLUDE ORGANIZATION AND OPERATION AND RESEARCH AND DEVELOPMENT FUNDING. SEVERAL PROJECTS AND THEIR CONTRIBUTIONS TO VOCATIONAL EDUCATION ARE DESCRIBED. (AUTHOR/JS)

VT 013 762

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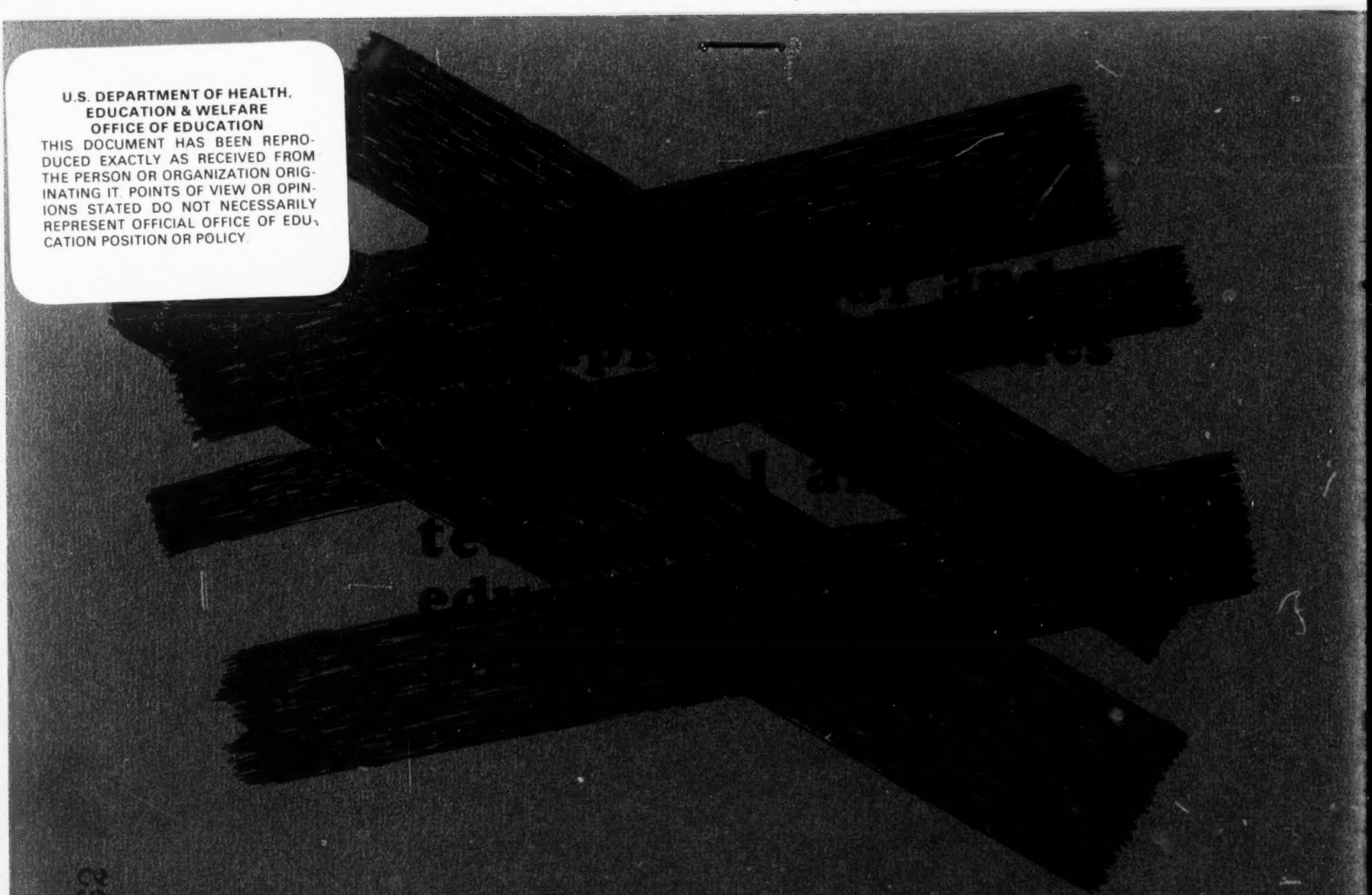

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board of vocational education & rehabilitation
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The Division of Vocational and Technical Education is committed to innovation in Education and will continue to utilize and demonstrate the outstanding talent available in local educational agencies.

Federal and State support of projects and programs initiated by local schools forms a solid base for an exciting, relevant, and accountable vocational education system. Providing visibility for such exemplary and innovative programs must receive priority emphasis if vocational education is to become a major element of the total educational system.

This publication describes the operation of Research and Developmental activities in Vocational Education in Illinois and provides selected examples of such activities.

Sherwood Dees, Director
Division of Vocational and
Technical Education

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Assistant Coordinator
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Foreword

The Illinois Research Coordinating Unit (RCU) was established prior to July 1, 1965 pursuant to the invitation of the U. S. Commissioner of Education to establish and operate Research Coordinating Units. Since the Illinois RCU's initial beginning, the Illinois Division of Vocational and Technical Education has placed added emphasis on the responsibilities of this Unit.

On August 1, 1969, the Illinois RCU was officially renamed the Illinois Research and Development Unit. Its present role and function is to serve as one of eight units organized to promote and establish educationally meaningful occupational programs for todat's youth and adults. The State of Illinois accepts the challenges set forth by the provisions of the 1968 Amendments to the Vocational Education Act of 1963 and the Research and Development Unit will play an integral part in reaching those goals.

The Illinois Research and Development Unit is playing an increasing role in the development of vocational education for all people in the State of Illinois. The changes which occurred in fiscal 1970 were designed to improve research, developmental, and exemplary programs funded with the Research and Development Unit. As a member of the research community, the Illinois Research and Development Unit has initiated a series of innovative activities designed to stimulate, encourage, and assist federal, state, and local programs. An effort has been made to plan for "measured" change by following planned priorities.

This report covers the historical development of the Research and Development Unit with special emphasis on the time period commencing July 1, 1970 and terminating on June 1, 1971. It summarizes the major accomplishments of the Unit during that period.

Robert Gray
Unit Coordinator
Research and Development Unit

ORGANIZATION AND OPERATION

CONCEPTION

The Vocational Education Act of 1963, Public Law 88-210, Section 4(c) indicated the importance of and the need for research in vocational education by making provisions for the establishment of Research Coordinating Units at the state level. The actual invitation for the establishment of units was not extended to each state until 1965. Twenty-four states accepted the invitation and were approved for funding prior to July 1, 1965. Illinois was one of the original twenty-four. Since its conception, the Illinois RCU has been established as a leader in research throughout the Nation, as well as, within the State of Illinois.

The Unit was originally conceived to work toward the following goals:

1. Assistance and support for increased and improved vocational research.

2. The identification and upgrading of research personnel.

3. The trial and evaluation of experimental curricular and instructional procedures.

4. A microcosmic concept of survey procedures relating to occupational opportunities and training needs.

5. Sound operational procedures for a research and development unit.

6. A consideration of the advisability of providing informational and evaluative services for the State Board and other state agencies.

A final report for the first grant period was completed in January of 1967 and is on file in the U. S. Office of Education (Project No. O. E. 5-85-126 Occupational Research and Development Coordinating Unit – Final Report.)

Second Grant Period
December 15, 1966-September 30, 1968

A second proposal was prepared in June of 1966 for the purpose of continuing the Unit from February 1, 1967 until June 30, 1968. The proposal was approved and the time period extended through September 30, 1968.

Many types of activities for the RCU were set forth in the original proposal. These activities were research oriented and developmental in nature. The general objectives set forth in the continuation proposal were to continue the original objectives and to put major emphasis on developmental type projects and dissemination of research results.

Activities and achievements during that period were included in an interim report (Project No. 6-3030; Grant No. OEG-3-7-063030-2687 prepared in October, 1968 which is on file in the U. S. Office of Education. The primary thrust of the Illinois RCU during this time was establishment of a variety of developmental programs for field experimenting and testing of innovative procedures. "Measured Change" could thus become an integral link between research and regulation.

Grant Extension Period
October 1, 1968-August 30, 1969

A third continuation of the Illinois RCU by the USOE Bureau of Research was granted through August 1969. Objectives outlined in the continuation proposal placed added emphasis on developmental and dissemination activities with some emphasis on decision making at the state and local level. An aggressive contractural research program was designed to meet the stated objectives. During this period, major projects were cooperatively funded with universities, community colleges, and local school districts.

Continuation and Reorganization Under the Act

In August of 1969 the various state RCU's became permanently established under the provisions of Part C of the 1968 Amendments to the Vocational Education Act of 1963, Public Law 90-576. The unit was also included in the State Plan for the administration of vocational and technical education in Illinois, dated September, 1969. An integral part of the Division of Vocational and Technical Education, Board of Vocational Education and Rehabilitation, the Unit is one of eight operational Units of the Division which is based in the State Capitol Complex at Springfield.

With the inclusion of the State RCU's under the Act and the Illinois RCU under the Illinois State Plan, it was decided to change the name of the Unit from the Illinois Research Coordinating Unit to the Illinois Research and Development Unit. Due to the broad nature of the projects being funded and the strong emphasis being placed on implementation of innovative research ideas, it was believed that this new title better described the overall function of the Unit as conceived and operated in Illinois. At that time the Unit had become deeply involved in research with major emphasis being palced on developmental activities and total implementation of these ideas.

The present Research and Development Unit is one of three units in the division primarily engaged in writing special contractual agreements and is responsible for encouraging, stimulating, and assisting with research, developmental, and exemplary activities designed to enrich and broaden vocational education.

The Illinois Research and Development Unit is presently involved in the funding and administration of three broad major project categories. These three broad categories are Research, Developmental and Exemplary. For each of these categories the Unit has established specific priorities. Priorities are absolutely essential in an operation of this type to insure that the limited amount of allocated funds are expended for the best possible reasons. In conjunction with this basic philosophy, the Unit priorities are based on mandates of the acts and present trends in the field. The unit offers the following brief explanation of what it categorizes under the broad headings of Research Activities, Developmental Activities, and Exemplary Activities.

Research Activities

Research activities are those activities that center upon either pure or basic research as it relates to vocational education. These activities place major emphasis on program evaluation and cost accountability

and are designed to aid in planning and "decision-making" at the state and local level.

Developmental Activities

Developmental Activities involve both the design and implementation of instructional materials and curriculum models. These activities may, in fact, stem from an initial research project and be transferred into a developmental stage when implementation becomes a priority. In any case, developmental activities will include an implementation phase in some local school situation.

Exemplary Activities

In Fiscal 1970 the Research and Development Unit was notified that they were to receive their first allocation of Part D Exemplary funds amounting to $162,979. Priorities were established to determine the areas for which the money could be best directed. It was determined that a demonstration center approach highlighting already successful research projects would provide for the most effective distribution of the allocation. In Fiscal 1971, an additional $239,023 was allocated to further the projects already established and to initiate development of new programs.

Exemplary activities funded by the Research and Development Unit are based on successful research and developmental project results. Outstanding innovative projects are selected and funded on a Demonstration Center Concept. They are geared toward providing proven innovative methods of reaching students with academic, social, economic, or other handicaps. These projects represent a bridge building effort between the school and the "World of Work."

These definitions describe a total research program, a program which goes beyond the point of determining and analyzing data, making recommendations, and filing final reports in some library to collect dust. The staff of the Illinois Research and Development Unit feel that the success illustrated by the past record of the Unit lies in the fact that they have stressed implementation and demonstration of the results of their efforts. This coupled with a system of nationwide dissemination of reports has given total visiblity to the efforts made.

The Illinois Research and Development Unit has placed emphasis on the total spectrum of research activities – a continuation from problem identification through experimentation, implementation, and demonstration. The Illinois RDU is a vital segment of the necessary linkage between federal, state, and local education agencies in a comprehensive paradigm for vocational education research in the United States.

Since 1962, numerous pieces of Federal legislation have been passed for the direct benefit of education in general. Of this number, several have been written specifically for vocational education. Two are of utmost importance to this Unit and Division in reference to research and development. They are the 1963 Act and the 1968 Amendments to the 1963 Act. In both major Acts, provisions were made for Research and Developmental activities.

By specifying monies for research and exemplary activities there is a positive indication that the need for research in vocational education is realized at the national level. The Federal Government is saying that in order for vocational education to progress, significant research must be conducted and more important, it must be on a continuous basis. Research that is not conducted in a planned and continuous manner leads to inconsistent planning and development which will be reflected in the educational system of tomorrow. With the turmoil in education today, the Illinois Research and Development Unit sees no alternative to an aggressive continuous and expanding program of research and development.

RESEARCH AND DEVELOPMENT FUNDING

FY 1966 – JUNE FY 1971

Many federal, state, and local agencies have shown increased enthusiasm in research as it relates to vocational education. The thrust toward providing better vocational activities for all children in the country is very positive.

In 1970, the federal government allocated some $162,979 to Illinois for use in Exemplary Programs and Projects. The 1968 Amendments to the Vocational Education Act of 1963 clearly state that:

> "The Congress finds that it is necessary to reduce the continuing seriously high level of youth unemployment by developing means for giving the same kind of attention as is now given to the college preparation needs of those young persons who go on to college, to the job preparation needs of the two out of three young persons who end their education at or before completion of the secondary level, too many of whom face long and bitter months of job hunting or marginal work after leaving school. The purposes of this part, therefore, are to stimulate, through Federal financial support, new ways to create a bridge between school and earning a living for young people, who are still in school, who have left school either by graduation or by dropping out, or who are in post-secondary programs of vocational preparation, and to promote cooperation between public education and manpower agencies."

This marked the first time that the federal government has provided exemplary funds to the Research Coordinating Units for use as a partial solution to some of the pressing problems facing education. Then, the question logically follows, "Was the same amount allocated in Fiscal 1971?" The answer is no. In 1971 some $239,023 has been strictly mandated for use as exemplary monies. This represents almost a 62% increase to Illinois in federal support.

As another example, let us look at this years Fiscal 71 funding for Part C of Sec. 131 of the 1968 Amendments to the Vocational Education Act of 1963. In Fiscal 1970, some $32,114 was allocated to Illinois for use as Part C monies. In Fiscal 1971, $742,023 has been allocated to Illinois for use as research monies. That amounts to 10% of the states federal allocation. Increased support is evident.

With the increase to Illinois in federal support there is also an increase in local support of research activities. Since its inception in 1966 some $6,281.085 dollars have been spent for research, development, and exemplary projects. Of this amount $2,189,622 has been provided by those conducting the research. Approximately 34.5% of the total budget since 1966 has come from local monies. Support is evident.

Included in this section is a listing of Fy 71 projects and basic summary of six years of operation for the Research and Development Unit.

SUMMARY OF RESEARCH & DEVELOPMENT FUNDING BY FISCAL YEAR
ANCILLARY MONIES

Fiscal Year	Research and Development	Exemplary*	Total State & Federal	Total Budgeted Amount, Federal State & Local
1966	425,285	—	425,285	593,262
1967	718,238	—	718,238	1,000,323
1968	766,861	—	766,861	1,125,621
1969	682,278	—	682,278	1,015,743
1970	610,067	159,612	756,175	1,261,874
1971	684,222	58,404	742,626	1,284,262
	3,886,951	218,016	4,091,463	6,281,085

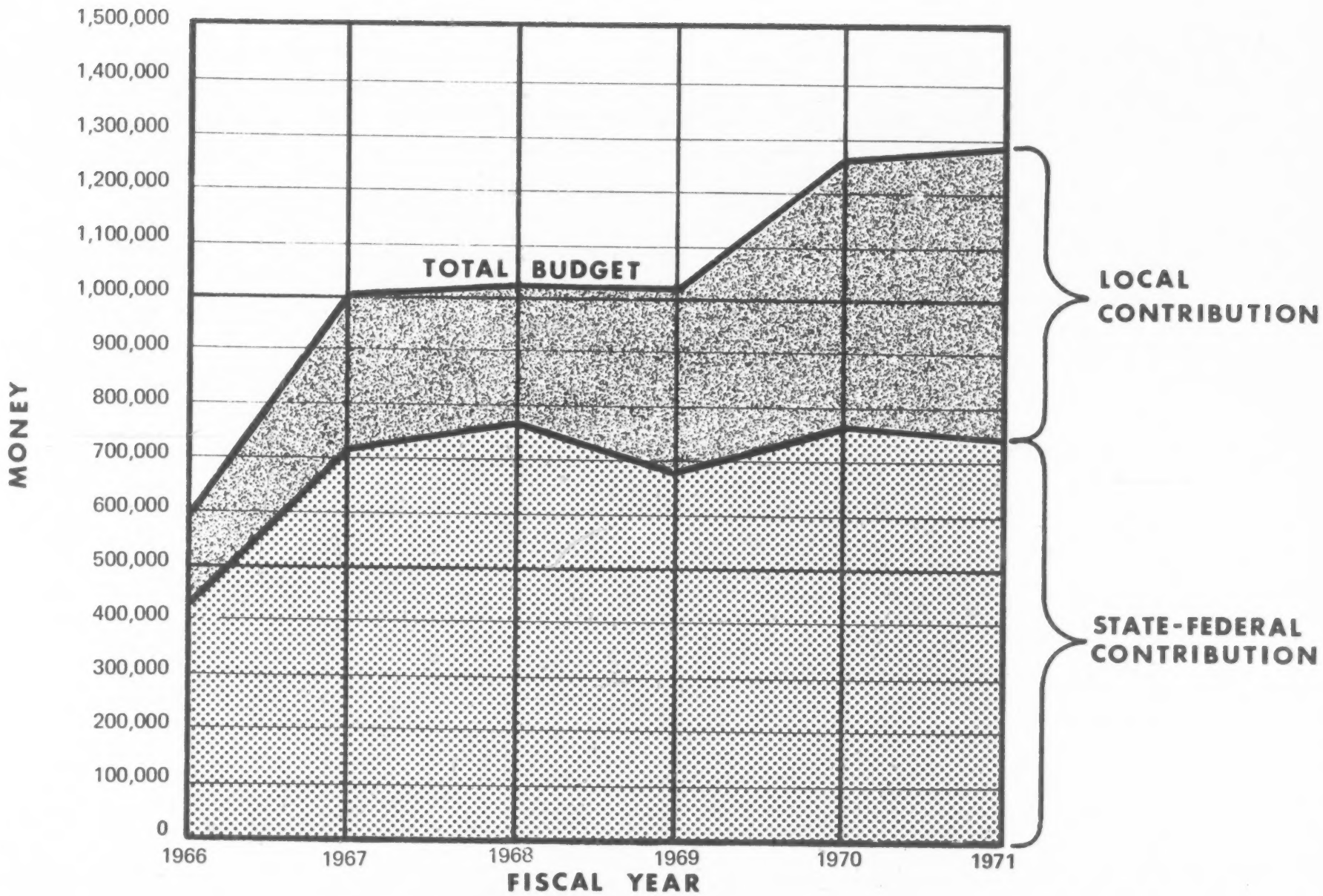
*Part D Exemplary Monies were first allocated in Fiscal 1970

RESEARCH AND DEVELOPMENT UNIT
INTERIM REPORT
SUMMARY OF OBLIGATIONS
JULY 1 – MAY 15, 1971

RESEARCH AND DEVELOPMENTAL PROJECTS APPROVED FOR FISCAL YEAR 1971

Project Code Number	Title	Principal Investigator and Institution	State/ Federal Monies 1971	Local Input	Total Budget
RDB-B1-002	A Research and Development Project in Occ. Ed.; The Development of Process Models for Decision Making in Curriculum Development and Evaluation	Joseph Borgen Dwight Davis Joliet Jr. College	$ 67,178	$ 16,950	$ 84,128
RDB-B1-003	Facilitating Career Development at the Elementary School Level	Ronald Stadt Southern Illinois University	44,166	16,180	60,346
RDB-B1-005	Commercial Horticultural Skill-Practices Institute for Illinois Secondary and Jr. College Agricultural Occ. Instructors: A Private Industry Approach	Theodore Buila Southern Illinois University	19,963	8,866	28,829
RDB-A0-011	The World of Work as an Organizing Center for the Curriculum of the Elementary School	Walter Wernick Northern Illinois University	110,726	154,000	264,726
RDB-B1-012	System for Individualizing Vocational Education	Thomas Koerner Niles	16,486	16,282	32,768
RDB-A1-016	Analysis of Surveys of Illinois Vocational Guidance	Richard W. Bradley Southern Illinois University	15,960	14,262	30,222
RDB-A1-017	Delinquency Intervention Program in the Carbondale Community High School – Phase III	Richard Pooley Southern Illinois University	59,175	19,725	78,900
RDB-D1-020	Computerized Vocational Information System (CVIS)	JoAnn Harris Villa Park	192,991	79,918	272,909
RDB-A1-022	Feasibility Study of Handicapped Individuals	Paul Mall	9,131	1,227	10,358
RDB-D1-025	Joint Occupational Orientation Project: An Experimental Approach to Vocational Education	E. A. Ebert Libertyville	29,323	9,774	39,097
RDB-A1-026	Technical Physics	C. Matz - Parkland	21,212	7,118	28,330

Project Code Number	Title	Principal Investigator and Institution	State/ Federal Monies 1971	Local Input	Total Budget
RDB-A1-030	A Special Analysis of Vocational Education in the City of Chicago	C. Joseph Ehrenberg Chicago	33,600	0	33,600
RDB-A1-034	Metropolitan Programs in Applied Biological and Agricultural Occupations: A Need and Attitude Study	Hollie Thomas University of Ill.	$ 15,000	$ 8,244	$ 23,244
RDB-A1-037	An Analysis of Secondary Area Vocational Centers In Illinois	Edward Anderson Wayne Zook	34,172	0	34,172
RDB-A1-035	State Survey of Home Ec. Programs in Illinois	Dorothy Keenan Southern Illinois University	4,740	1,464	6,204
RDC-A1-043	The Development of a System Model(s) for the Collection, Processing, Summarization and Comparison of Course Cost, Enrollment & Reimbursement Data at the Community College	Robert M. Tomlinson Chester Rzonka University of Illinois	10,399	0	10,399
RDC-A1-046	Development of Three Phase On-site Evaluation Instruments	T. L. Wentling University of Illinois	6,710	0	6,710
		TOTAL	690,932	354,010	1,044,942
EXEMPLARY PROJECTS APPROVED FOR FISCAL 1971 PART D FUNDS					
RDD-A1-032	DeKalb Co. Pre-Vocational and Vocational-Special Needs Varied Exemplary Project	D. S. Hurd DeKalb Co. Demonstration Center	15,500	54,976	70,476
RDD-A1-039	Demonstration Center for A Comprehensive Home Economics Program in a Medium Sized High School	Mary Beth Stine Flora Twp. High Sch.	9,914	21,650	31,564
RDD-A1-042	West Central Hancock Co. Vocational Joint Agreement	Gayle Nelson Carthage Twp. High School	12,640	8,500	21,140
RDD-A1-045	Vocational-Technical Education—Public Information Program	D. Reid Ross St. Louis Regional Industrial Development Corporation	20,350	103,000*	123,350
*Represents a combination of grants from other state and local agencies.		TOTAL	58,404	188,126	246,530



LOCAL, STATE-FEDERAL FUNDS
USED FOR RESEARCH ACTIVITIES

RESEARCH, DEVELOPMENTAL, AND EXEMPLARY PROJECTS FISCAL YEAR 1970

DEVELOPMENTAL PROJECTS APPROVED FOR FISCAL YEAR 1970

Project Code Number	Title	Principal Investigator and Institution	State/ Federal Monies 1970	Local Input	Total Budget
34-C0	Enriching the Basic Scholastic Skills of Students Who are Academically, Socially, and Economically Disadvantaged Through Vocational Centered Laboratory Learning	Robert Walker U. of Illinois	$ 4,888	$ 4,888	$ 9,776
41-A9	A Need Survey and Feasibility Study of Local Paramedical Occupations	John Robinson Chicago City College	18,272	18,312	36,584
43-A0	Micro-teaching and Video-taping for Pre-service and In-service Education	Richard Nelson	27,700	27,701	55,401
44-A0	Surveys of Counselor Educators and Secondary School Counselors Concerning Graduate Preparation in Vocational Guidance and Guidance Information Services	Richard Bradley Southern Illinois University	17,897	17,897	35,794
45-A0	Vocational-Technical Training Study for Industry in the St. Louis Metropolitan Region	Charles James Southern Illinois University	1,000	1,000	2,000
46-A0	Manpower and Training Survey	Carl Larson Lake Land College Mattoon	2,896	2,897	5,793
47-A0	Preparedness Program	Phillip Walker Parkland College Champaign	14,793	29,586	44,379
00060-E0	Demonstration and Research Center in Vocational Guidance	Harold Sutter Sterling Twp. High School	22,613	7,538	30,151
00069-D0	Experimental Vocational Program	Howard Collier Peoria Public Schools	23,427	7,451	30,878
00078-C0	Career Development Program	Frank Lentz Barrington Cons. H. S.	53,929	17,977	71,906

Project Code Number	Title	Principal Investigator and Institution	State/ Federal Monies 1970	Local Input	Total Budget
00082-C0	Enriching the Basic Scholastic Skills of Disadvantaged Youth Through Vocational-Centered Laboratory Learning	James Trotter Warsaw Com. Unit H.	14,772	4,925	19,697
00083-C0	An Experimenta' Program in Vocational Education	Loren Kennedy Havana Com. Unit H. S.	9,825	3,275	13,100
00084-C0	Computerized Vocational Information System	JoAnn Harris Willowbrook Com. H. S.	114,843	38,281	153,124
00085-C0	Experimental Aerospace Program	Edward Blue Cahokia-E. St. Louis H. S.	23,239	7,733	30,972
00089-B0	Technical Mathematics	Paul Thompson Parkland College Champaign	46,417	15,473	61,890
00090-B0	Demonstration Workshop Series in Data Processing	Wm. Carpenter Evanston Twp. H. S.	8,535	2,845	11,380
00092-B0	Joint Occupational Orientation Project: An Experimental Approach to Vocational Education	Paul Doescher Libertyville Com. H. S.	26,877	8,959	35,836
00095-B0	Delinquency Intervention Program in the Carbondale Community High School, Phase II	Richard Pooley Southern Illinois University	48,612	16,204	64,816
00097-A0	A Pilot Study in Teacher Education to Provide Technological Resources for In-service Industrial Teachers to Relate Contemporary Technological Practices to Industrial Education Content and Program Development	E. A. Jacobsen Northern Illinois University	13,590	4,530	18,120
RDB-A0-001	Marion Experimental Research of Catacheristic Youth (M.E.R.C.Y.)	Larry Vincent Marion C. U. Schools	22,446	7,483	29,929
RDB-A0-002	A Research and Development Project in Occ. Ed: The Development of Process Models for Decision Making in Curriculum Development and Evaluation	Joseph Borgen Dwight Davis Joliet Jr. College	24,550	6,916	31,466

Project Code Number	Title	Principal Investigator and Institution	State/ Federal Monies 1970	Local Input	Total Budget
RDB-A0-003	Facilitating Career Development at the Elementary School Level	Ronald Stadt Southern Illinois University	15,620	4,815	20,335
RDB-A0-005	Commercial Horticultural Skill-Practices Institute for Illinois Secondary and Jr. College Agricultural Occ. Instructors: A Private Industry Approach	Theodore Buila Southern Illinois University	$ 1,177	$ 1,092	$ 2,269
RDB-A0-009	Development of an On Line Pupil Data Bank	W. T. Briggs Springfield Public Schools	18,800	11,300	30,100
		TOTAL	576,718	268,978	845,696

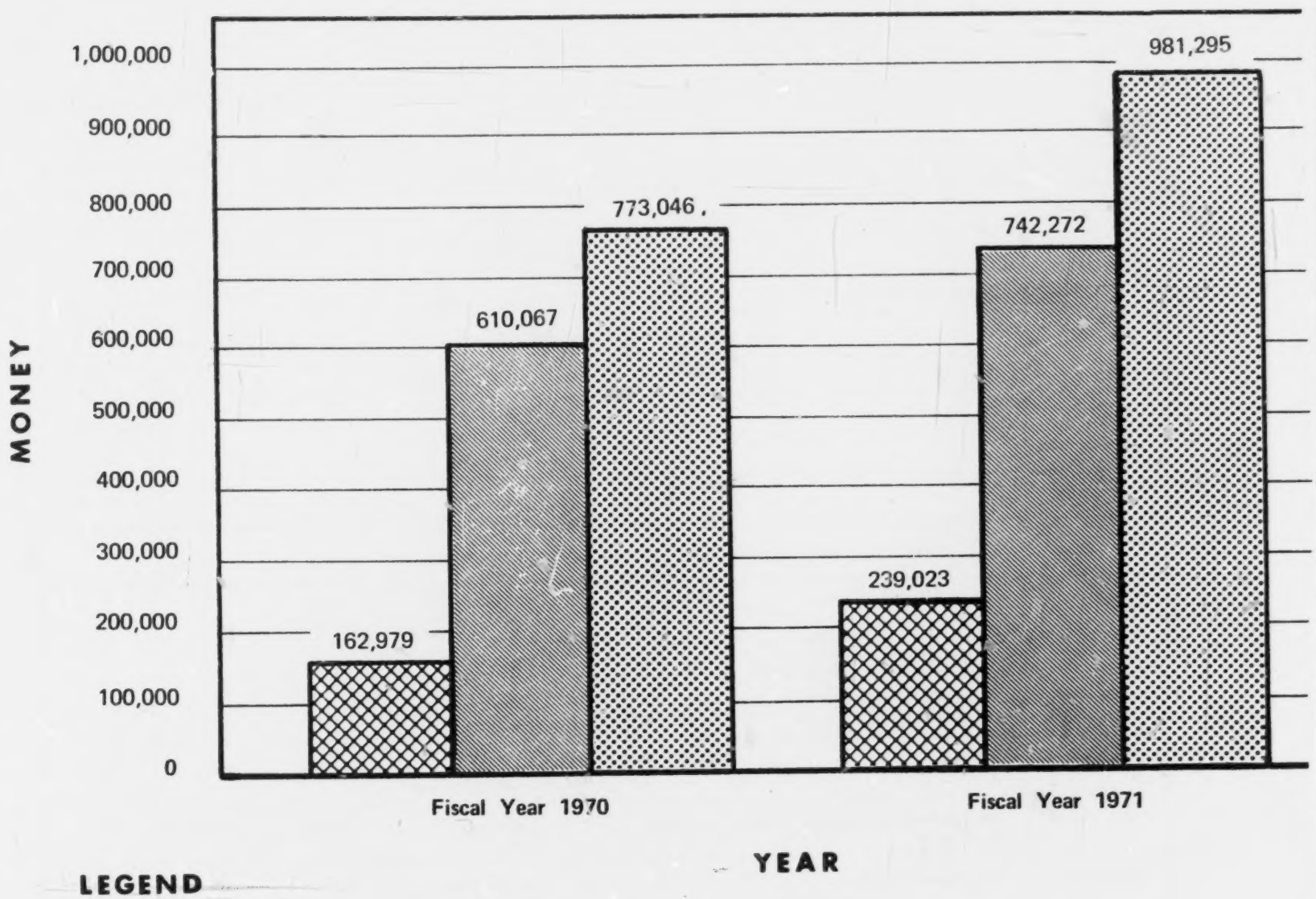
RESEARCH PROJECTS APPROVED FOR FISCAL 1970 PART C FUNDS

Project Code Number	Title	Principal Investigator and Institution	State/ Federal Monies 1970	Local Input	Total Budget
RDC-A0-013	Cooperative Junior College Computer Study	C. Thornblad Shawnee Com. College	$ 2,000	$ 6,000	$ 8,000
RDC-A0-019	Study the Feasibility of a Pilot Home Based Today Care Program Utilizing Welfare Mothers and Other Disadvantaged Persons as Members of the Child Care Staff Team	Myrna Kassel Human Services Manpower Career Center — Chicago, Ill.	2,500	500	3,000
RDC-A0-028	An Exploratory Analysis of Differential Program Costs of Selected Occupational Curricula in Selected Illinois Junior Colleges	Robert Tomlinson Univeristy of Illinois	5,671	0	5,671
RDC-A0-029	Analysis of One and Five Year Plans of Local School Districts for Vocational Education	William Rogge University of Illinois	9,266	0	9,266

Project Code Number	Title	Principal Investigator and Institution	State/ Federal Monies 1970	Local Input	Total Budget
RDB-A0-004	Facilitating Career Development: An Annotated Bibliography	Larry Bailey Southern Illinois University	3,397	1,133	4,530
RDB-A0-012	System for Individualizing Vocational Education	Thomas Koerner Niles Twp. High Sch	7,357	4,608	11,965
–	Contractual Service	Wayne Zook Illinois State Univ	1,847	0	1,847
–	Contractual Service	Ed Anderson Illinois State University	$ 1,311	$ 0	$ 1,311
		TOTAL	33,349	12,241	45,590

EXEMPLARY PROJECTS APPROVED FOR FISCAL 1970 PART D FUNDS

Project Code Number	Title	Principal Investigator and Institution	State/ Federal Monies 1970	Local Input	Total Budget
00084-C0	Exemplary Demonstration and Dissemination Center for Project CVIS	JoAnn Harris Villa Park	$12,760	$ 1,417	$14,177
RDD-A1-015	An Exemplary Program in Prosthetic-Orthotic Education	Walter Komiak Fenger SE College	45,000	96,073	141,073
RDD-A1-018	Air Frame-Power Mechanics Program for Upper Classmen	Edward Wirth Cahokia	17,300	18,604	35,904
RDD-B1-021	Preparedness Program	Troy Simpson Parkland College	40,902	32,730	73,632
RDD–A1-024	Aviation Mechanics Program	Edward Blue E. St. Louis	17,100	2,926	20,026
RDD-B1-027	An Exemplary Demonstration and Dissemination Center for Project CVIS	JoAnn Harris Villa Park	26,550	4,250	30,800
		TOTAL	159,612	156,000	386,088



LEGEND

- Part D – 61.9% increase in FY 71 over FY 70
- Part B and C funds – 9.2% increase in FY 71 over FY 70
- Total funds – B, C, and D for each Fiscal Year

1250

COMPARISON OF FUNDING ALLOCATIONS

PRIORITY AREAS FOR RESEARCH, DEVELOPMENTAL, AND EXEMPLARY ACTIVITIES FISCAL YEAR 1971

In June, 1970 a master plan was developed by the Research and Development Unit as a working model for planning research, developmental, and exemplary activities. Designed to assist the Division of Vocational and Technical Education, the master plan utilizes planned priorities to effect maximum results for the dollar spent. The total research, developmental, and exemplary effort is stressed rather than a fragmented activity approach. Direction is the key.

Since the beginning of Fiscal 1971, an increased effort has been made by the staff of the Research and Development Unit to plan for change. Priority areas have been assessed and categorized to provide direction. Projects have been funded which meet the needs of one or more priority areas.

The following subsections list and briefly describe the current priority areas of the Research and Development Unit. Also included in this section are the projects funded for the first half of Fiscal 71 and an explanation of how each project meets the needs mentioned in the respective priority. Some projects will go into depth in a specific priority area while other studies will include parts of several areas.

COMPREHENSIVE OCCUPATIONAL EDUCATION PROGRAM

The researcher and developer must be aware of a comprehensive occupational education program which emphasizes total career development. Such a program will take the young child as he enters school and provide him with the educational opportunities which will help him prepare for the world of work. This system will depend on articulation and coordination as described in the above section.

A comprehensive occupational education program must begin at the elementary level. Information about the world of work can be taught to students at that age. The relevancy of their entire educational process is dependent upon their understanding and grasp of the prospects for the future. Occupational orientation about specific vocations must be provided at the upper elementary and the first years of high school. The results of such efforts should be junior and senior students who are aware of the world of work and equipped to determine the occupational experiences which can provide them with the skills required to enter the world of work.

The schematic of a comprehensive occupational program would provide for educational experiences in all occupational categories. Students would have the opportunity to select courses in any of the following subject matter areas: applied biological and agricultural sciences, business, marketing, and management, health occupations, industrial oriented, and public and personal services. Such a system would include educational offerings for the following target populations: (1) disadvantaged, (2) handicapped, (3) elementary, (4) secondary, (5) post-secondary, and (6) adults. As sufficient research and developmental activities yield the mechanics and procedures by which these occupational categories can best be presented to the target populations and it has been determined what the course offerings should be, effort can be made to establish model programs at various selected school throughout the state.

R & D PROJECT

Title: Career Development for Children Project

Project Director: Larry J. Bailey

Location: Southern Illinois University

The goal of the present project is to schematize a conceptual model with accompanying materials that would provide guidelines and give impetus to career development programs for elementary school students. The operational task was one of designing behavioral descriptions which would encompass the developmental levels and designing of learning experiences to enable each individual to successfully cope with the demands of each vocational developmental task.

CONTRIBUTION

1. Reviewed, synthesized and interpreted the body of literature and research related to career development.

2. Published and disseminated the booklet entitled "Facilitating Career Development: An Annotated Bibliography." Approximately 3,500 copies of this book have been distributed throughout the country.

3. Provided teacher educators and classroom teachers with a career development model relating age, vocational developmental stages, vocational developmental tasks, educational objectives, and behaviorally oriented occupational content in a definitve way.

4. Developed curriculum guides and supporting instructional materials for the career development model.

5. Stimulated further research to aid in the facilitation of career development for children and youth.

Computerized Career Information and Exploration

By LARRY J. BAILEY and KENNE G. TURNER

The great promise of utili
of vocational guidance is mani
computer-based guidance syste
retrieval, and student interact
however, is to be aware of bo
adapting these systems to lo

In this decade there has been an emergence of a social and political consciousness toward the importance of career guidance. Recent research studies have demonstrated conclusively that traditional guidance programs are not preparing youth to make realistic occupational choices. Super and Overstreet (1960) found that over 50 per cent of the ninth-grade boys in their study were planning to enter occupations that appeared inappropriate in terms of intellectual and educational requirements. Project TALENT data revealed a high degree of disparity between students' career plans made ... indicated one year ... man study ... twelfth-grade ... professes

improvement
...ers of

21,741 choices for a career

By MYRON BRENTON

To the Parent:

Growing unemployment among better educated segments of American society and the cry of many young people for education that has personal r... e, are causing many people to re-examine the role of education and the universal worth of a college degree. Youth, than any other time in recent history are asking themselves, "What shall I do with myself?" The indicatio... cation has failed to adequately assist young people with their career planning and decision-making. In ... research project is being conducted at Southern Illinois University entitled the *Career Developme*... purpose of the program is to develop a career-oriented curriculum for Illinois students in gra... sis will be on developing an awareness and understanding of "self" and the "world of w... king more intelligent and realistic career decisions. Education for career developme... ility of the schools. Parents inevitably influence the developing attitudes and res... hich follows recently appeared in *The New York Times Magazine*. It has been ... ope that it will contribute to their understanding of how they ...

Larry J. Bailey
Princip...

Career Development for Children Project

Career Development for Children Project •

Career Development for Children Project

R&D PROJECT

Title: Project A.B.L.E.

Project Director: Dr. Walter Wernick

Location: Northern Illinois University

A.B.L.E. Model Program's approach to instruction places primary emphasis upon the "World of Work" as an organizing center for the curriculum. The focus is upon creating a theory of practice whereby teachers begin with significant content drawn from life activities. With such relevant content, teachers will be aided in managing instructional support systems. These, in turn, will relate people-oriented work activities with needed skills, facts, and attitudes.

CONTRIBUTION

1. Instructional materials for teachers to help them manage "World of Work" organizing centers.
2. Clinical assistance in planning lessons and units at project headquarters or at school sites.
3. Consultant service for school principals, learning center directors and elementary school counselors.
4. Clearinghouse for ideas and materials to present occupational information to children.
5. In-service programs for schools, districts or institutes.
6. Coordination of services at Northern Illinois University designed to aid "career development" activities for children.
7. Demonstration teaching at public schools and the University school.
8. Information programs for parents, lay advisory committees, school boards and other interested community organizations.

THE WORLD OF WORK AND THE ELEMENTARY SCHOOL

By Dr. Walter Wernick

Dr. Wernick is professor of education for the Department of Elementary Education at NIU and project director of the research project described in his article. He earned his B.S. from City College of New York; his M.A. and Ed.D. from the Teachers College, Columbia University. He is author of many articles and reviews and has developed a film on reading and writing for the future elementary school child. He is a member of several professional organizations, including life membership in NEA and Phi Delta Kappa.

"What should I teach?"

How long has it been since you heard that question?

Recently, it appears that content has been pushed out of its proper perspective. "How should I teach?" has been usurping the stage, especially in the elementary school, and this imbalance of energies has held back curriculum development from attaining many desired goals.

Pedagogical concern about content is not dead. Thoughtful teachers have always been concerned with the substance of their instruction and will continue to do so. Yet, it is unfortunate to note how often classroom instruction has started and ended with inert subject matter. Too many elementary school children have not been

Home bakers beat by assembly line

" and "shapers" did the "home niversity

y, eight prepared me sugar before two nished one

"Research Baker in His art of the oject in the niversity Lab t is to serve r improving content in

Dorothy Peterson, student teacher from Wildwood, suggested offering a cookie recipe booklet at the sale. Miss Majchrzak, also a supervising teacher, came up with the idea of giving the booklet free with the purchase of a cookie. The children provided the recipes.

THE A-OK Bakery name came from A-OK, name of primary cluster, directed Helen McNamara. Applebee originated the id printing step-by instructions on the b cards identifying the "c mixers and shapers." in preparations was student teacher, M Bernard, ST. Charles.

able MODEL PROGRAM

authentic basic life-centered education

DeKalb carpenter explains work to local youngsters

Uuno Maki, DeKalb carpenter, spoke to approximately 20 primary cluster children (6 to 10 year olds) at the University Laboratory School as part of the "World of Work" project.

Maki told how a building is constructed, emphasizing special things such as the snow load of a roof and the stress on openings at doorways and windows. He also discussed the reading of blueprints and other drawings, and using tools.

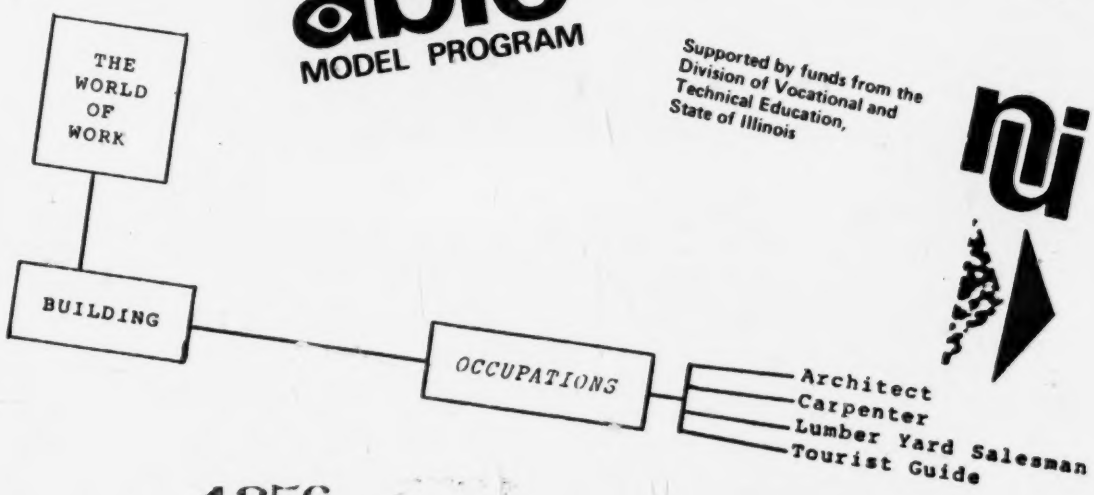
F... e was a small

boy he was interested in carpentry, Maki said. He watched work being done and learned much from observation. Maki also stressed the need for schooling as well as many years of work experience in his field.

This summer pilot projects are being conducted in the Northern Illinois University Lab School as part of the World of Work overall project, which is to serve as a model for improving instructional content in elementary schools.

authentic basic life-centered education

able MODEL PROGRAM



Supported by funds from the Division of Vocational and Technical Education, State of Illinois

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IMPROVING THE LEARNING ENVIRONMENT

Emphasis will continue to be placed on improving the learning environment in our educational system. Although many projects have been conducted for this purpose in recent years, much remains to be accomplished. New and better techniques must be found to teach the ever increasing number of students that will face educators of tomorrow.

When pursuing such projects, the researcher and developer must be cognizant that results should be applicable to instruction in all occupational categories. When this atmosphere exists, repetitious endeavors will be minimized. Emphasis will be toward encouraging projects which have broad applicability.

R & D PROJECT

Title: Computerized Vocational Information System

Project Director: JoAnn Harris

Location: Willowbrook High School, Villa Park

Project CVIS serves as an illustration of the kind of innovation which can be developed and implemented when local enthusiasm and resources converge with government funds.

CONTRIBUTION

1. The only successful computerized vocational information system in the United States that was developed by high school counselors.

2. The computer is used as a tool to assist students in the exploration of a wide range of occupations.

3. An attempt to develop a sequential vocational exploration capability (seventh grade through community college.)

4. Developed scripts and experiences which allow the student to explore self in relationship to education and career.

5. Serves as a demonstration center to illustrate, test, and evaluate the feasibility, operation, and capability of computer-based vocational guidance systems.

6. Recognized by National and State and International Governments as one of the most innovative concept projects in the world of education.

Computers Guide Vocations

ELECTRONIC 'LIBRARY' ASSISTS IN CAREER PLANNING

VILLA PARK, Ill. -- The guidance staff at Willowbrook High Scho
electronic "library" of career information to help students make voca

The Computerized Vocational Information System (CVIS) consists c
terminals on line to a System/360 Model 30 at the nearby college of D
the computer are data on more than 400 vocations as well as records --
results of interest and achievement tests -- for 1,700 sophomores, junio
seniors.

To get into the system a student enters his student number. After the student answers
questions from the computer and selects his area of interest, an IBM 1053 communications
terminal located next to the display unit prints out the job information.

R & D PROJECT

Title: System for Individualizing Vocational Education

Project Director: Thomas Koerner

Location: Niles Township High Schools

The primary purpose of this project was to develop an instructional system to meet the individual needs of students in vocational courses by allowing each student as much instruction as necessary. With the use of modified cassette tape records, slides, and filmstrips, as well as paper manuals, teachers are able to give individual students special help.

CONTRIBUTION

1. Familiarized a selected number of vocational education teachers with a variety of instructional techniques for presenting materials in a programmed audio-visual mode.

2. Trained a cadre of teachers for programming instruction materials in vocational education courses most suitable for this technique.

3. Designed an instructional system which will be responsive to the individual learning patterns of a variety of students in vocational education.

4. Developed instructional materials for use in individualizing instruction in vocational education courses.

5. Familiarizes teachers with a structured alternative approach to teacher directed instruction.

6. Tested and evaluated the system's capability to enable participating students to achieve learning.

Niles Township Schools Prepare Teaching Tapes

Slide and film tape casettes experimentally. At the
known as "instructional the semester, their eva
modules" will be used to will be submitted w
provide individual instruction tapesand films to th
for students in vocational arts Koerner said the sta
at two Niles Township high tapes and films to
schools this fall. then make duplicat
Funded by a $24,000 grant the projects for
from the state, the project was thruout Illinois.
originated last spring by John Aside from th
Bristol, assistant district super- aspects, some of
intendent for use in business have set up work-
education, home economics and so the students
industrial arts. new skills to
Nicknamed S. I. V. E. [sys- Several are uti
tem for individualized voca- skills in local s
tional education], its objective First p u b l
is to allow more teachers to of the filmed
work on a one-to-one basis with finished produ
their s t u d e n t s. During the p. m. Oct. 26 in the Nil
semester, students will be able auditorium at the district board
to supplement regular class- meeting. Koerner is also work-
room instruction with step-by- ing on similar demonstrations
step directions for projects such as carburetor repairs, the to explain the new techniques
soldering process or operations of business machines.

Individual Help

Dr. Thomas F. Koerner, S. I. V. E. director, said a student can run thru the slides and taped information as many times as he needs to. Materials can be taken home or used in special study areas. "The student is able to progress pretty much at his own rate and the teacher is free to provide any personal help necessary," he said.

During in-service seminars last spring, 12 teachers were selected from Niles West, Edens Expressway and Oakton Street, and Niles North, 9800 N. Lawler Av., both in Skokie. Total enrolment in the two schools is approximately 5,600, Koerner said.

37 Projects

The group devised 37 projects which are now being used

State Money Aids Nilehi Work Ed.

A RECENT AND sizeable finan-
cial grant to Nilehi from the State
nois could result in even
ndividualized instruction for
s pursuing vocational ed-

t $24,000 in two separate
as provided Nilehi by the
ate Department of Voca-
ucation and Rehabilita-
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nd business educa-

hase program,
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called for interested subject area teachers to produce slide film-casette tape presentations on specific topics within their areas.

These "instructional modules" are then to be used by students at home or at school to supplement regular classroom instruction.

"For instance," Project SIVE Director, Dr. Tom Koerner, said, "suppose a student in an industrial arts area was interested in carburetor repair. Following general classroom instruction on the topic, the student could then isolate himself with the slide-tape program, follow a slide by slide presentation with accompanying taped instruction on carburetor repair. He could repeat this as often and for as long as he wishes.

"NOT ONLY IS the student able to progress pretty much at his own rate, but," Koerner concluded, "the teacher is freed to provide any personal help necessary."

Last summer, 12 Nilehi teachers wrote 37 SIVE program proposals. Following approval of each proposal the teacher was given a week to complete it.

Project topics, in addition to carburetor repair, include: cash-iering; key punch operation; ... of different

Nilehi vocational effort gets $24,000 grant

ALMOST $24,000 has been granted to Niles Township high schools by the Illinois State Department of Vocational Education and Rehabilitation for project SIVE—System For Individualized Education.

SIVE, designed by Assistant Supt. John Bristol this past spring, is aimed at providing more individualized instruction in such courses as industrial arts, home economics, and business education.

A THREE-PHASE program, SIVE in its first two stages called for interested subject area teachers to produce slide film-cassette tape presentations within ic topics within

These "i a $24,000 grant modules" a Township High School District to used by stu promote individualized instruc- at school tion for students pursuing voca- ular clas tional education.

"For Two separate grants, made by the state's department of voca- SIVE said, tional education and rehabilita- an indus interested in pair. Following

classroom instruction on the topic, the student could then isolate himself with th slide-tape program, follo slide-by-slide presents with accompanying ruction on car . He could re for as

Niles high schools get state grant

The State of Illinois has made

tion, will aid the operation of project "SIVE" System for Individualized Education.

Designed by Assistant Supt. John Bristol, the project is aimed at providing more individual instruction for students studying industrial arts, home economics, business education, and other vocational courses.

Insturction, while other groups will receive only the latter.

R&D PROJECT

Title: The Preparedness Program

Project Director: Troy Simpson

Location: Parkland Junior College, Champaign, Illinois

The Preparedness Program began in 1969 as an educational experiment designed to encourage, recruit, and motivate disadvantaged students who are unlikely to actively explore and pursue an educational program for themselves within the existing educational structures. In 1970 the Preparedness Program was funded as an exemplary program.

CONTRIBUTIONS

1. Places emphasis upon behavior and social usefulness as well as upon intellectual development as an outcome of learning.

2. Designed to give socio-economic and academically disadvantaged students the opportunity to participate in a successful educational experience within the framework of a community college.

3. Total involvement of the student, maximum exposure to information, increased skill development and personal development to its maximum potential.

4. Helps the student gain a better concept within the context of the class and/or group.

5. Assists students and teachers in becoming more sensitive to each other through interaction and verbal interchange, thereby developing a sense of trust between them.

6. Provides an environmental situation between students and teachers that would provide exchange outside the classroom.

7. Provides a media to express ideas to make classroom content meaningful and relevant to the needs of the students.

Preparedness Program Gives Second Chance

by Bruce Murray

The Preparedness Program was begun at Parkland College in September, 1969, by various staff members of the college. The program is designed "to prepare disadvantaged persons for experiencing success within the Junior College District 505," according to Troy Simpson Jr., director of the program.

Under the program, persons who lack the financial or educational background to attend college are given a twenty-two week (two academic quarters) instructional program that enables them to advance toward more education.

mathematics, and personal human development.

Many of the students that completed the program found it extremely val Even after having had poo school records, students completed the Prepar Program and have gone to take courses in Ca Transfer programs.

PREPAREDNESS PROGRAM

Preparedness director Troy Simpson, left, and Jim Lyles, main counselor for the program, work on follow-up study.

CHAMPAIGN-URBANA COURIER

Troy Simpson heads new program

Parkland recruiting disadvantaged

By Jean Andrews
Of The Courier

Recruitment of Parkland College students from disadvantaged persons and a "Preparedness" program to help them stay in school are scheduled to begin in coming weeks.

Troy Simpson Jr., previously a counselor with Adler Zone Clinic, Decatur, has taken over a new job at Parkland as coordinator od special programs.

1263

Parkland 'Preparedness' program aids 25 blacks

Parkland College's endeavor in a program somewhat similar to the University of Illinois' "Project 500" has an enrollment of 25 black students from Champaign-

lack of money, and in some cases for lack of motivation and push," said Troy Simpson Jr., coordinator of special programs at Parkland.

from these career programs also are transferrable for education beyond junior college.

R & D PROJECT

Title: Delinquency Intervention Project

Project Director: Richard Pooley

Location: Carbondale Community High School

This is a project designed for delinquency intervention in a high school-community setting. Using university graduate students as "Big-Brother" type counselors to work with delinquent-prone youths. The concern of this project centers on identification of the educational needs of dropout-prone high school students and implementing educational methods and materials that provide alternatives to college preparatory programs.

CONTRIBUTIONS

1. Graduate student counselors interacted with "so-called" delinquents in their "big brother" capacity with amazing results.

2. Identified the educational needs of dropout-prone high school students and developed a manual for delinquency intervention.

3. Designed educational methods and materials that provided alternatives to college preparation programs.

4. Caused increased coordination between existing public agencies and public institutions in designing training projects for university graduate students for professional careers in corrections, rehabilitation and education.

EVALUATION AND ACCOUNTABILITY

An area of extreme priority is one of evaluation and accountability of our educational programs. It is most essential that all research, developmental, and exemplary projects undertaken be especially sound in this respect. The time is past when educators will not be held accountable for the products which they produce. Education will no longer be regarded as an unquestionable process in ones journey to maturity. Since man is most familiar with the term dollar and cents, increased emphasis shall be given to cost-benefit accounting. Much of our accountability will evolve around this commality. In the process we must not ignore attitudes. The vagueness and uncertainity of this evaluative device has frightened many.

The impact of evaluation and accountability is most apparent among today's educators. A reassuring point to educational researchers is that more emphasis is being placed on less rigid evaluative techniques. The social sciences will probably never become as sophisticated as the physical sciences. When this is understood, more emphasis can be placed on attitudes scales which measure thoughts of persons affected by educational programs.

Educators must be willing to work under the premise that although research results are not entirely correct, they must be tailored to fit specific situations. The results are most certainly not hard-and-fast, but they are closer to the truth than intuition alone.

R & D PROJECT

Title: A Special Analysis of Vocational Education in the City of Chicago

Project Director: C. Jos. Ehrenberg

Location: Chicago, Illinois

This study deals solely with the City of Chicago. An examination of the existing structure and content of both public and private vocational education in Chicago is being undertaken.

CONTRIBUTIONS

1. Comprehensive search and familiarization with literature and legislation concerning vocational education.

2. Field investigation of vocational training programs in the Chicago public schools and private schools.

3. Final report including the analysis and recommendations for appropriate directions.

R & D PROJECT

Title: Analysis of One and Five Year Plans of Local School Districts for Vocational Education

Project Director: William Rogge

Location: University of Illinois

The prime objective of the project is to ascertain the effectiveness of the local plans submitted to the state as a basis for state funding of local vocational programs. All local plans submitted to the state are analyzed by a protocol that reflects national and state priorities. A sampling of the plans will be read and evaluated and some 87 school districts will be interviewed.

CONTRIBUTIONS

1. Encourages and focuses local planning efforts.

2. Meeting state and national priorities as expressed through the 1968 Vocational Amendments in the State of Illinois guidelines.

3. Guiding actual local program development.

4. Development of a planning guide intended to demonstrate principles of good planning.

R & D PROJECT

Title: Development of Three Phase On-site Evaluation Instruments

Project Director: T. L. Wentling

Location: University of Illinois

The Division of Vocational and Technical Education is currently formulating an evaluation process referred to as the "Three Phase System for State-wide Evaluation of Occupational Education Programs." This study will be concerned with Phase 3 of the system (on-site visitation), and is very dependent upon a concisely defined process to be conducted by the visitation team members.

CONTRIBUTIONS

1. Development of a structured set of instructions and questions to aid in the on-site visitation.

2. Development of pre-interview instruments designed to initially gather base line data on students, teachers, administrators, and community representatives.

R&D PROJECT

Title: Cooperative Junior College Computer Study

Project Director: Carl Thornblad

Location: Shawnee Community College

This study is designed to review the present "state of the art" of computer utilization as it relates to education. An analysis is being made of current usage of computers by public junior colleges in Illinois including the purpose and services rendered by each installation.

CONTRIBUTIONS

1. Detailed review will include the computer utilization data on current usage, staffing, equipment, and cost.

2. Development of a data gathering instrument for analyzing utilization of computers by public junior colleges.

3. Various alternatives of providing the same type of service as currently provided and as projected will be studies with suggestions as to which appear to be most economically feasible.

R & D PROJECT

Title: State Survey of Home Economics Programs in Illinois

Project Director: Dorothy Keenan

Location: Southern Illinois University

The survey is designed to base line quantitive data about the Home Economics program in operation during 1970-71 in grades 6-12 in the public schools in the State of Illinois. Such information is needed in order to determine the degree to which Illinois has responded to the directive for Home Economics education.

CONTRIBUTIONS

1. Development of a model istrument which can be used periodically to aid in on-going evaluation.

2. Aid to program planning at both state and local levels.

ARTICULATION AND COORDINATION

We must not ignore the fact that the lack of relevancy in educational programs transcends all grade levels. Neither the elementary, secondary, nor post-secondary systems are spared from the problem. For this reason, research and developmental projects which are relevant to existing needs shall be initiated at all levels.

Such a system would stress articulation and coordination between all grade levels. Students must progress smoothly through their entire educational program toward the final goal of acquiring the skills necessary to enter the world of work. The transition between administrative structures (one building to another) shall be such that students notice only a change in the physical environment and not a change in educational emphasis.

R&D PROJECT

Title: Exemplary Program in Prosthetic-Orthotic Education

Project Director: Paul Rupprecht

Location: Olive-Harvey Junior College, Northwestern University

Prosthetics and orthotics are those fields of physical rehabilitation medicine which deal with artifical appliances for the human body. Prosthetics deals with artificial limbs (Prosthesis) and Orthotics deals with bracing (Orhtoses) for the human body. The program is designed to provide the student with a sound vocational education program in the design, fabrication, and fitting of artificial appliances with the aim of direct job entry upon graduation.

CONTRIBUTIONS

1. The Cooperative arrangement between Olive-Harvey Junior College and Northwestern University is unique in that the cost of instruction is borne separately by each institution.

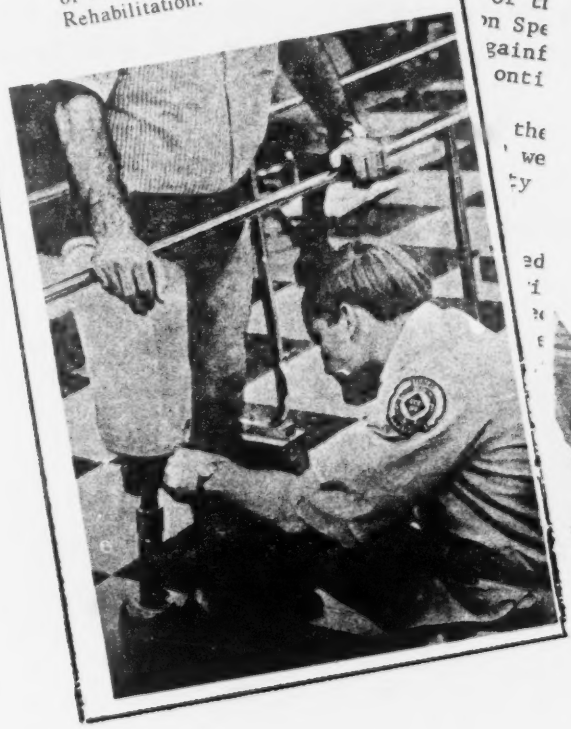
2. There is no other institution offering prosthotic-orthotic programs in the central U.S.A. Only one other associate degree program is in existence.

3. Students are trained in a profession where an extreme shortage exist for skilled personnel, and the technical education has not kept pace with the needs.

4. Developed in cooperation with a well organized program of general education providing understanding, skills, values, and attitudes desirable for effective living in contemporary society.

EXEMPLARY PROGRAM IN PROSTHETICS AND ORTHOTICS EDUCATION

Jointly sponsored by the City Colleges of Chicago (Olive-Harvey College) and Northwestern University in cooperation with the Division of Vocational Technical Education, State Board of Vocational Education and Rehabilitation.



STUDENT PROSTHETIST ORTHOTIST
CITY COLLEGES OF CHICAGO
NORTHWESTERN UNIVERSITY
CCC NU

SURVEY--GRADUATES OF DEGREE PROGRAMS IN PROSTHETICS AND ORTHOTICS

The first graduates of a prosthetics and orthotics degree program in the United States were two students who received their baccala
grees from New York University in 1965. By the en
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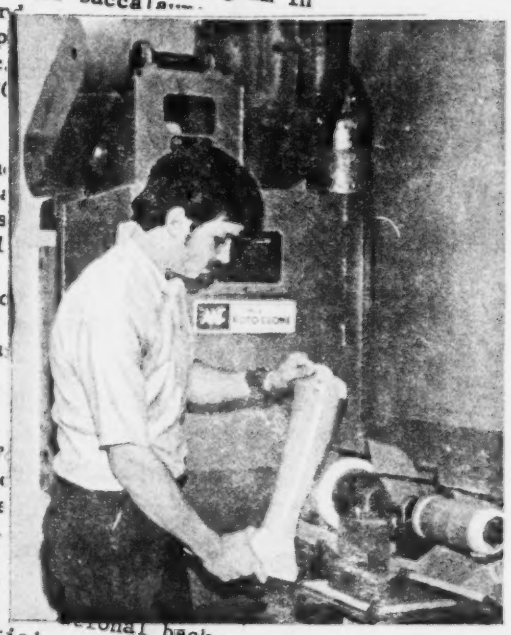

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ion of prosthetists and orthotists.

of the findings of the survey will appear in the December,
otics and Prosthetics

R & D PROJECT

Title: Joint Occupational Orientation Project: An Experimental Approach to Vocational Education

Project Director: E. A. Ebert

Location: Libertyville High School

This project is designed to make activities and materials relevant for the potentially alienated student. The elementary school first identifies at their level those students who possess the characteristics of potential dropouts. The secondary school provides educational experiences that will equip the potential dropout with skills that will make him a productive citizen.

CONTRIBUTIONS

1. Block of time curriculum modification stressing the utilitarian value of basic subjects and vocations.

2. Group and individual guidance.

3. Individualized scheduling and instruction.

4. Utilization of courses that assist in career fulfillment.

5. Cooperation between elementary and secondary schools.

LOCAL AND STATE PROGRAM PLANNING

Research activities designed to expedite total planning at local and state levels is of immediate priority. A series of research projects are to be undertaken emphasizing such areas as master planning in area centers and cost and effectiveness of secondary and post secondary programs. As the staff of the Vocational and Technical Education Division, the State Board of Vocational Education and Rehabilitation, and the Governor's Advisory Council on Vocational Education identify needs for pertinent research, such activities will be carried out by the Research and Development Unit.

R & D PROJECT

Title: An Analysis of Secondary Area Vocational Centers in Illinois

Project Directors: Edward Anderson, Wayne Zook

Location: Illinois State University

This study will be conducted in two phases. Phase I will be concerned with collecting data via personal interviews, questionnaires, and community surveys. Phase II will consider population, manpower and other pertinent trends involved in proper planning for the future.

CONTRIBUTIONS

1. The relationship of money expended for Area Vocational Centers and the total expenditure for vocational education in Illinois will be determined.

2. Total school enrollment of schools in proximity to Area Vocational Centers will be obtained.

3. Comparisons between the descriptive data collected and analysis of the foregoing factors will serve as a basis for drawing conclusions, making recommendations and suggesting directions for the future.

Title: The Exploratory Analysis of Differential Program Costs of Selected Occupational Curricula in Selected Illinois Junior Colleges.

Project Director: Robert M. Tomlinson, Chester Rzonca

Location: University of Illinois

There is a need for complete cost data accurately describing program costs, both initial and operating at the community college level Sufficient categories should be provided allowing for the itemization of budget expenditures. It is the intent of this study to utilize and build upon data previously collected by the Board of Vocational Education and Rehabilitation and the Illinois Junior College Board and to provide structure to reflect costs for selected occupational programs.

CONTRIBUTIONS

1. Provides differential program costs within the limitations of available data for six selected Illinois Junior Colleges.

2. Analyzes alternative methods of allocating program costs to various occupational curricula.

3. Determining collection and analysis procedures necessary for effective collection of differential program cost data

R & D PROJECT

Title: Development of Systems Models for Decision-Making in Curriculum Development and Evaluation

Project Director: Dwight Davis, Joseph Borgen

Location: Joliet Junior College

Many new programs must be identified, developed, and evaluated to insure compliance with the contemporary needs of today's students. In order for local agencies, area centers, and post-secondary institutions to do an effective job of program identification, development, implementation, and evaluation, there should be developed an innovative, systematic and defensible plan to accomplish the task. This project is an attempt to develop and test such a plan.

CONTRIBUTION

1. Review of the literature on models for curriculum development and evaluation.

2. Reviewed current thinking on the effects of planned curriculum on social and economic conditions.

3. Three basic approaches to curriculum development identified and established as the model guidelines for the project.

4. Identifies four basic approaches in designing models for curriculum evaluation.

5. Stresses that economic considerations used by educational planners from two areas of economic thought: (a) manpower forecasting, and (b) decision making covering capital investment allocations.

6. Providing a systems model makes it possible to consider the effect of a planned curriculum on enhancing the human factor and the ensuing effects of such considerations on the economic conditions of a region.

R & D PROJECT

Title: Vocational-Technical Education—Public Information Program

Project Director: D. Reid Ross

Location: Bi-State, St. Louis and East St. Louis

High School and junior high school students throughout the Bi-state St. Louis Metropolitan Region neglect interest in educational opportunities leading to careers as skilled craftsmen. This project consists of essential features that will provide a public information program to be implemented in the Bi-state St. Louis Metropolitan Region.

CONTRIBUTIONS

1. On-going effort of direct contact with teachers, parents and students.

2. Public relations effort utilizing mass media.

3. Development of a "Vocational Education Exhibition" to be arranged with the cooperation of business and industry in the Bi-state St. Louis Metropolitan Region.

4. Cooperative public relations effort between East St. Louis and St. Louis Region's

ASSESSMENT OF ATTITUDES AND NEEDS

To insure that adequate courses are being offered in vocational education, concern should be given to systematically assessing the attitudes and needs of the individuals and groups who are to be served. Vocational educators could also profit from an assessment of attitude toward and a need for vocational education in general.

When this has been established, we should be better able to determine the present status of vocational education. Not until this fully is understood can vocational educators provide the experiences and answers necessary to insure future development.

R & D PROJECT

Title: Metropolitan Programs in Applied Biological and Agricultural Occupations: A Need and Attitude Study

Project Director: Hollie Thomas

Location: University of Illinois

Purpose of this study is to ascertain the need for and feasibility of establishing applied biological and agricultural programs in the Metropolitan Area of Chicago. The results of this study will provide data to provide support for the development of applied biological and agricultural occupations programs in metropolitan areas.

CONTRIBUTIONS

1. Determination of employment needs in specified areas of applied biological and agricultural occupations in the Chicago metropolitan area.

2. Determination of attitudes of students in metropolitan areas concerning applied biological and agricultural occupations.

3. Determination of school administrative personnel attitudes regarding the offering of programs in applied biological and agricultural occupations.

4. To determine if teachers are prepared or are willing to prepare to teach courses in applied biological and agricultural occupations.

Title: Commercial Horticultural Skill Practices Institute for Illinois Elementary, Secondary, Junior College Instructors: A Private Industry Approach

Project Director: Theodore Buila

Location: Southern Illinois University

The Horticultural Skill Practices Institute is concerned with (1) strengthening the practical horticultural skills of Illinois education staff (K-14) (2) providing Illinois a base cadre of market place oriented instructors to initiate, and maintain and develop relevant horticultural instruction.

CONTRIBUTIONS

1. Instruction ranges from applied "green biology" in the elementary school to specific occupational training in the higher grades.

2. Instruction and training are executed by DuPage Horticultural School.

3. Institute evaluation will utilize cost effectiveness techniques.

De-schooling horticultural education:

Program puts emphasis on practical experience

by Ted Buila and Bill Jahn

INSIDE THE HORTICULTURAL INDUSTRY it's no secret that only a handful of schools can be depended on for graduates with enough skills and horticultural common sense to step into jobs without having to be watched every moment. Practical horticultural instruction has col most agricultural coll schools. Perhaps this i industry wants. After has growled very lo the deluge of lillip lum crumbs that buried a once-sou under layers of bug.

happening in our schools—and it can't be blamed on long hair — something we don't get a lot of pleasure watching. Namely, the agricultural college administra tors (deans, chairmen and teac ers) are running scared. All many programs at the second and college level are in jeop ational costs are up, ar down. To bu going

Illinois Hort Industry Makes Opening Bid

r and Bill Jahn of DuPage School, Inc., in West reported a recent re- iculture and education ultural industry has a in practical horticul- n.

go on to say: "We dering schools and nction/learning as all of us would g is not depend-

For example, in the earlier grades, this might take the form of what we would call curriculum enrichment—the sharing of plant materials and garden plots with a local part district or perhaps working with park district personnel.

Another idea might be the use of the local florist to teach color harmony and geometry (simple, of course, but quite practical) with living materials.

DuPage Horticultural School offers new program for teachers

WEST CHICAGO, Ill. — During the past year the DuPage Horticultural School in West Chicago has conducted a horticultural skills practice institute for 15 selected teachers in Illinois.

For the pa ector ural S outhe rbonc ultur r leve y lacki fort to r deve which earch Illin l Edu

it is a teacher re-education that meets the industries' specifications.

The Institute focuses on creating a "new" educational relationship between the teachers and

as it occurs in industry, utiliz commercial materials and eq ment.

A sharp emphasis is given h a n d s-on skills developm taught and supervised by "

plete toucha esourc pment ting. f this g "of o deve entatio nslated curri es, in

R & D PROJECT

Title: Analysis of Surveys of Illinois Vocational Guidance

Project Director: Richard Bradley

Location: Southern Illinois University

This investigation is designed to bring about improvements in pre-service graduate preparation of secondary school counselors. The main area of concentration is improvement in occupational and educational information courses. The present research involves the analysis of data collected during Fiscal year 1970.

CONTRIBUTIONS

1. A syllabus for educational and occupational guidance courses which reflects surveys of outcomes, as well as descriptive reporting of practices and innovative programs in Illinois will be produced.

2. Results will be transformed into an educationally relevant form which will give direction for vocational guidance.

3. Excellent example of a cooperative vocational education program between the public institution and a private institution.

DISSEMINATION

Researchers and developers must constantly be concerned with providing results which are pertinent to the practitioner. All too often, results from relevant projects are not accepted simply because they are not presented in usable terms. Of prime importance to research, developmental, and exemplary programs is the dissemination of findings which can be utilized by others. The day is past when educators can do research for research purposes only. Proposals must be evaluated on the premise of how many individuals will be effected by the results which are obtained.

Title: Special Programs for Vocational and Occupational Preparedness

Project Director: Glenn Taylor

Location: DeKalb County

This project is designed to serve as a demonstration center for the school year 1970-71. The center was established for interested persons desiring to develop a special program for mentally handicapped students with major emphasis upon vocational training and its relationship to the mentally handicapped student. The demonstration center is centered in DeKalb County.

CONTRIBUTIONS

1. An aid in the development of curriculum materials for the mentally handicapped child with emphasis on "The World of Work."

2. Providing in-service meetings for the middle, junior and senior high students with special needs.

3. Assistance and aids for teachers in developing appropriate vocational materials.

4. To allow schools to observe different approaches to programs for mentally handicapped students.

R & D PROJECT

Title: West Central Hancock County Vocational Education Agreement

Project Director: Gayle Nelson

Location: Carthage District No. 312, Hamilton District No. 328, Nauvoo-Colusa District No. 325, Warsaw District No. 316

The "West Central Hancock County" joint agreement is an agreement which serves the needs of students in four small high schools in a rural area. The four schools involved in the agreement are:

Carthage District No. 312
Hamilton District No. 328
Nauvoo-Colusa District No. 325
Warsaw District No. 316

The four schools involved in the cooperative agreement were too far from an area vocational school to participate.

This project is designed to explore the strengths and weaknesses of the cooperative thus providing guidelines to follow which will allow for faster implementation of future programs. Drive-in conferences will be held so that interested persons will be able to see and hear first hand how the program was developed and is operated.

CONTRIBUTIONS

1. Serves as a model joint agreement.

2. Visitations are conducted so that other schools can see the program in action.

3. Materials are distributed which are pertinent to the formation of a joint agreement.

4. Provides consultant services for interested administrators during planned drive-in conferences.

R&D PROJECT

Title: Exemplary Program in Air Frame—Air Power Mechanics

Project Director: Edward Blue

Location: E. St. Louis School District No. 189 — Cahokia School District No. 187

The purpose of the project is to design a curriculum at the high school level to prepare high school students with the essential skills that will enable them to gain entrance to employmnet in the field of aircraft maintenance or its related activities. Over a two year period students can earn up to 720 hours toward an A & P License Mechanics Certificate. The actual training is provided through a joint agreement between the local high schools and a private university and a junior college.

CONTRIBUTION

1. Provides an innovative type of vocational educational program in the areas of air frame and air power mechanics

2. Outstanding example of a community agency (university) — school cooperative project. Cooperative venture of a large private university, junior college and local school systems in a highly innovative educational program.

3. Importance of this new vocational educational opportunity is reinforced by the great need for motivating our student body, to remain in school and prepare themselves for the adult work world.

4. Reinforces a Board of Education commitment: the need for working toward developing relevant vocational school experiences for high school students.

5. Unique vocational educational opportunity.

A high school student in the A&P program rivets two pieces of metal together in the metallic structures phase of the course.

Instructor James Bryer of the Parks College staff lectures to Cahokia High School students on Federal Aviation Agency regulations.

Ed Blue explains how the flaps function on a small aircraft.

Students learn to patch wings of small aircraft.

R & D PROJECT

Title: Demonstration Center for a Comprehensive Home Economics Program in a Medium Sized High School

Project Director: Mary Beth Stine

Location: Flora Township High School

The demonstration center in Flora Township High School will make available its facilities and its program files to all who wish to see how a medium-sized school in a small community can meet the requirements of the Vocational Education program and at the same time fill the needs of all students interested in the three phases of Home Economics—Gainful, Useful and Consumer Homemaking. It is hoped that experience in building the program, keeping it in operation, and planning for the future would be helpful to those schools, so far have been hesitant in starting this type of program or in strengthening their present program. The home economics program will act as a demonstration center to meet the following criteria:

CONTRIBUTIONS

1. To allow schools (administrators and teachers) of similar size and structure to have the opportunity to observe a total home economics program in action (Useful, Gainful & Consumer Homemaking).

2. To provide an opportunity for exchange of ideas among schools of similar sizes.

3. To share published and unpublished materials with administrators and teachers both in the areas of consumer homemaking education, as well as in personal and public service occupations.

4. To show how a school can start a health program by integrating it with a cooperative personal and public service occupations program in a small school.

5. To provide consultant service through a later workshop. Total program concepts will be discussed before schools must submit their local plans to the State Board of Vocational Education and Rehabilitation.

HONORS FOR LOCAL SCHOOL

FTHS Home Ec Department, Is State 'Demonstration Center'

The Flor... School war... that its H... partment... a "Demo... the Boa... cation...

Flora program chosen as model in work classes

This ... cation ... came ... ed by Mrs. Mary Beth Stine, ... ferer ... and Mrs. Dorothea Martin's ... min ... child care class will take the ... om ... role of a demonstration center ... af ... for the entire school year.

... As a medium-sized high ... school with a total home econo-... mics program, FTHS will play ... host to 100 or more high schools ... during the year. At any time ... administrators, home ec in-... structors, and other interested ... persons including Congressmen ... will have a chance to observe ... the program in action and the ... ways it can be funded.

For a one-day workshop ... vember 19, about ... be invited to exc... and see the studen... and in the classroo...

The other schools ... a medium-sized high ... a small community ... the requirements of th... tional Education Progr... still fill the needs of ... interested in vocational ... economics.

Information and materia... be available so other sc... can make plans to fit ... school situation. For those ... make plans for their o... schools, a follow-up conferen... will allow their plans to ... checked by a consultant.

An evaluation of the entire program will take place May 30.

High for student... proceeding ... today ... yond the ... preparator... be-

Care of children real part of new class

Child's Care Occupation Class, offered to junior and senior girls, is a first-time course at ... by Mrs. Doro-

old.

In the regular classroom, ... 26 girls learn prenatal and p... natal care of babies. They ...

10:30-12:30—Tour ... Statie... Care Occupational ... Food Service Stations, and Con-... and Homemaking Clas-...

... to take the civil service ... which enables them to ... every school or day

Flora's first demonstration center draws 130 teachers and principals

"Too much to see with not enough time," the visitors la-... mented after the drive-in con-... ference November 19. Chosen ... as the first demonstr... ter in ...

played host to the 130 ... ec teachers and admin... who arrive... home ... tors ... 150-

Teachers, principals to visit first demonstration center

Four buses—one blue, one pink, one yellow, and one green —will transport visitors during the FTHS Drive-In Conference for home economics teachers and administrators to... the colors assigned to ... gnate different tours ... varied areas of inte... Because FTHS is th... h school of its size ... e with such a broad ... nomics program, the ... rd of Vocational Edu... selected it as an outsta... example for the first home eco-... nomics demonstration center in Illinois.

Representatives ... 100 Illi...

... stations ... cted. A question ... session at the ... l help the other ... r future home ... rams of this ...

Martin, child ... instructor, ... Stine, FTHS ... department ... Helregel, stu-... Mrs. Vesta ... ngfield, will ...

Employment class adds health services

A health service, called medical careers, is the newest development in the expanding student employment plan, instructed by Mrs. Mary Beth Stine. Selected by interview from a group of 12, six students are employed by the hospital. Theresa Boyer works as a secretary, Mike Hockman in physical therapy, Cheryl Bowen as a nurses' aide in Medical and Surgery, Linda Rodgers in the obstetrics ward, Debbie King in the dietary department, and David ... maintenance depart... Geor... Sparta... care ... Motor... ers i... East... with ... Ot... dents ... the ... Jac... Sch... cal... 7... gr... de...

GAINFULLY EMPLOYED at the Clay County Hospital, Linda Rodgers and Cheryl Bowen listen to instructions from Mrs. Opal Alexander on their first day at work.

NEW IDEA IN DISSEMINATION

In Bulletin No. 11-670 "A Master Plan of Research, Developmental and Exemplary Activities in Vocational-Technical Education," one of the key objectives for exemplary (Part D) funds was the identification and highlighting of effective on-going or "example-ary" programs which could serve as models for improving occupational education.

These demonstration centers highlight operational programs which exemplify new concepts in vocational education, or new approaches to problem areas in vocational education. Through the results of various research and developmental activities the seed of innovativeness has been sown. Local educators have taken the initiative in providing relevant programs that are meeting the needs of their students.

It is anticipated that through visitations, conferences, brochures, etc., teachers, administrators, and parents could observe programs and receive information concerning innovative concepts in vocational education.

Demonstration Centers for 1970-71 School Year

- Exemplary Demonstration and Dissemination Center for Project CVIS, Villa Park, Illinois.
- DeKalb County Demonstration Center – Special Programs for Occupational and Vocational Preparedness, DeKalb, Illinois.
- Demonstration Center for a Comprehensive Home Economics Program in a Medium-Sized High School, Flora, Illinois.
- West Central Hancock County Vocational Joint Agreement, Carthage, Illinois.
- An Exemplary Demonstration Center in Aviation Mechanics, Cahokia and East St. Louis, Illinois.

* new directions
for vocational home economics

A description of a Demonstration Center being conducted by the Flora Township High School in cooperation with

DeKalb County

IN CONJUNCTION WITH THE STATE DIVISION OF VOCATIONAL TECHNICAL EDUCATION

Exemplary Programs

EXEMPLARY DEMONSTRATION CENTERS

Vocational and Occupational

Preparedness

for

Special Needs Students

West Central

Hancock County

VOCATIONAL EDUCATION JOINT AGREEMENT

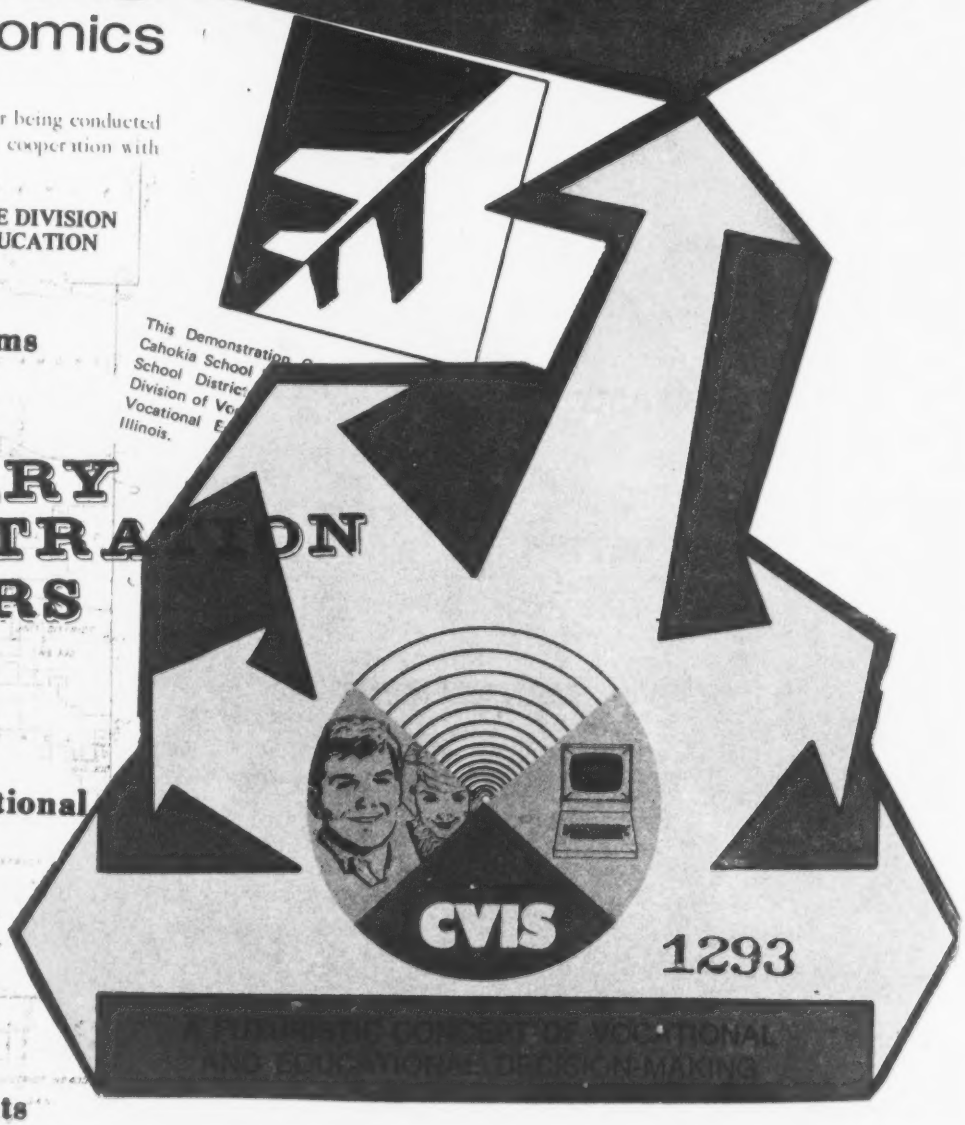
Nauvoo-Colusa
Hamilton
Warsaw
Carthage

AN AVIATION MECHANICS PROGRAM
EXEMPLARY DEMONSTRATION CENTER

COMPUTERIZED VOCATIONAL INFORMATION SYSTEM

A cooperative project at Willowbrook High School and College of DuPage

This Demonstration C
Cahokia School
School Distric
Division of Vo
Vocational E
Illinois.



A

MOVE

TOWARD

BETTER

MANAGEMENT

Staff members of the Research and Development Unit have been actively involved, along with other staff members of the Division, in the development of an internal management system for the State Office. This system will be known as "Systems Approach for Management of Vocational Education in Illinois." A description of this system and its ramifications follows. A diagram showing the Goals and Objectives of the Research and Development Unit for Fiscal Year 1972 is shown on the following pages.

Systems Approach for Management of Vocational Education in Illinois

Management is the key to success in any organization where resources are allocated to attain desired goals and where uncertainty and scarcity of resources is a reality. In order to be a more effective organization, the Division of Vocational and Technical Education has established a systems approach for management of vocational education in Illinois.

Management can be defined as purposeful and systematic decision making involving the allocation of resources to specific means for achieving desired ends. The foundation of management activity is planning which can be defined as the development of an initial set of decisions directed toward attaining specific goals by optimal means.

In this management system, each unit of the Division is defined as an individual system designed to carry out a unit purpose which in turn supports the accomplishment of an overall purpose for the Division. The Division is defined as a Suprasystem in which the units operate. The Board is then a Suprasystem of a higher order in which the Division operates.

In developing the systems approach, the Division began by assessing needs, stating the purpose of each unit, setting generalized goals to support the purpose, writing specific objectives to accomplish each goal and identifying the various activities needed to accomplish each objective. Based on this system the units will be able to make better decision based on several sound alternatives. The system can also be helpful in terms of budgeting, personnel needs, and many other administrative functions of the Division.

Management Information System (MIS)

The vehicle for management, and in turn decision-making is Information. Information is the element which allows management to be a dynamic process and enables the decision-maker to employ management tools.. In support of the overall Management System, the Division is in the process of developing a Management Information System (MIS).

The MIS will basically be a data retrieval system which shall seek to provide data in two major categories: Supply and Demand.

To be successful, the total information system must be accessible to both the local decision-maker and the State office. Cooperation by local educational agencies is paramount for successful implementation and operation of the System.

The Research and Development Unit is coordinating the efforts of developing the Management Information System. Three different approaches are presently under review. It is anticipated that a decision can be made soon making it possible to develop and implement one of the proposed concepts. A successful information system could provide the necessary data from which sound decisions could be made for the improvement of Vocational Education in Illinois.

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RESEARCH AND DEVELOPMENT UNIT

PURPOSE

The purpose of the Research and Development Unit is to provide for the development of research, developmental, and exemplary activities for all levels of occupational education.

GOALS	OBJECTIVES
To identify and support research, developmental, and exemplary career development programs which emphasize an articulated and coordinated K-14 system.	To continue support of significant projects with emphasis on occupational information and occupational orientation. To support the development and implementation of articulated and coordinated methods of career development.
To initiate research activities designed to expedite total planning and decision-making at the state and local level.	To initiate and support manpower needs studies in conjunction with other appropriate agencies. To support research activities for determining the feasibility of joint agreements in providing comprehensive vocational education programs. To initiate the development of a Management Information System at the state level. To support studies concerning cost differential and cost benefit at all levels of occupational education. To support the development of evaluation techniques for vocational education programs in conjunction with the Program Approval and Evaluation Unit. To encourage and support activities designed to improve program planning and curriculum decisions at the local level.
To support research, developmental, and exemplary activities which formulate models of instruction utilizing contemporary methods of/and technology.	To support the development and implementation of pilot centers to determine the feasibility of a state-wide system of computerized vocational information. To promote the development of methods of instruction with emphasis on individualized instructional techniques. To promote and support the development of new and innovative instructional techniques emphasizing technological progress. To support the establishment of a model placement and follow-up system at the high school level.
To plan and initiate a system which insures the implementation of significant research and developmental results.	To provide a system for the dissemination of research and developmental materials and findings. To support exemplary projects which implement and provide visibility for outstanding R&D projects. To support demonstration centers spotlighting viable programs in vocational and technical education. To assist in developing workshops and conferences for the purpose of dissemination of research and development projects.

Prepared and Published by:
Research and Development Unit
and
Professional and Curriculum Development Unit
Division of Vocational and Technical Education
Board of Vocational Education and Rehabilitation

1287

VT 013 763
PROJECTIONS: 1980. THE MANPOWER POSTURE OF THE NATION IN THE 1970'S.

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U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS, 341 NINTH AVENUE, NEW YORK, NEW YORK 10001
PUB DATE - MAY70 15P.

DESCRIPTORS - *EMPLOYMENT PROJECTIONS; *POPULATION TRENDS; *LABOR FORCE; *ECONOMIC PROGRESS; EMPLOYMENT TRENDS; PRODUCTIVITY; TABLES (DATA)

ABSTRACT - THE GROWTH OF THE NATION'S ECONOMY BETWEEN 1968 AND 1980 IS PROJECTED. INCLUDED ARE ECONOMIC GROWTH, LABOR FORCE, AND INDUSTRY AND OCCUPATIONAL EMPLOYMENT PROJECTIONS. CHARTS AND TABLES ARE USED TO PRESENT THE DATA. (BH)

VT 013 763

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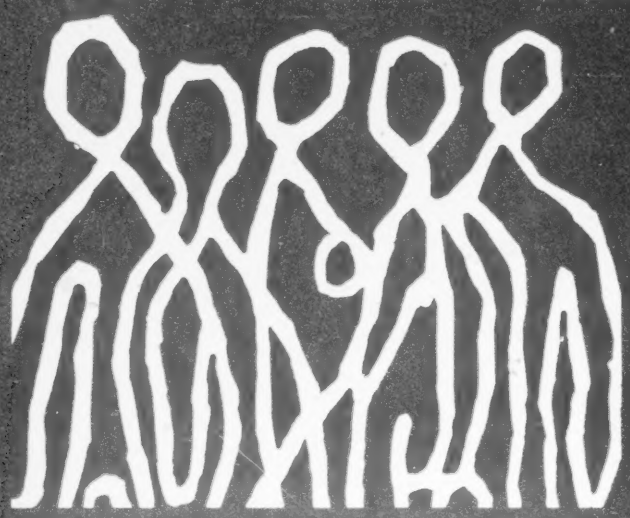
PROJECTIONS: 1980



the manpower Posture of the Nation in the 1970's

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Regional Director

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Assumptions

The BLS projections about the world of 1980 discussed in this article are based on these specific assumptions:

▶ *The international climate* will improve. The United States will no longer be fighting a war, but, on the other hand, a still guarded relationship between the major powers will permit no major reductions in armaments. This would still permit some reduction from the peak levels of defense expenditures during the Viet Nam conflict.

▶ *Armed Forces strength* will drop back to about the same level that prevailed in the pre-Viet Nam escalation period.

▶ *The institutional framework of the American economy* will not change radically.

▶ *Economic, social, technological, and scientific trends* will continue, including values placed on work, education, income, and leisure.

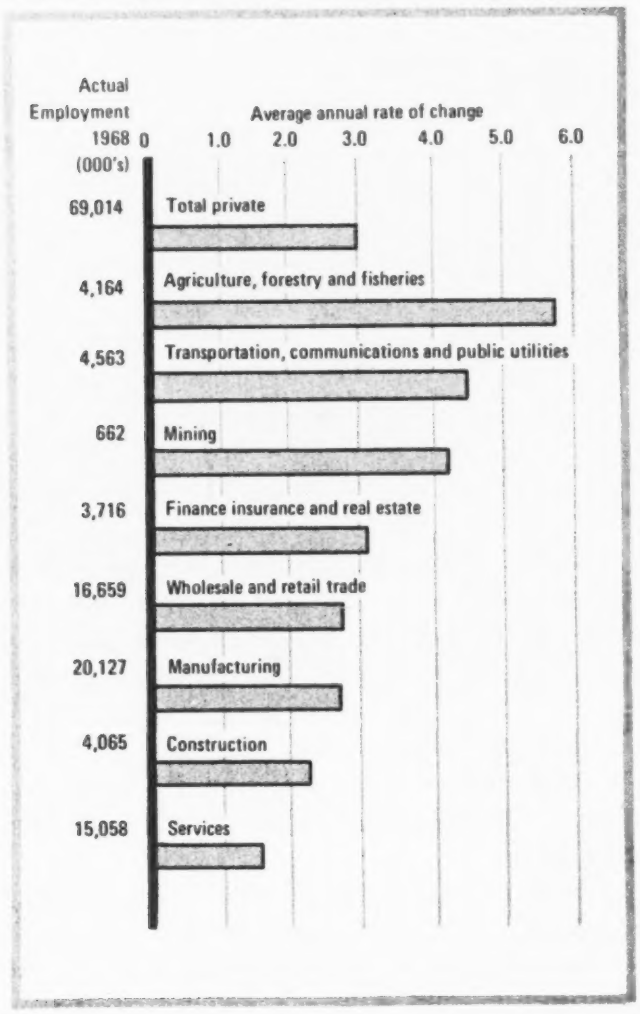
▶ *Fiscal and monetary policies* will be able to achieve a satisfactory balance between low unemployment rates and relative price stability without reducing the long-term economic growth rate.

▶ *All levels of government* will join efforts to meet a wide variety of domestic requirements, but Congress will channel more funds to State and local governments.

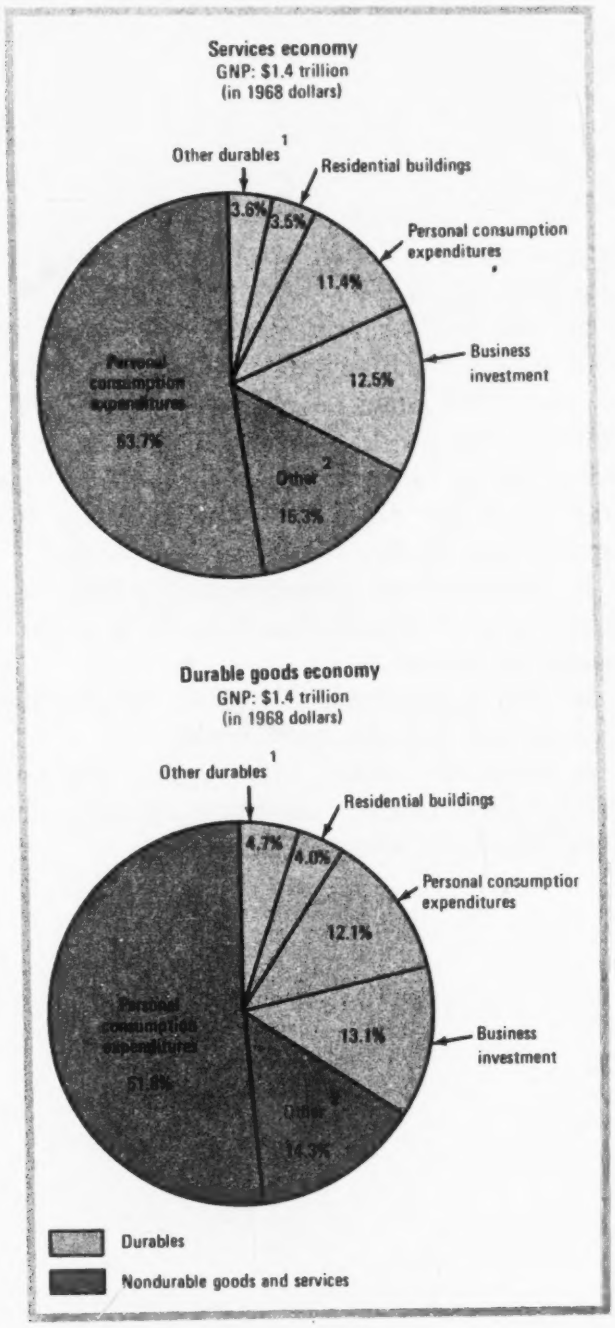
▶ *Efforts to solve the problems posed by air and water pollution and solid waste disposal,* although they may preempt an increasing amount of the Nation's productive resources, will not lead to a significant dampening of our longrun potential rate of growth.

▶ *Fertility rates will be lower* than they have been in the recent past.

Projected productivity, by major sector, private economy, 1968–80

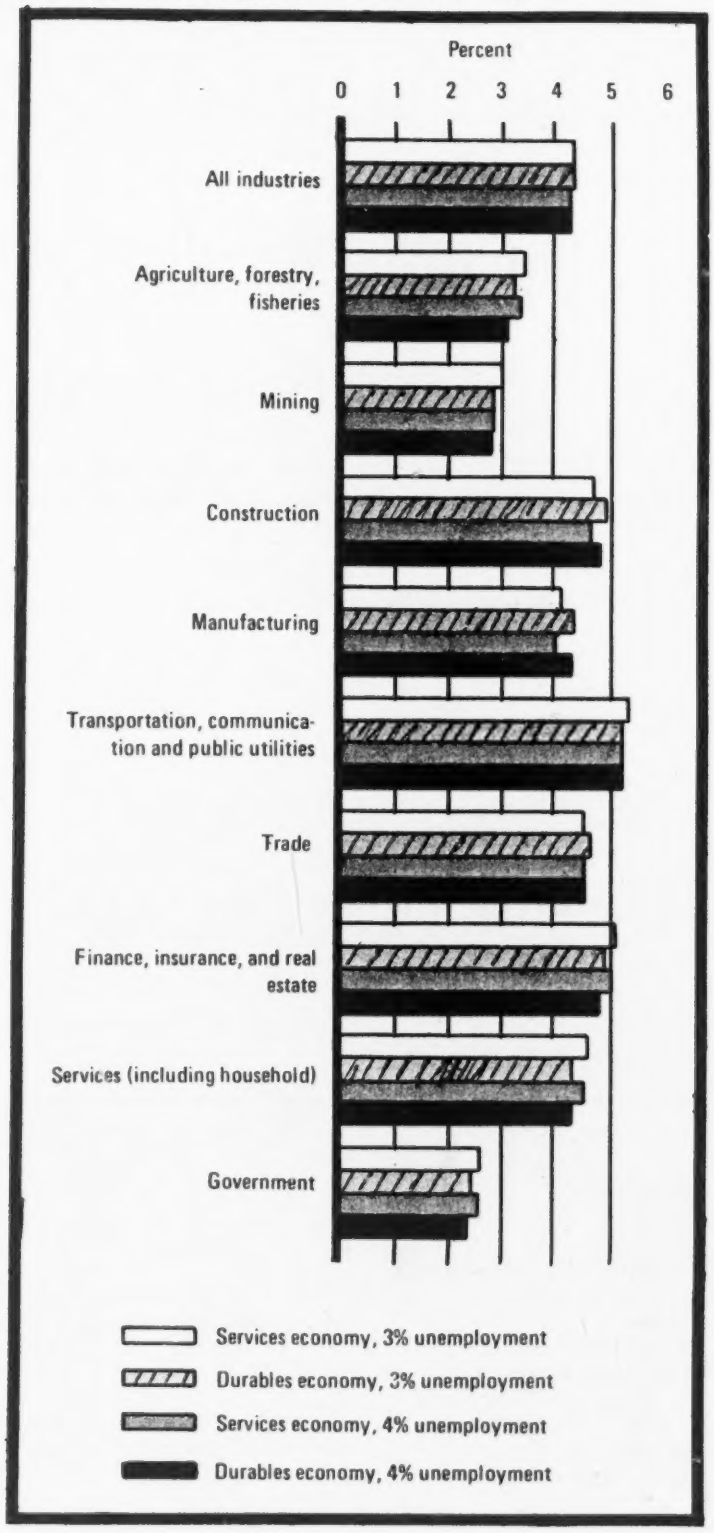


Differences in demand structure in a services economy and in a durables economy, 1980 (both 3- and 4-percent unemployment levels)



[1] Includes net exports and government purchases.
[2] Includes government compensation and household services.

Average annual rates of growth in value of output, 1968–80 (projected in 1968 dollars)

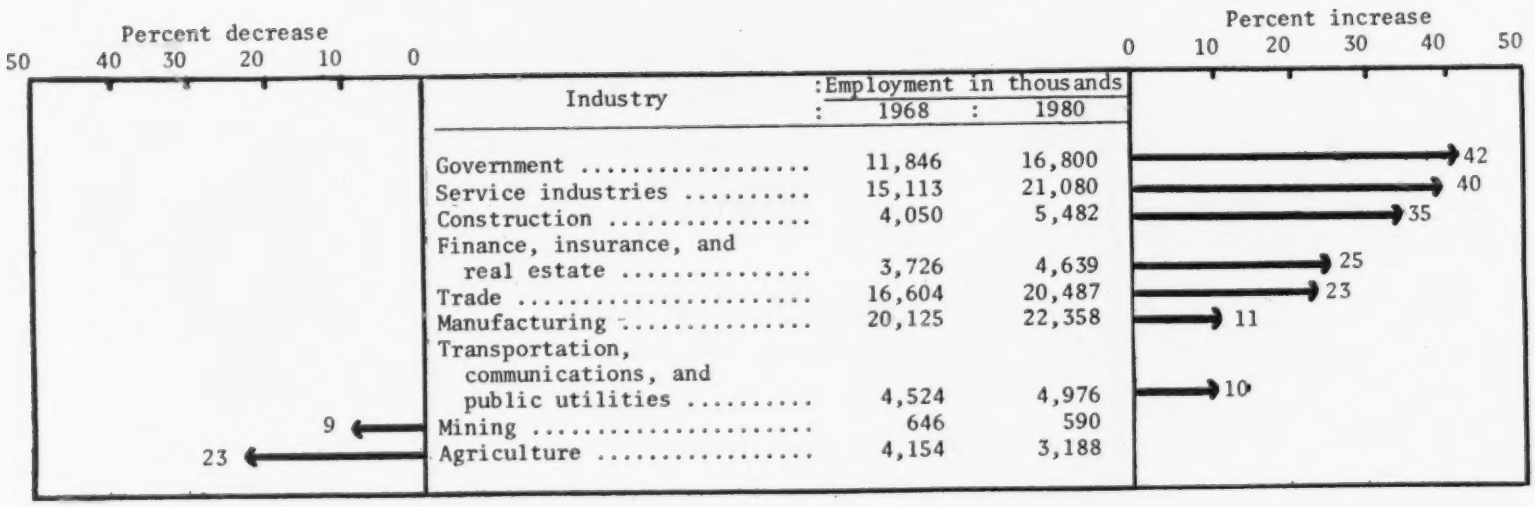


Changes in total and wage and salary employment by industry sector, 1965 and 1968 (actual) and 1980 (projected for services and durable goods economies)

[In thousands]

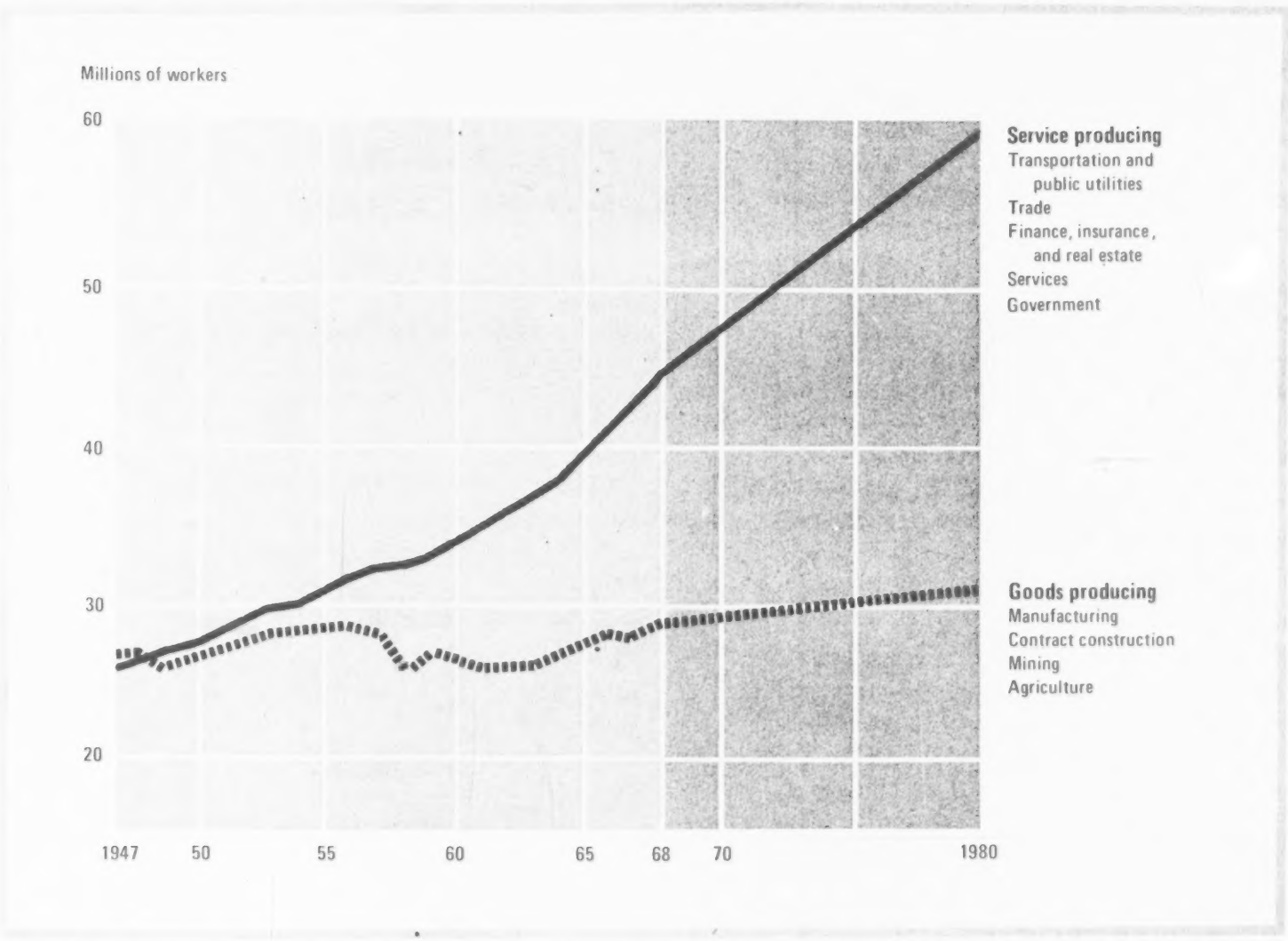
Industry sector	1965		1968		1980							
					Services economy				Durables economy			
					3-percent unemployment		4-percent unemployment		3-percent unemployment		4-percent unemployment	
	Total employment	Wage and salary employment	Total employment	Wage and salary employment	Total employment	Wage and salary employment	Total employment	Wage and salary employment	Total employment	Wage and salary employment	Total employment	Wage and salary employment
GOODS PRODUCING												
Manufacturing	18,454	18,062	20,125	19,768	22,358	21,935	22,133	21,712	23,240	22,817	23,005	22,584
Agriculture	4,671	4,521	4,154	4,012	3,188	3,030	3,156	3,000	3,192	3,034	3,160	3,004
Construction	3,994	3,186	4,050	3,267	5,482	4,600	5,427	4,553	5,595	4,713	5,539	4,665
Mining	667	632	646	610	590	550	584	544	588	548	582	542
SERVICE PRODUCING												
Services industries	13,722	11,501	15,113	12,826	21,080	18,660	20,867	18,474	20,585	18,165	20,376	17,983
Trade	15,352	12,716	16,604	14,081	20,487	17,625	20,282	17,450	20,501	17,639	20,296	17,464
Transportation, communications, and public utilities	4,250	4,036	4,524	4,313	4,976	4,740	4,926	4,692	4,961	4,725	4,911	4,677
Finance, insurance, and real estate	3,367	3,023	3,726	3,383	4,639	4,260	4,593	4,217	4,538	4,159	4,493	4,117
Government	10,091	10,091	11,846	11,846	16,800	16,800	16,632	16,632	16,200	16,200	16,038	16,038

Job growth by industry sector, 1968-80
(Projections for 1980 based on a services economy, 3 percent unemployment)



1304

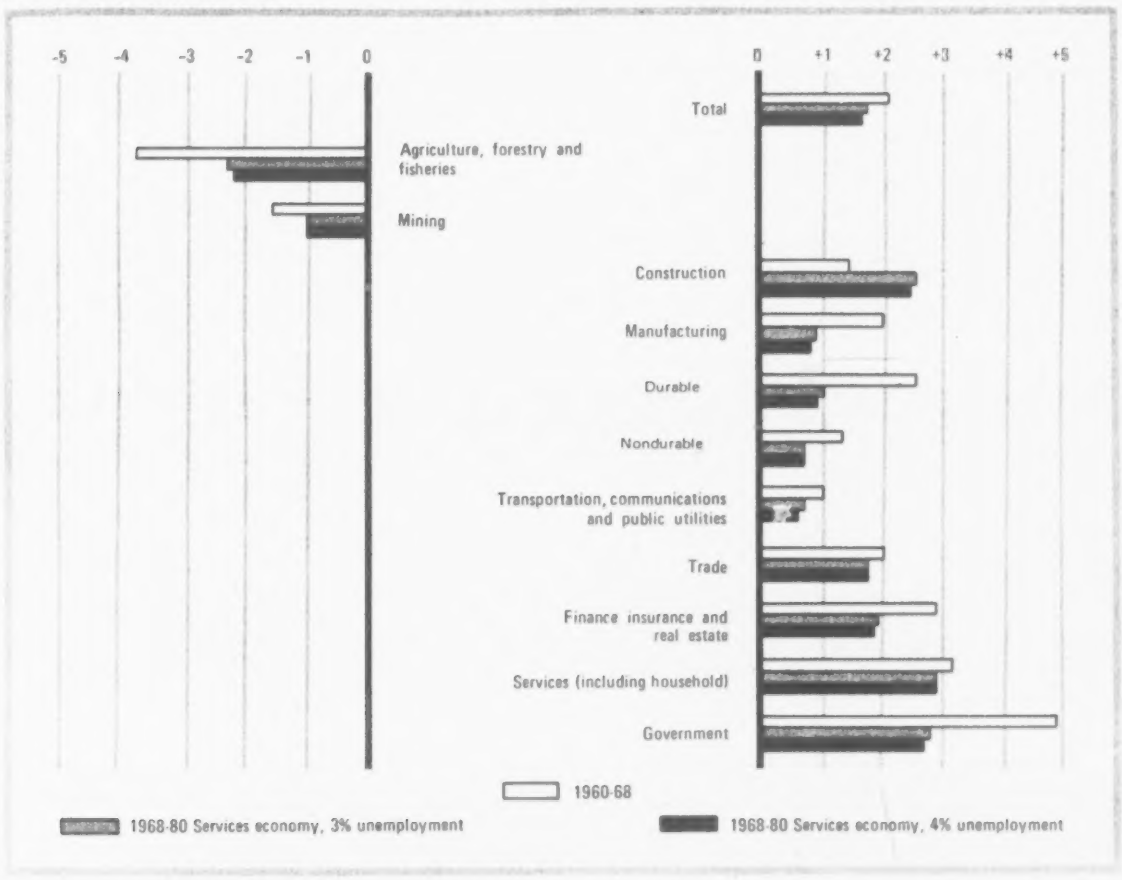
Employment[1] trends in goods-producing and services-producing industries, 1947–68 (actual) and 1968–80 (projected for a services economy with 3-percent unemployment)



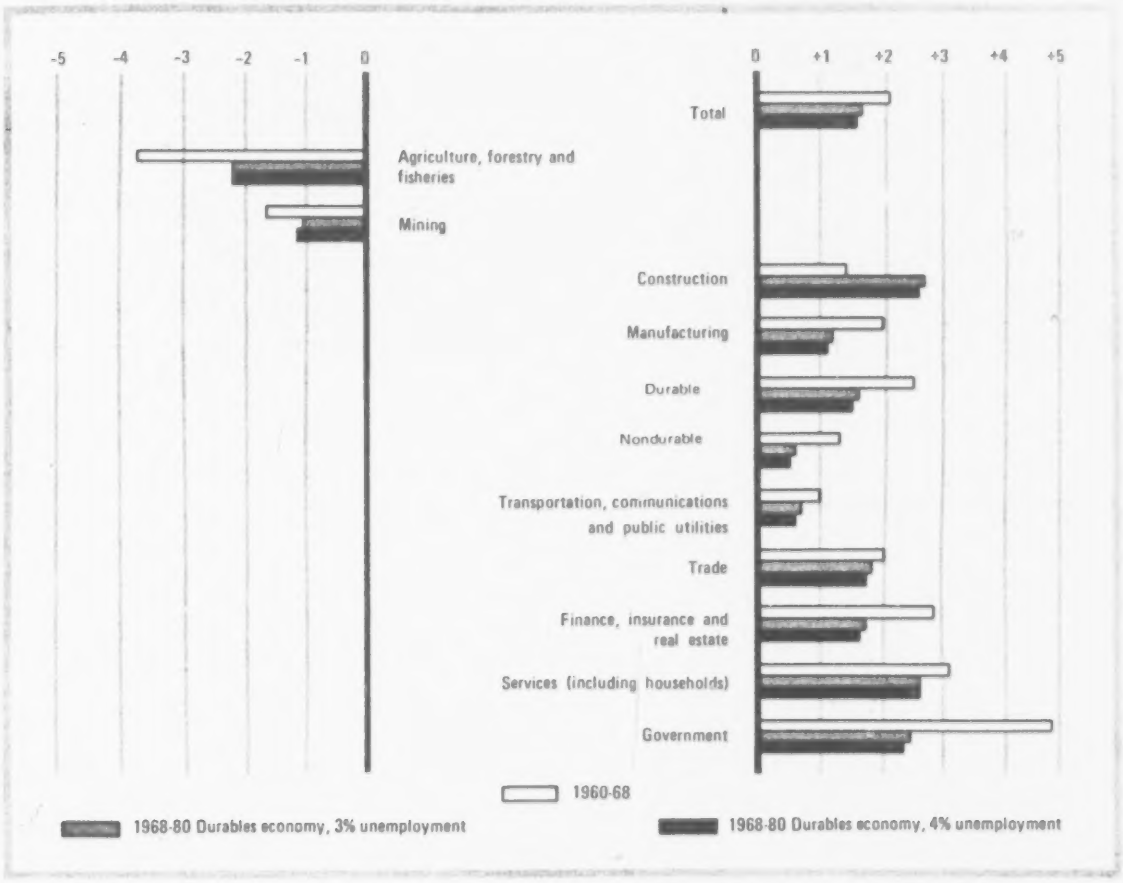
[1] Wage and salary workers only, except in agriculture, which includes self-employed and unpaid family workers.

1305

Total employment: average annual rate of change, by major sector, 1960–68 (actual) and 1968–80 (projected for a services economy)

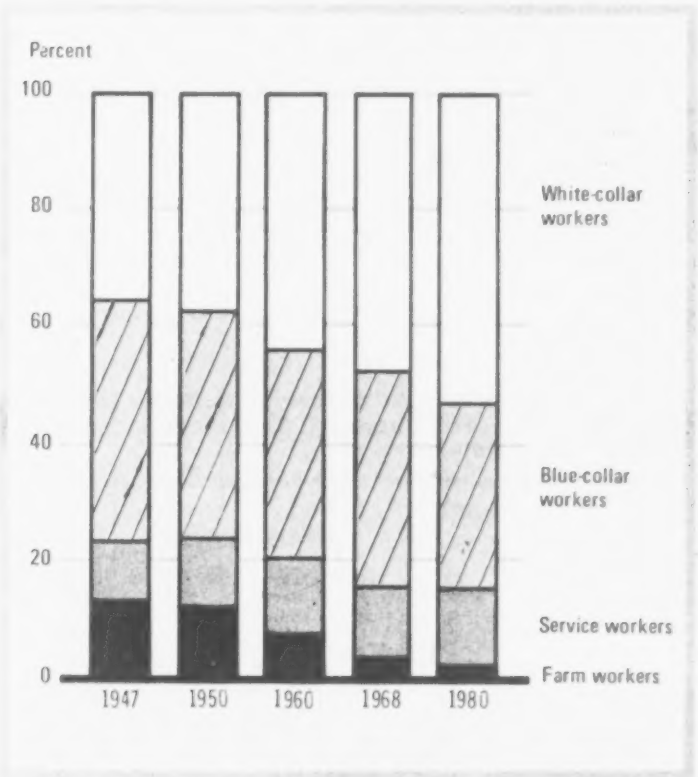


Total employment: average annual rate of change, by major sector, 1960–68 (actual) and 1968–80 (projected for a durables economy)



1306

Employment trends among major occupational categories,[1] 1947–68 (actual) and 1980 (projected for a services economy with 3-percent unemployment)

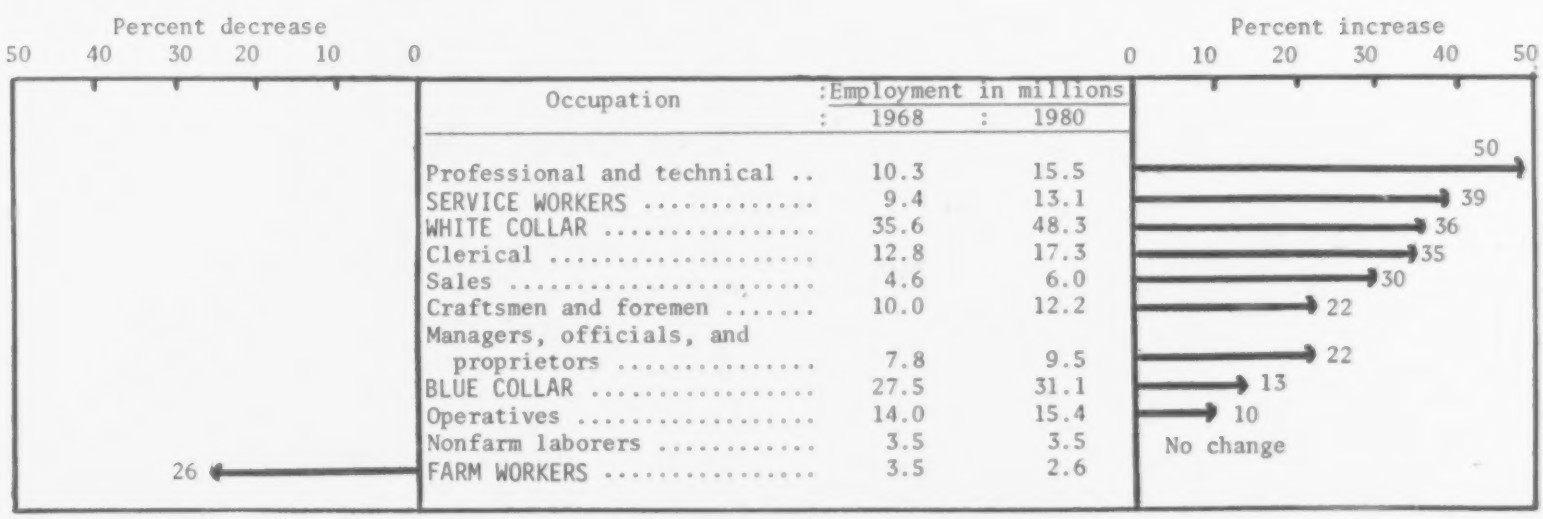


[1] Farm workers include farm managers.

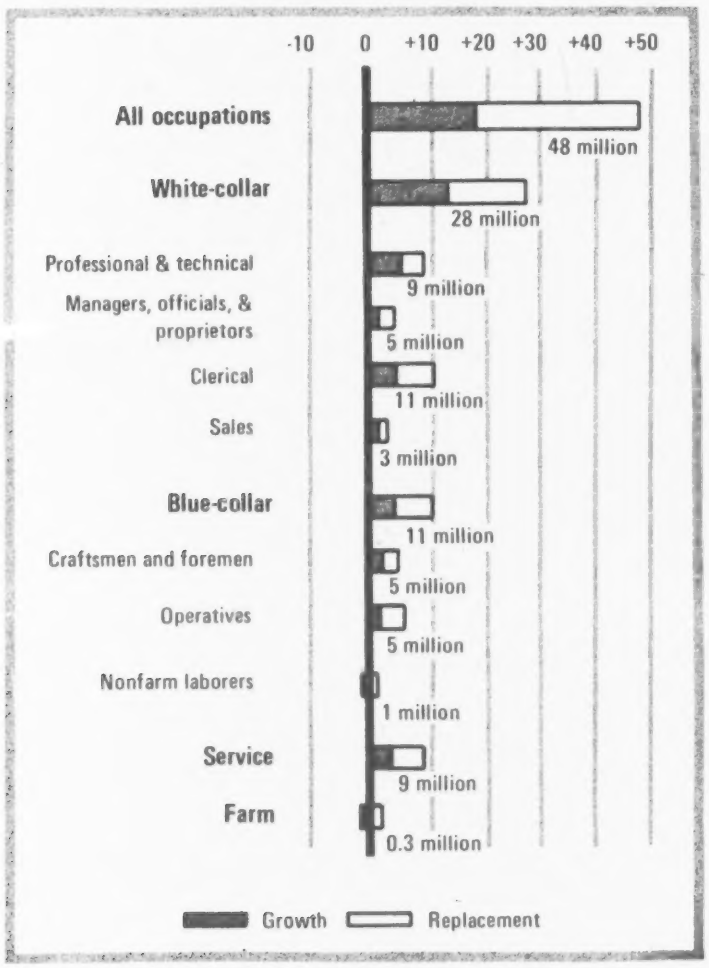
Average annual rate of employment change, by major occupational group, 1960–68 (actual) and 1968–80 (Projected for a services economy with 3-percent unemployment)

Occupational group	1960–68	1968–80
Total	1.8	1.9
White-collar workers	2.8	2.6
Professional, technical, and kindred	4.1	3.4
Managers, officials, and proprietors	1.2	1.7
Clerical	3.5	2.5
Sales	1.2	2.2
Blue-collar workers	1.7	1.0
Craftsmen and foremen	2.0	1.7
Operatives	2.0	0.8
Nonfarm laborers	.....	−0.1
Service workers	2.0	2.8
Farm workers	−5.1	−3.4

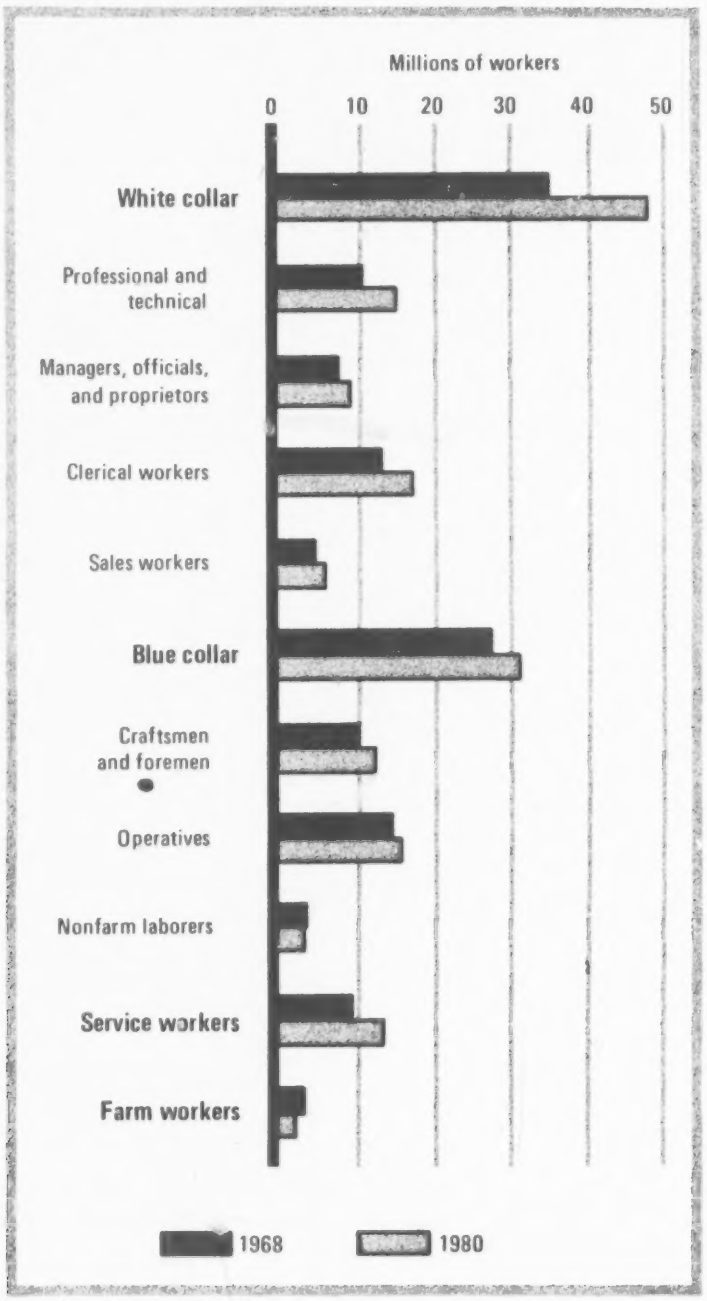
Job growth by occupational group, 1968-80
(Projections for 1980 based on a services economy, 3 percent unemployment)



Net job openings in major occupational categories and groups, 1968–80 (projected for a services economy with 3-percent unemployment)

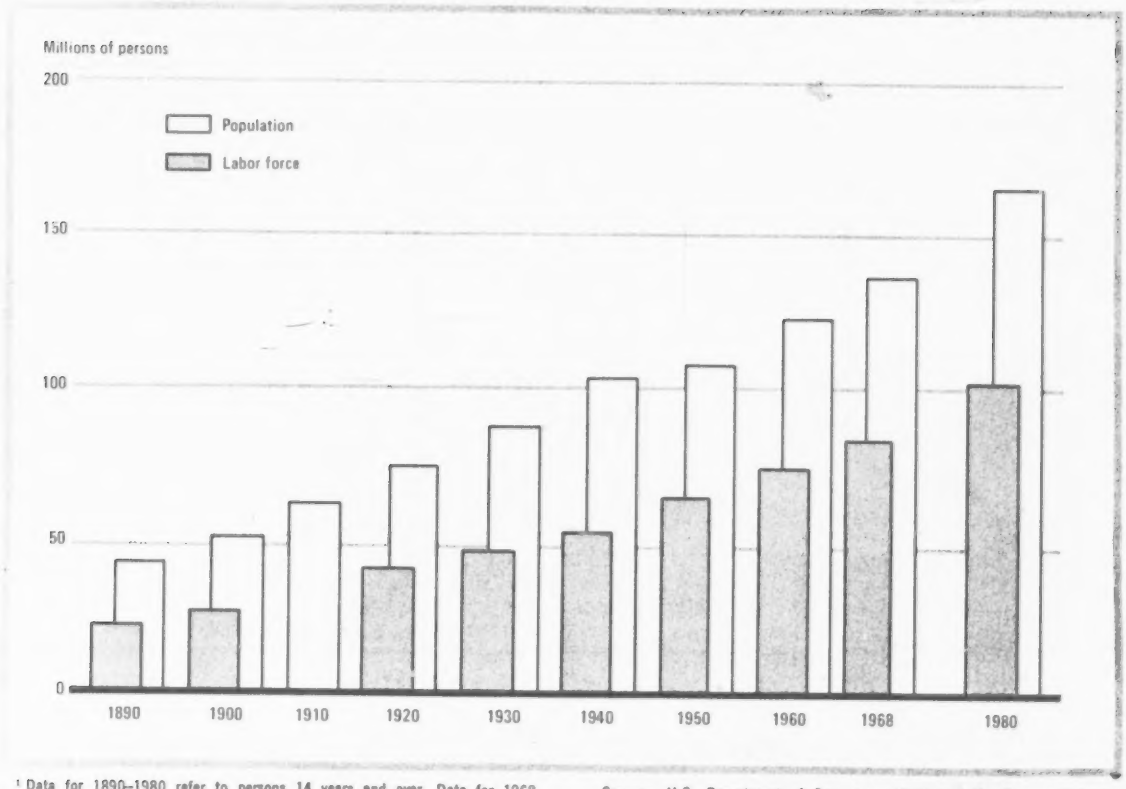


Employment in major occupational groups, 1968 (actual) and 1980 (projected for a services economy with 3-percent unemployment)



1308

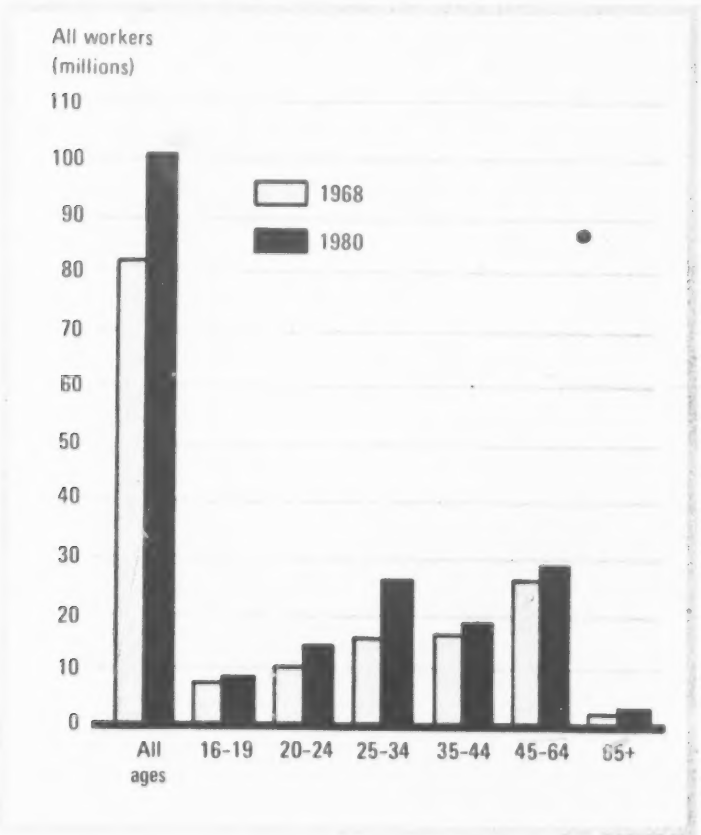
Labor force and population,[1] 1890 to 1980



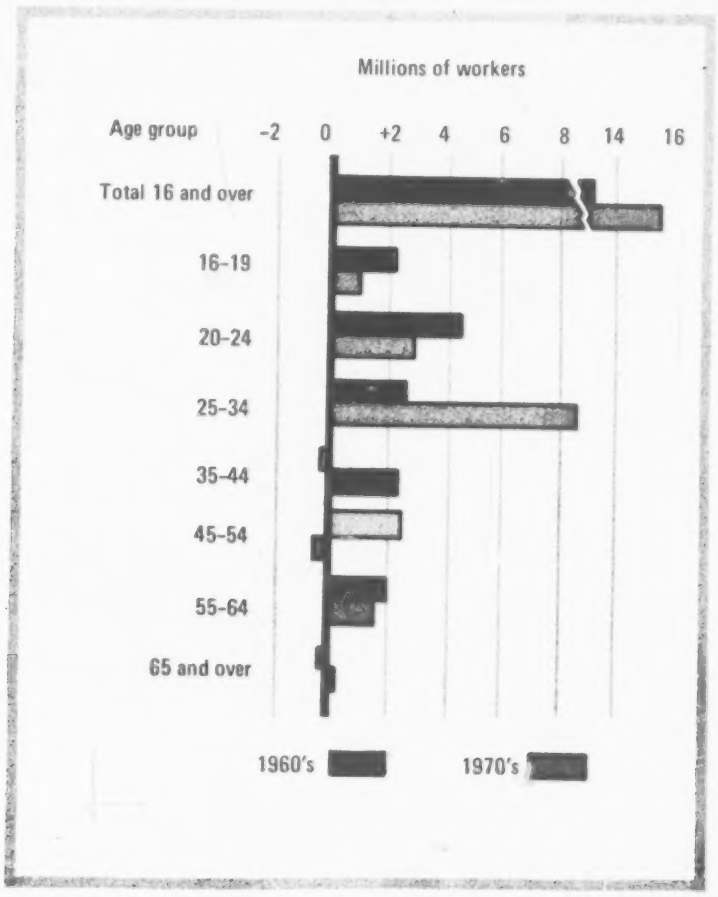
[1] Data for 1890–1980 refer to persons 14 years and over. Data for 1968 and 1980 refer to persons 16 years and over. Comparable labor force data not available for 1910.

Sources: U.S. Department of Commerce, Bureau of the Census; U.S. Department of Labor, Bureau of Labor Statistics; John D. Durand, **The Labor Force of the United States, 1890–1960** (New York, N.Y., Gorden & Breach, 1968); Gertrude Bancroft, **The American Labor Force** (New York, N.Y., John Wiley & Sons, 1958).

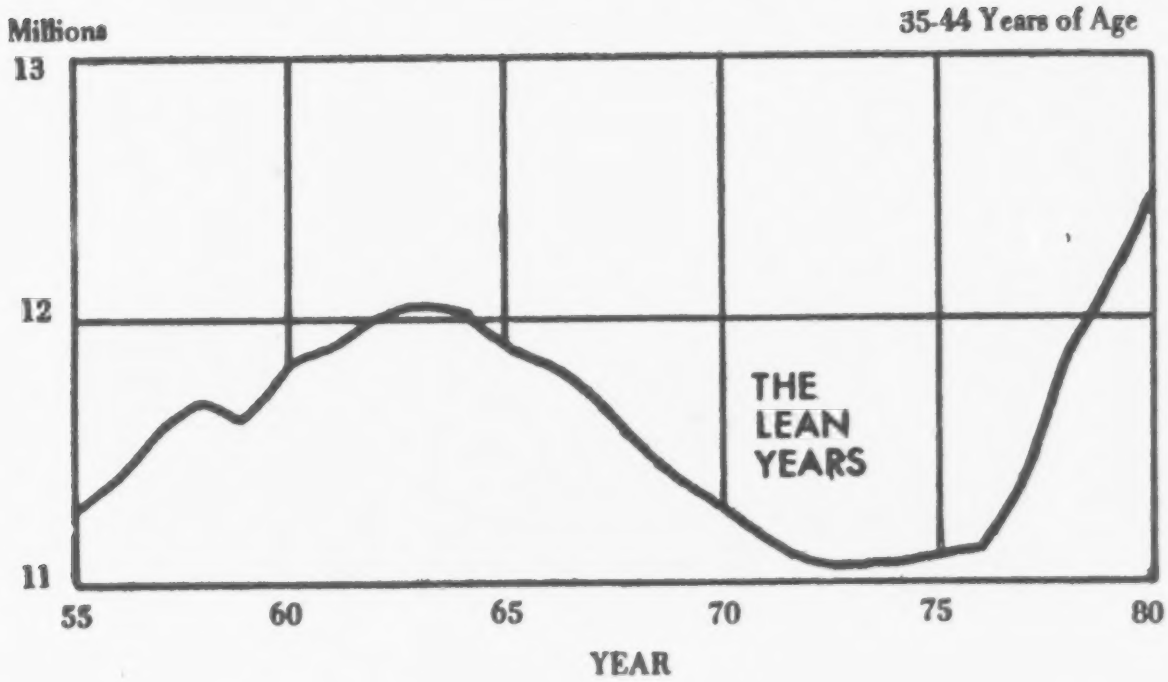
The shape of the labor force, 1968 (actual) and 1980 (projected)



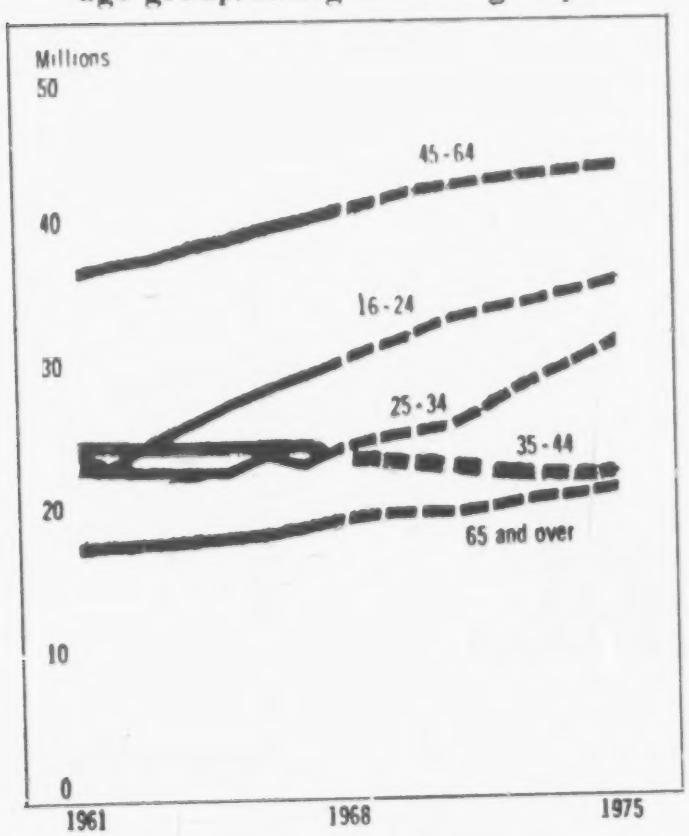
Major changes in the labor force, 1960's (estimated) and 1970's (projected)

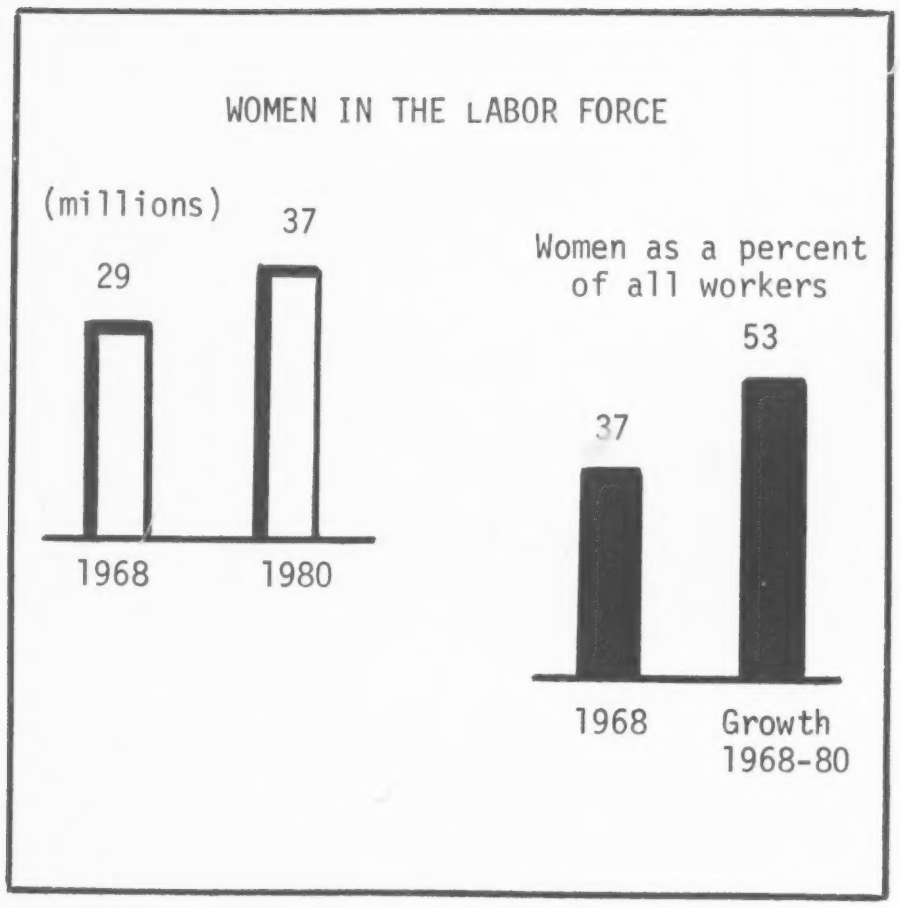


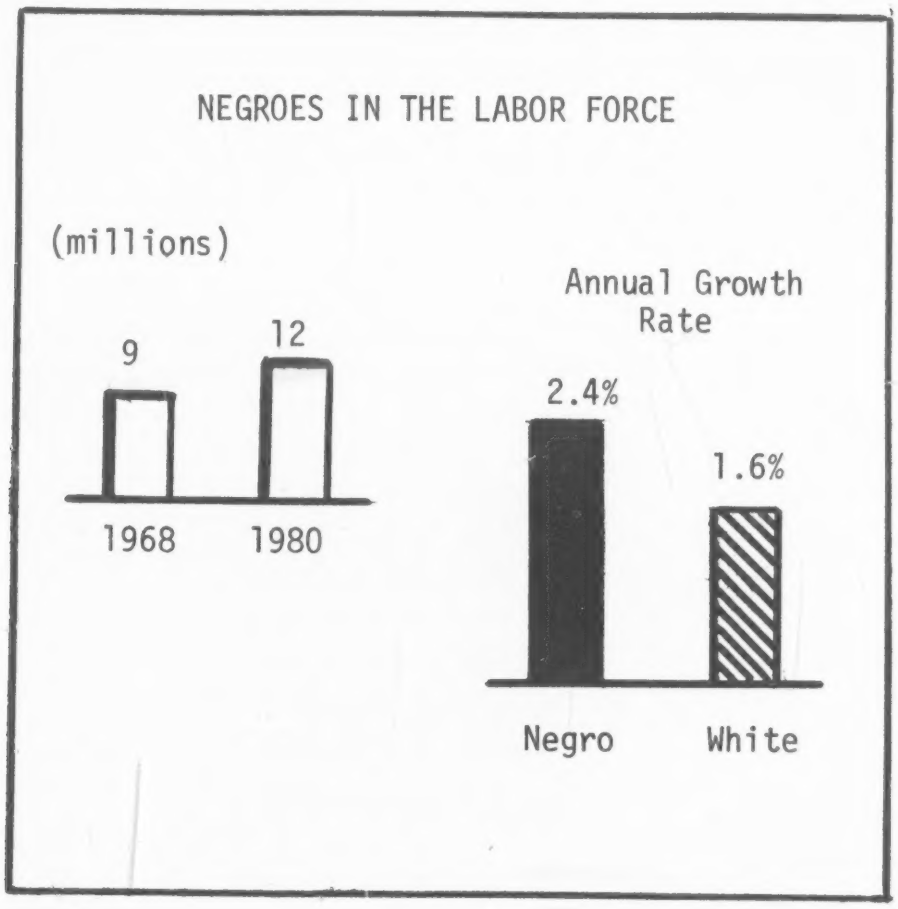
POPULATION, MALES



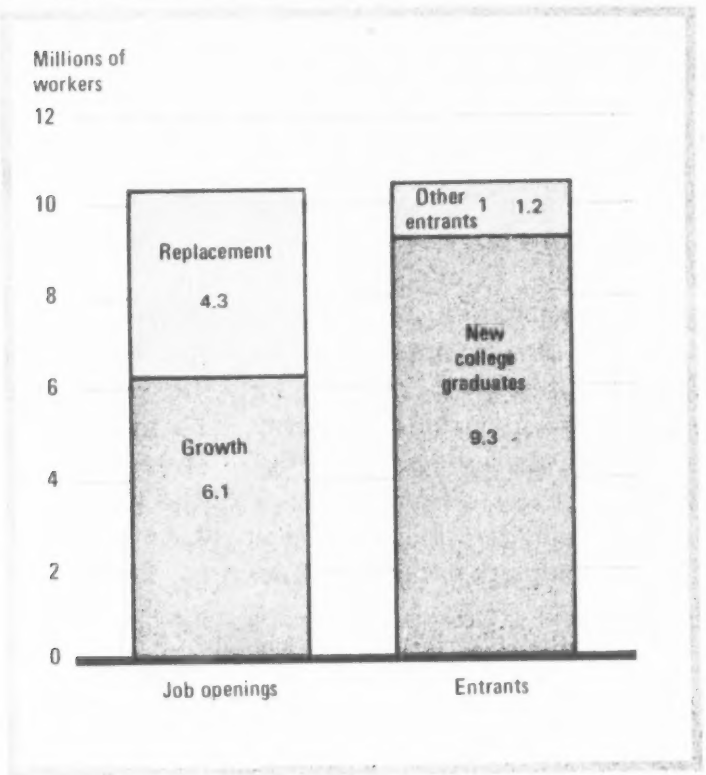
Population is declining in 35-44 year age group, rising in other groups.




WOMEN IN THE LABOR FORCE
(millions)
29
37
1968
1980
Women as a percent of all workers
37
53
1968
Growth 1968-80


NEGROES IN THE LABOR FORCE
(millions)
9
12
1968
1980
Annual Growth Rate
2.4%
1.6%
Negro
White

Projected job openings for college graduates and projected entrants, 1968–80



[1] Includes reentrants, delayed entrants, and immigrants.

Distribution of college graduates by major occupational field, 1968 and 1980

Occupational group	1968			1980		
	Total employment [1] (thousands)	College graduates [2] (thousands)	Percent, graduates to total	Total employment [1] (thousands)	College graduates [2] (thousands)	Percent, graduates to total
All occupational groups	75,920	9,229	12.3	95,100	15,342	16.1
Professional and technical	10,325	6,182	59.9	15,500	10,230	66.0
Managers, officials, and proprietors	7,776	1,562	20.0	9,500	2,850	30.0
Sales	4,647	463	10.1	6,000	780	13.0
Clerical	12,803	583	4.6	17,300	779	4.5
All other	40,369	439	1.1	46,800	703	1.5

[1] 16 years of age and over.
[2] Data include persons 18 years of age and over having 4 years of college or more.

Labor force balance sheet, 1960–70, 1970–80

	Number in millions
1960 DECADE (1960–70)	
Total labor force, 16 years and over, 1960	72.1
Less withdrawals, 1960 through 1969	20.9
1960 total labor force still in labor force in 1970	51.2
Plus new entrants, 1960 through 1969	26.4
Plus all other entrants, 1960 through 1969 [1]	8.0
Total labor force, 16 years and over, 1970 [2]	85.6
1970 DECADE (1970–80)	
Total labor force, 16 years and over, 1970 [2]	85.6
Less withdrawals, 1970 through 1979	26.3
1970 total labor force still in labor force in 1980	59.3
Plus new entrants, 1970 through 1979	33.7
Plus all other entrants, 1970 through 1979 [1]	7.7
Total labor force, 16 years and over, 1980	100.7

[1] Primarily reentrants plus immigrants.
[2] Estimated

Projection techniques

Labor force and occupational projections cover the period 1968 to 1980 because 1968 was the most recent year for which complete data were available at the time of the calculations. All other projections —GNP, hours, productivity, aggregate and industry demand, and industry employment—are based from 1965 because the next 3 years (1966 to 1968) were substantially affected by the demands of the Viet Nam war. Since it is assumed that these hostilities will be over by 1980, recent changes related to the impact of the Viet Nam war were considered to be atypical and unlikely to be characteristic of the years ahead.

Growth rates, in most cases, are shown not only for 1965–80, but also for 1968–80 to reflect the impact of the intervening years. Since the article was written, however, some 1969 data have become available. Because a slackening of growth in the economy occurred during 1969, the GNP would have to grow at the rate of 4.4 percent a year for the period 1969–80, rather than 4.3 percent as shown for the 1968–80 period, to reach the 1980 projected levels. Similarly, productivity would have to grow at 3.2 percent a year rather than the 3.0 percent shown. Projected employment growth remains unchanged at 1.7 percent a year.

The labor force projection, based on the Bureau on the Census projections of population, is developed through separate projections of labor force participation for the various age, sex, and color groups in the population. The detailed participation rates are then applied to the projected levels in each population group.

The economic growth projections are developed in consultation with the Interagency Committee on Economic Growth, which consists of representatives of the U.S. Department of Labor, the U.S. Department of Commerce, the Bureau of the Budget, and the President's Council of Economic Advisors. These projections have benefited from the advice of—and have utilized the research product of—several other government agencies and private research organizations that also participate in the Interagency Growth Studies Program. The input-output tables developed by the U.S. Department of Commerce's Office of Business Economics provide the basic framework for the growth projections.

To explore the implications of alternative growth rates and patterns, two different demand structures of the economy are presented in this article: one is based upon a continuation of the long-term shift toward the purchase of more consumer and public *services*. The other assumes a slower growth in the trend toward services with correspondingly greater emphasis on *durable goods* production: Consumer, producer, and military. Both these demand structures start with approximately the same level of potential output in 1980; the differences lie only in the composition of final demand and its related components. Specific differences are spelled out in later sections of the article.

Within each set of demand projections, two alternative assumptions are outlined regarding the unemployment rate: one assumes a 3-percent unemployment rate by 1980; the other assumes a somewhat higher rate, 4 percent. Projections at the lower rate are based on the assumption that by 1980 the country will have been able to develop a mix of public and private policies that can assure such a low rate without creating inflationary pressures. Since the same structure of the economy for 1980 has been assumed for both the 3-percent and the 4-percent unemployment projections, the proportionate distribution of employment among major industry and occupational sectors is virtually the same for both projections except that all industries would have a slightly higher level of employment under the 3-percent unemployment assumption. It is recognized that this assumption may be an oversimplification; however, the magnitude of the difference in employment that would result from a more discriminating set of assumptions for pinpointing the employment difference of a 1-percent change in the unemployment level would be quite minor except for relatively few industries or occupations. The discussion in this article will be limited to the 3-percent unemployment assumptions. Tables, however, show industry data for both alternatives.

Industry and occupational employment projections—the end product of labor force and economic growth projections, are arrived at by utilizing two projection techniques. Total industry employment, which includes wage and salary workers, unpaid family workers, and the self-employed, is obtained by calculations involving projected changes in demand, interindustry relationships, and output and productivity. The employment projections are initially developed for about 82 industries or industry groups, covering the entire economy. The employment estimates are also distributed into much greater industry detail (about 250 industries) by using regression analysis to estimate employment in each industry consistent with the basic assumptions of the economic projections. The results of the two methods are carefully analyzed and reconciled for consistency. Finally, the employment projections are converted into estimates of occupational requirements by projecting detailed occupational patterns, industry by industry, which, when combined with the industry employment estimates, yield the final product of the entire sequence of projections—occupational estimates.

1313

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DESCRIPTORS - *MEDICAL ASSISTANTS;
*EDUCATIONAL PROGRAMS; *DIRECTORIES; PROGRAM
DESCRIPTIONS; ENROLLMENT

ABSTRACT - INCLUDED IN THIS REPORT ARE
DESCRIPTIONS OF 125 TRAINING PROGRAMS IN 35
STATES, 60 OF WHICH ARE PRESENTLY
OPERATIONAL, WITH THE REST AT LEAST IN THE
ADVANCED PLANNING STAGE AS OF MARCH 1971.
CURRICULUM, DEGREES, ENTRANCE REQUIREMENTS,
ENROLLMENT, NUMBER OF GRADUATES, AND STAGE OF
DEVELOPMENT ARE DESCRIBED FOR EACH PROGRAM.
(BH)

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HEALTH MANPOWER DATA SERIES

SELECTED TRAINING PROGRAMS FOR PHYSICIAN SUPPORT PERSONNEL

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service National Institutes of Health

March 1971

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1315

The Division of Manpower Intelligence, established in the Bureau of Health Manpower Education in 1970 to provide a focus for the development, interpretation, coordination, and evaluation of health manpower education information, publishes four report series, as follows:

* HEALTH MANPOWER DATA SERIES - Reports of survey findings and compilations of data on health manpower educational institutions and training programs, and related manpower data.

* ANALYTICAL STUDIES SERIES - Monographs and other problem-oriented studies dealing with health manpower education, supply and requirements.

* RESEARCH AND DEVELOPMENT SERIES - Technical papers concerned with the development of improved analytic methods and techniques, for use in studies of health manpower education.

* BHME PROGRAM SERIES - Listings, statistics, and analyses of Bureau of Health Manpower Education grants and loan programs, other BHME operations, and related programs.

SELECTED TRAINING PROGRAMS FOR PHYSICIAN SUPPORT PERSONNEL

March 1971

Department of Health, Education, and Welfare
National Institutes of Health
Bureau of Health Manpower Education
Division of Manpower Intelligence
Professional Requirements Branch

1318
1317

ACKNOWLEDGMENTS

This compilation was prepared by Dr. Genrose Copley and Mrs. Karen Lechter of the Professional Requirements Branch. The cooperation of the American Academy of Pediatrics and the various program directors in making available the information is gratefully acknowledged.

Introduction

Programs for training physician support personnel have greatly proliferated in the past year. The original compilation of such programs in June 1970 identified 67 programs, 39 of which were described in detail. Of these 39, 17 required a background in nursing as a prerequisite.

As of March 1, 1971, the cut-off date for the inclusion of new materials in this compilation, 125 programs in 35 states have been identified as meeting the criteria for inclusion. Of these, 47 extend nursing roles and 78 accept students with varied qualifications. At least 60 programs are presently operational, with about 1,000 students in training and an equal number of graduates.

The programs included here are those which we have been able to identify as of March 1971. An exhaustive survey of such programs is currently underway, and the information collected will be included in a future edition of this publication. The Professional Requirements Branch would appreciate your help in identifying additional programs which should be included.

No endorsement or assurance of quality is inferred by the inclusion of programs in the compilation, and accreditation status is not given. Criteria for inclusion of a program in this compilation are:

1. The program is operational, in pilot testing stage, or in advanced planning, with assurance of financial support and operation within a year.

2. As of March 1971, accreditation standards do not exist, are being developed, or have only recently been developed.

3. For admission, students must have completed high school or its equivalent and the program provides either:

   a. Short- or long-term training to expand the capabilities of persons with previous health service training and experience, or

   b. Long-term training for persons with no previous formal health service training or experience.

4. The resultant health professional would have identification differentiated from traditional health professions as they currently exist, and would work under the direction of a physician or physicians to perform tasks the physician would have to perform in the absence of this specially-trained individual.

Accreditation and Guidelines for Developing Programs

Programs for orthopedic assistants continue to be included in the compilation, constituting an example of programs for which accreditation

procedures have recently been developed. The American Academy of Orthopedic Surgeons, working with the appropriate organizations, has submitted materials justifying the development of orthopedic assistants as a new category of allied health professional. This justification has been approved by the American Medical Association (AMA) Council on Health Manpower, and essentials for training have been developed by the AMA Council on Medical Education. The training programs in San Francisco and Iowa for orthopedic assistants are prototype programs meeting the established requirements. Candidates for training interested in the accreditation status of orthopedic assistant programs should check with the program directors or with the AMA Department of Medical Education.

At the present time, the American Urological Association is working actively with the AMA to establish the mechanisms for accrediting urologic assistant training programs.

The American Academy of Pediatrics and the American Nurses Association have developed and issued joint guidelines for Pediatric Nurse Associate training programs. Similar negotiations are being carried out between the American Academy of Pediatrics and the American Association of Medical Assistants with regard to training programs for pediatric assistants. These efforts are being coordinated with the AMA. Persons interested in training in these categories may seek information about the status of a given training program from the program director or the American Academy of Pediatrics.

The American Society of Internal Medicine, American Academy of Pediatrics, American Academy of Family Physicians, and American College of Physicians are currently working with the AMA to develop guidelines for assistants to primary care physicians. As of March 1, 1971, however, the details have not been completely developed.

Other organizations which have published statements defining types of physician's assistants include the National Academy of Sciences, the Association of American Medical Colleges, and the American Hospital Association. The guidelines developed by the AMA Council on Health Manpower for the development of new health occupations were published in the August 17, 1970 issue of the Journal of the American Medical Association, and copies are available from the AMA.

For Counsellors and Prospective Students

In view of the rapid developments in this field, persons using information contained in this compilation for student counselling or for the selection of training opportunity should carefully check the status of training standards for the particular category as well as the status of the individual training program. Prospective students are also advised to be fully aware of the legal status of the particular category in their State. To date, at least 6 states have passed legislation enabling physicians to delegate tasks to physician's assistants and other similar personnel (Arizona, Colorado, Kansas, Oklahoma, California, and Florida), and at least 12 others are known to be considering such legislation.

TABLE OF CONTENTS
(Alphabetically by State and City)

page

INTRODUCTION iii

PROGRAMS WITH VARIED ENTRANCE REQUIREMENTS 1

ALABAMA
MEDEX 3
University of Alabama, Birmingham, Alabama

Pathology Assistant 4
University of Alabama, Birmingham, Alabama

Physician's Assistant 5
University of Alabama, Birmingham, Alabama

Physician's Assistant, Diabetes 6
University of Alabama, Birmingham, Alabama

Surgeon's Assistant 7
University of Alabama, Birmingham, Alabama

CALIFORNIA
Pediatric Assisting 8
De Anza Junior College, Cupertino, California

Orthopaedic Assistant 9
Foothill Junior College, Los Altos Hills, California

MEDEX 10
Charles R. Drew Postgraduate Medical School, Los Angeles, California

Orthopaedic Assistant 11
City College of San Francisco, San Francisco, California

COLORADO
Child Health Associate 12
University of Colorado, Denver, Colorado

DISTRICT OF COLUMBIA
Cardiovascular Technician 14
Washington Hospital Center, Washington, D. C.

GEORGIA
Master Anesthesia Technologist 15
Emory University, Atlanta, Georgia

Medical Specialty Assistant 16
Emory University, Atlanta, Georgia

Pediatric Assistants 17
Georgia State University, Atlanta, Georgia

PROGRAMS WITH VARIED ENTRANCE REQUIREMENTS (continued) page

KENTUCKY
Clinical Associate 18
University of Kentucky, Lexington, Kentucky

MICHIGAN
Physician's Assistant 19
Western Michigan University, Kalamazoo, Michigan

MINNESOTA
Physician's Associate 20
University of Minnesota, Minneapolis, Minnesota

Urological Assistant 21
Veteran's Administration Hospital, Minneapolis, Minnesota

MISSOURI
Physician's Assistant 22
United States Medical Center, Springfield, Missouri

NEW HAMPSHIRE
MEDEX 23
Dartmouth Medical School, Hanover, New Hampshire

NEW YORK
Medical Services Associate 24
Brooklyn Cumberland Medical Center, Brooklyn, New York

Orthoptics and Ophthalmic Assistant 26
Columbia-Presbyterian Medical Center, New York, New York

Medical Emergency Technician 27
Manhattan Community College, New York, New York

Marine Physician Assistant 28
U.S. Public Health Service Hospital, Staten Island, New York

Orthopedic Assistant 29
U.S. Public Health Service Hospital, Staten Island, New York

NORTH CAROLINA
Pathology Assistant 30
Duke University, Durham, North Carolina

Physician's Assistant 31
Duke University, Durham, North Carolina

Physician's Assistant 33
Bowman-Gray School of Medicine, Winston-Salem, North Carolina

NORTH DAKOTA
MEDEX 34
University of North Dakota, Grand Forks, North Dakota

PROGRAMS WITH VARIED ENTRANCE REQUIREMENTS (continued) page

OHIO
Surgical Assistant 35
Cincinnati Technical Institute, Cincinnati, Ohio

Urological Assistant 36
University of Cincinnati, Cincinnati, Ohio

The Corpsman 37
Cleveland Clinic Hospital, Cleveland, Ohio

Circulation Technology 38
Ohio State University, Columbus, Ohio

Surgical Assistant 39
Cuyahoga Community College, Parma, Ohio

OKLAHOMA
Physician's Assistant 40
University of Oklahoma, Oklahoma City, Oklahoma

Physician's Associate 41
University of Oklahoma, Oklahoma City, Oklahoma

PENNSYLVANIA
Graduate Art Therapist 42
Hahnemann Medical College, Philadelphia, Pennsylvania

Mental Health Technology 44
Hahnemann Medical College, Philadelphia, Pennsylvania

TEXAS
Clinical Associate 45
University of Texas, Galveston, Texas

Ophthalmic Assistant 47
Baylor College of Medicine, Houston, Texas

WASHINGTON
MEDEX 48
University of Washington, Seattle, Washington

WEST VIRGINIA
Physician's Assistant 49
Alderson-Broaddus College, Philippi, West Virginia

WISCONSIN
Physician's Assistant 50
Marshfield Clinic, Marshfield, Wisconsin

page

PROGRAMS FOR EXTENDING NURSING ROLES 53

ARIZONA
Family Nurse Practitioner 55
University of Arizona, Tucson, Arizona

CALIFORNIA
Family Health Practitioner 57
University of California, Berkeley, California

Pediatric Nurse Associate 59
Loma Linda University, Loma Linda, California

Nursing Pediatrist 61
U.C.L.A. School of Medicine, Torrance, California

COLORADO
Pediatric Nurse Practitioner 62
University of Colorado, Denver, Colorado

School Nurse Practitioner 64
University of Colorado, Denver, Colorado

CONNECTICUT
Pediatric Nurse Associate 65
University of Connecticut, Hartford, Connecticut

Pediatric Nurse Practitioner 66
Yale University, New Haven, Connecticut

ILLINOIS
Pediatric Nurse Associate 67
Rush Presbyterian-St. Luke's Hospital, Chicago, Illinois

KENTUCKY
Family Nursing Program 68
Frontier Nursing Service, Wendover, Kentucky

MAINE
Pediatric Nurse Associate 70
University of Maine, Portland, Maine

MASSACHUSETTS
Pediatric Nurse Practitioner 72
Bunker Hill Health Center, Charlestown, Massachusetts

MICHIGAN
Pediatric Nurse Practitioner 74
Wayne State University, Detroit, Michigan

MISSOURI
Pediatric Nurse Practitioner 75
Washington University, St. Louis, Missouri

PROGRAMS FOR EXTENDING NURSING ROLES (continued) page

NEW YORK
Nurse Physician Surrogate 77
Albert Einstein College of Medicine, Bronx, New York

Triage or Screening Professional 78
Albert Einstein College of Medicine, Bronx, New York

Public Health Nurse Practitioner 79
Dr. Martin Luther King, Jr. Health Center and Montefiore Hospital, Bronx, New York

Pediatric Nurse Practitioner 80
University of Rochester, Rochester, New York

OHIO
Pediatric Nurse Associate 82
University of Cincinnati, Cincinnati, Ohio

PENNSYLVANIA
In-Service Education for Ambulatory Pediatric Nurse 83
St. Christopher's Hospital for Children, Philadelphia, Pennsylvania

Pediatric Specialist Program for Public Health Nurses 84
Allegheny County Health Department, Pittsburgh, Pennsylvania

TENNESSEE
Pediatric Nurse Clinician 85
University of Tennessee, Memphis, Tennessee

TEXAS
Ophthalmic Nursing 87
Baylor University, Houston, Texas

Pediatric Nurse Practitioner 88
U.S. Air Force Medical Center, San Antonio, Texas

VIRGINIA
Nurse Clinician 89
University of Virginia, Charlottesville, Virginia

PLANNED OR OPERATIONAL PROGRAMS NOT SUMMARIZED IN DETAIL 91

CALIFORNIA

Title Unknown* 91
Martin Luther King, Jr. Health Center, Los Angeles, California

* Probably a program for extending nursing roles.

PLANNED OR OPERATIONAL PROGRAMS NOT SUMMARIZED IN DETAIL (continued) page

CALIFORNIA (continued)
Title Unknown* 91
Permanente Group of Southern California, Los Angeles, California

Emergency Service Technician 91
Casa Loma College, Pacoima, California

Physician's Assistant 91
Mercy Hospital, San Diego, California

Title Unknown* 91
Permanente Medical Group, San Francisco, California

Nurse Practitioner 92
Stanford University, Stanford, California

Physician's Assistant 92
Stanford University, Stanford, California

CONNECTICUT
Surgical Assistant 92
Yale University, New Haven, Connecticut

DISTRICT OF COLUMBIA
Title Unknown* 92
Department of Health, Washington, D. C.

Physician's Assistant 93
D. C. General Hospital, Washington, D. C.

Title Unknown 93
George Washington University, Washington, D. C.

Ophthalmic Technician 93
Georgetown University Hospital, Washington, D. C.

Physician Assistant 93
U.S. Department of Justice, Washington, D. C.

Physician's Assistant 93
Washington Hospital Center, Washington, D. C.

* Probably a program for extending nursing roles.

PLANNED OR OPERATIONAL PROGRAMS NOT SUMMARIZED IN DETAIL (continued) page

DISTRICT OF COLUMBIA (continued)
Physician's Assistant - Cardiology 93
Washington Hospital Center, Washington, D. C.

FLORIDA
Expanded Nurse 93
University of Florida, Gainesville, Florida

Professional Assistant and Associate 93
University of Florida, Gainesville, Florida

Health Care Administrator 94
St. Petersburg Junior College, St. Petersburg, Florida

GEORGIA
Anesthesia Assistant 94
Medical College of Georgia, Augusta, Georgia

Physician's Assistant - Mental Health 94
Georgia State College, Atlanta, Georgia

Physician's Assistant 94
Medical College of Georgia, Augusta, Georgia

ILLINOIS
Title Unknown*..... 94
Evanston Hospital, Evanston, Illinois

IOWA
Orthopedic Assistant 94
Kirkwood Community College, Cedar Rapids, Iowa

Pediatric Clinic Associate 94
University of Iowa, Iowa City, Iowa

KANSAS
Title Unknown*.. 95
University of Kansas Medical Center, Kansas City, Kansas

KENTUCKY
Electroencephalography Technician 95
University of Kentucky, Lexington, Kentucky

Radiation Dosimetrist 95
University of Kentucky, Lexington, Kentucky

Title Unknown*..... 95
University of Kentucky, Lexington, Kentucky

* Probably a program for extending nursing roles.

PLANNED OR OPERATIONAL PROGRAMS NOT SUMMARIZED IN DETAIL (continued) page

MARYLAND
Family Health Supervisor 95
Johns Hopkins University, Baltimore, Maryland

Primary Care Associate*..... 95
Johns Hopkins University, Baltimore, Maryland

Community Health Representative 95
Indian Health Service, Silver Spring, Maryland

Title Unknown*..... 95
University of Maryland, Baltimore, Maryland

Title Unknown 96
University of Maryland, Baltimore, Maryland

MASSACHUSETTS
Expanded Nurse 96
Boston Hospital for Women, Boston, Massachusetts

Surgical Assistant 96
Massachusetts General Hospital, Boston, Massachusetts

MINNESOTA
Title Unknown*..... 96
University of Minnesota, Minneapolis, Minnesota

MISSOURI
Physician Assistant 96
Medical Administrative Officer, Springfield, Missouri

NEBRASKA
Title Unknown 96
University of Nebraska, Lincoln, Nebraska

NEW MEXICO
Family Nurse Practitioner 96
University of New Mexico, Albuquerque, New Mexico

NEW YORK
Baccalaureate Program in Health Administration 97
Ithaca College, Ithaca, New York

Physician's Assistant 97
Montefiore Hospital, New York, New York

Title Unknown*..... 97
Mt. Sinai School of Medicine, New York, New York

Title Unknown*..... 97
New York City Department of Health, New York, New York

* Probably a program for extending nursing roles.

PLANNED OR OPERATIONAL PROGRAMS NOT SUMMARIZED IN DETAIL (continued) page

NEW YORK (continued)
Cardiopulmonary Technician 97
State University of New York, Stony Brook, New York

NORTH CAROLINA
Title Unknown*..... 97
Regional Medical Program, Durham, North Carolina

OHIO
Anesthesia Assistant 97
Case-Western Reserve University, Cleveland, Ohio

Nurse Practitioner 98
Cleveland Department of Health, Cleveland, Ohio

OKLAHOMA
Physician's Assistant 98
Oklahoma State University, Stillwater, Oklahoma

OREGON
Family Physician's Assistant 98
University of Oregon, Portland, Oregon

PENNSYLVANIA
Health Department Nurse 98
Philadelphia Health Department, Philadelphia, Pennsylvania

Title Unknown*..... 98
University of Pennsylvania Hospital, Philadelphia, Pennsylvania

Emergency Medical Technician 98
University of Pittsburgh, Pittsburgh, Pennsylvania

TENNESSEE
Family Nurse Practitioner 98
Vanderbilt University, Nashville, Tennessee

TEXAS
Title Unknown 99
El Centro College, Dallas, Texas

UTAH
MEDEX 99
Intermountain Regional Medical Program, Salt Lake City, Utah

WASHINGTON
Cardiopulmonary Technician 99
Spokane Community College, Spokane, Washington

* Probably a program for extending nursing roles.

PLANNED OR OPERATIONAL PROGRAMS NOT SUMMARIZED IN DETAIL (continued) page

WISCONSIN
Title Unknown* 99
University of Wisconsin, Madison, Wisconsin

SELECTED REFERENCES 101

* Probably a program for extending nursing roles.

PROGRAMS WITH VARIED ENTRANCE REQUIREMENTS

INSTITUTION:	University of Alabama Medical Center 1919 Seventh Avenue South Birmingham, Alabama 35233
PROGRAM DIRECTOR:	William Harlan, M.D. Assistant Dean, Division of Family Practice and Ambulatory Medicine
PROGRAM TITLE:	MEDEX
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	This is a one-year program consisting of alternating periods in didactic studies and clinical experience with a preceptor. Students are pre-matched with a preceptor before entering the program.
DEGREE OR CERTIFICATE AWARDED:	Certificate
ENTRANCE REQUIREMENTS:	Former Independent duty-level corpsmen are preferred.
NUMBER OF STUDENTS ENROLLED:	20
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	University of Alabama at Birmingham Medical Center School of Community and Allied Health Resources 1919 Seventh Avenue South Birmingham, Alabama 35233
PROGRAM DIRECTORS:	James W. Truelove, M.D. Acting Assistant Director School of Health Services Administration University of Alabama Beulah M. Hathaway, M.D. Chief, Anatomic Pathology Birmingham Veteran's Administration Hospital 700 19th Street South Birmingham, Alabama 35233
PROGRAM TITLE:	Pathology Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The one-year course of study consists of a program of both didactic lectures and a clinical experience. Courses include anatomy, biology, chemistry, medical terminology, photography, histology, and cytology. There are plans to expand the program to two years in the near future, to enable students to receive a B.S. degree.
DEGREE OR CERTIFICATE AWARDED:	Certificate
ENTRANCE REQUIREMENTS:	Two years of college or the equivalent are preferred.
NUMBER OF STUDENTS ENROLLED:	3 (There are plans to expand to 10)
NUMBER OF STUDENTS GRADUATED:	1

INSTITUTION: University of Alabama Medical Center
1919 Seventh Avenue South
Birmingham, Alabama 35233

PROGRAM DIRECTOR: William Harlan, M.D.
Associate Dean, Division of Family Practice and Ambulatory Medicine

PROGRAM TITLE: Physician's Assistant

STAGE OF DEVELOPMENT: Operational

CURRICULUM: The 24-month program is divided into 2 parts--didactic and clinical. The didactic portion consists of three phases: Introductory Phase (5 weeks)- courses include history, philosophy ethics of medicine, medical terminology, chemistry, medical microbiology, laboratory medicine, animal experimentation and surgery, and data processing; Core Phase (22 weeks)- anatomy, physiology, biochemistry, pharmacology, behavioral sciences; Final Phase (6 weeks)- patient evaluation and diagnosis, electrocardiography, growth and development, radiology, and dentistry.

The 9 month didactic period is followed by 11 months of required clinical rotations in medical outpatient, general surgery, obstetrics and gynecology, and pediatrics, and 4 months of elective rotations in cariology, endocrinology, gastroenterology, nephrology, neurology, rheumatology, dermatology, orthopedics urology, and radiology.

DEGREE OR CERTIFICATE AWARDED: Certificate

ENTRANCE REQUIREMENTS: Students with 2 years of college, primarily in the biological sciences, are preferred; students should have previous experience in the health field, with at least one year involving extensive direct patient care.

NUMBER OF STUDENTS ENROLLED: 12

NUMBER OF STUDENTS GRADUATED: None to date

INSTITUTION:	University of Alabama Brimingham, Alabama
PROGRAM DIRECTOR:	Buris Boshell, M.D. Diabetes Trust Fund 2117 8th Avenue South Birmingham, Alabama 35233
PROGRAM TITLE:	Physician's Assistant, Diabetes
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The training period consists of one year of didactics, and one year of clinical experience in the hospital. Details are available from the institution upon request.
DEGREE OR CERTIFICATE AWARDED:	Certificate
ENTRANCE REQUIREMENTS:	High School graduates, preferable with a science background.
NUMBER OF STUDENTS ENROLLED:	12
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	University of Alabama at Birmingham Medical Center School of Health Services Administration 1919 Seventh Avenue South Birmingham, Alabama 35233
PROGRAM DIRECTOR:	Margaret K. Kirklin, M.D.
PROGRAM TITLE:	Surgeon's Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The two-year program combines studies in all aspects of surgery including pathology, pharmacology, history taking, and physical examinations with an equal amount of time devoted to clinical experience.
DEGREE OR CERTIFICATE AWARDED:	A Certificate is awarded.
ENTRANCE REQUIREMENTS:	Two years of college, with emphasis in the basic sciences, and an individual evaluation by the admissions committee.
NUMBER OF STUDENTS ENROLLED:	9
NUMBER OF STUDENTS GRADUATED:	2

INSTITUTION:	De Anza College Foothill Community College District 21250 Stevens Creek Blvd. Cupertino, California 95014
PROGRAM DIRECTORS:	Nathan H. Boortz, Ed.D. Mrs. Eloise Hansen
PROGRAM TITLE:	Pediatric Assisting
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The two-year program is an option of the two-year Medical Assisting Curriculum offered at De Anza College. Pediatric Assisting majors will have courses emphasizing pediatrics. Medical Assisting courses include anatomy and physiology, effective communications, medical terminology, microbiology, first aid, clinical techniques, office management, general psychology, and a number of others. The pediatric portion consists of courses in common childhood diseases and prevention, pediatric test methods and procedures, immunology and microbiology, and externship. At the present, a summer session is required of students in the program in addition to the usual 2-year Medical Assisting program.
DEGREE OR CERTIFICATE AWARDED:	A.A. Degree (Associate of Arts)
ENTRANCE REQUIREMENTS:	Completion of the Medical Assisting Curriculum and staff recommendation. Applicants to the Medical Assisting Program must meet the regular requirements for entry into De Anza College.
NUMBER OF STUDENTS ENROLLED:	Anticipate 10-15 per year
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	Foothill College Foothill Community College District 12345 El Monte Avenue Los Altos Hills, California 94022
PROGRAM DIRECTORS:	Nathan H. Boortz, Ed.D. Mrs. Mary McLanathan
PROGRAM TITLE:	Orthopaedic Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	This is a two year program with courses in anatomy and physiology, biochemistry, physicial therapy, patient service and emergency room techniques, microbiology, orthopaedic diseases and injuries, general psychology and business and industrial psychology, political science, operating room techniques, prosthetics and orthotics, and several other courses. The program is one of a number of programs offered by the college in health careers. A total of 96 credits are required.
DEGREE OR CERTIFICATE AWARDED:	Associate of Arts Degree (A.A.)
ENTRANCE REQUIREMENTS:	High School diploma; High School Algebra or Math 101; High School Biology or Biology 10. Former military corpsmen are preferred.
NUMBER OF STUDENTS ENROLLED:	11
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	Charles R. Drew Postgraduate Medical School Los Angeles, California
PROGRAM DIRECTOR:	M. Alfred Haynes, M.D., Chairman Department of Community Medicine Address correspondence to: Director, MEDEX 1635 East 103rd Street Suite 206 Los Angeles, California 90002
PROGRAM TITLE:	MEDEX
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	After training at the medical school for three months, the Medex is assigned for a year to a preceptor who is a physician in general practice. For these twelve months, he assists the physician by learning and applying primary care skills under his close supervision.
DEGREE OR CERTIFICATE AWARDED:	Certificate indicating completion of the MEDEX training program.
ENTRANCE REQUIREMENTS:	Former medical corpsmen trained to a level of independent performance.
NUMBER OF STUDENTS ENROLLED:	20
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	City College of San Francisco 50 Phelan Avenue San Francisco, California 94102
PROGRAM DIRECTORS:	Mr. Jules Fraden Dean of Instruction F. Richard Schneider, M.D. Clinical Director
PROGRAM TITLE:	Orthopaedic Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The program of instruction covers a period of two years and consists of four 15-week semesters. The curriculum includes courses in the following core areas: (1) health service (275 hours), (2) orthopaedic assisting, (850 hours) and (3) general education (375 hours). Included are instruction in patient care and staff relationships, anatomy and physiology, emergency room techniques, cast and traction application, office procedure and care of supplies and equipment, orientation to physical therapy, orientation to prosthetics and orthotics, and operating room techniques. The two-year course will also include practical experience as orthopaedic assistants in 8 affiliated hospitals and in orthopaedic surgeons' offices.
DEGREE OR CERTIFICATE AWARDED:	A.A. degree. Certification will initially be carried out by the accredited Orthopaedic Assisting program until certification guidelines will be developed by a Board of Orthopaedic Assistants.
ENTRANCE REQUIREMENTS:	Preferably a high school education or its equivalent. Adults with a 10th or 11th grade reading level and medical corpsmen will also be considered.
NUMBER OF STUDENTS ENROLLED:	1969 25 Students Enrolled 1970 25 Students Ernolled
NUMBER OF STUDENTS GRADUATED:	None to date. 20 students will graduate in June, 1971.

INSTITUTION:	University of Colorado School of Medicine 4200 East Ninth Avenue Denver, Colorado 80220
PROGRAM DIRECTORS:	Henry K. Silver, M.D. Chairman, Department of Pediatrics James A. Hecker, M.D. John E. Ott, M.D.
PROGRAM TITLE:	Child Health Associate Program
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	Child Health Associates will complete two (or more) years of work in an undergraduate college or university before entering the program; this would be followed by a two-year course of instruction at the University of Colorado Medical Center in Denver and a one-year internship. As undergraduates, students will take a course similar to that taken by premedical students. The curriculum for the first of the two years at the medical center would consist principally of study in the basic sciences, while the second year would be primarily a clinical experience on the pediatric wards, in the nurseries, in the outpatient department, as well as in various community facilities. The clinical year would be followed by an internship of 12 months. The student would be able to care for almost all the problems of well children as well as most of those with mild disease states (80% of the children seen in a medical practice fall in these categories). Within established limits, the associate would be qualified in diagnose, counsel, and prescribe in both health and sickness.
DEGREE OR CERTIFICATE AWARDED:	B.A. degree from the University of Colorado. Certification by the Colorado State Board of Medical Examiners.

University of Colorado
School of Medicine

ENTRANCE REQUIREMENTS:	Completion of 60 semester hours or 90 quarter hours in an accredited college or university. Candidates must have successfully completed 8 semester hours each of general chemistry, psychology and biology, and a one-year course in English Literature. In special circumstances, substitutes for the above requirements may be made.
NUMBER OF STUDENTS ENROLLED:	23
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	Washington Hospital Center 110 Irving Street, N.W. Washington, D.C. 20010
PROGRAM DIRECTORS:	James M. Bacos, M.D. Chief of Cardiology
PROGRAM TITLE:	Cardiovascular Technician Training Program
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The 18-week program concentrates on giving background and clinical experience in the cardiovascular field. With the training, the trainee should be sufficiently well versed to be able to step into one of several roles in the cardiovascular field, working under the supervision of a knowledgeable physician. He will complement the work of the nurses, work parallel to them, and relieve them of some of their non-nursing tasks. The course is divided into two phases: Phase I consists of five weeks of formal lectures, laboratories, and demonstrations, with ample time for informal discussions with the instructors. Phase 2 consists of rotations through various clinical areas, arranged to give opportunity for practical application of the didactic material. During this phase, four days per week are spent in the clinical areas and lectures are continued on the remaining day.
DEGREE OR CERTIFICATE AWARDED:	Information not available
ENTRANCE REQUIREMENTS:	High school graduate and experience in any medical area involving patient care.
NUMBER OF STUDENTS ENROLLED:	Information not available
NUMBER OF STUDENTS GRADUATED:	Information not available

INSTITUTION:	Emory University School of Medicine Atlanta, Georgia 30322
PROGRAM DIRECTOR:	John E. Steinhaus, M.D. Professor and Chairman Department of Anesthesiology
PROGRAM TITLE:	Master Anesthesia Technologist - An Experimental Study
STAGE OF DEVELOPMENT:	This is an experimental program for training technological assistants for anesthesiologists.
CURRICULUM:	Nine months didactic training devoted to applied physiology and electronic instrumentation. Twelve months clinical training with emphasis on instrument operation and cardio-respiratory support.
DEGREE OR CERTIFICATE AWARDED:	Master of Health
ENTRANCE REQUIREMENTS:	Bachelor's Degree
NUMBER OF STUDENTS ENROLLED:	6
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	Grady Memorial Hospital 80 Butler Street, S.E. Atlanta, Georgia 30303
PROGRAM DIRECTOR:	E. Alan Paulk, M.D.
PROGRAM TITLE:	Medical Specialty Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The two year Program is designed to train experts in the practical and technical aspects of patient care in the areas of Medical Intensive, Coronary, Respiratory, and Emergency Care. The first nine months consist entirely of didactic courses in Anatomy and Physiology, chemistry, medical terminology, medical physics, pharmacology, drug math, introduction to the study of disease, ICU techniques, and laboratory techniques. During the remaining fifteen months, students receive clinical experience in Coronary, Respiratory, and Medical Intensive Care Units and Emergency Clinics to supplement classroom lecture on cardiovascular disease, medical electronics, cardiovascular instrumentation, cardiac auscultation, cardiac dysrhythmias, cardiovascular history and physical, respiratory disease, pulmonary function testing, history and physical, respiratory therapy, management of medical emergencies and management of surgical emergencies.
DEGREE OR CERTIFICATE AWARDED:	Certification as a Medical Specialty Assistant from Grady Memorial Hospital.
ENTRANCE REQUIREMENTS:	1. High school graduate. 2. At least two years as a corpsman in the armed service or similar experience in the health field. 3. Scholastic Aptitude Test scores. 4. Completed application, three personal references, and high school and any college transcripts.
NUMBER OF STUDENTS ENROLLED:	4
NUMBER OF STUDENTS GRADUATED:	5

INSTITUTION:	Georgia State University School of Allied Health Sciences 33 Gilmer Street Atlanta, Georgia 30303
PROGRAM DIRECTOR:	J. Rhodes Haverty, M.D. Dean, School of Allied Health Sciences
PROGRAM TITLE:	Pediatric Assistants
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The program is 21 months in length (7 quarters), and combines an academic curriculum with practical experience obtained in a clinical setting. Courses include biology, English, mathematics, microbiology, sociology, allied health sciences, pediatrics, pharmacology, and history.
DEGREE OR CERTIFICATE AWARDED:	Associate Degree
ENTRANCE REQUIREMENTS:	In addition to meeting the admissions requirements of Georgia State University, it is advisable the students have completed one unit in chemistry and one unit in typing.
NUMBER OF STUDENTS ENROLLED:	8
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	Albert B. Chandler Medical Center College of Allied Health Professions University of Kentucky Lexington, Kentucky 40506
PROGRAM DIRECTOR:	Dr. Joseph Hamburg, Dean, College of Allied Health Professions
PROGRAM TITLE:	The Clinical Associate
STAGE OF DEVELOPMENT:	Planning (Hope to be operational 9/71)
CURRICULUM:	The curriculum, which is still in the planning stages, is aimed at teaching both the "how" and "why" of performing duties. The 2-year course will consist of one year of classroom work and one year in a closely-supervised preceptorship.
DEGREE OR CERTIFICATE AWARDED:	Associate Degree
ENTRANCE REQUIREMENTS:	A high school diploma.
NUMBER OF STUDENTS ENROLLED:	Anticipate 20
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	Western Michigan University West Michigan Avenue Kalamazoo, Michigan 49001
PROGRAM DIRECTOR:	Dr. George Mallinson Dean Graduate School
PROGRAM TITLE:	Physician's Assistant
STAGE OF DEVELOPMENT:	Planning
CURRICULUM:	This will be a three-year program of medical study. The students will be trained to fill in the gap in the "medical pyramid" between the physician and the technician. The program will be open-ended so that students could go on to earn a medical doctor's degree if they choose.
DEGREE OR CERTIFICATE AWARDED:	B.A. (The M.A. degree will be awarded to students who receive an additional year of specialty training.)
ENTRANCE REQUIREMENTS:	Students will be accepted into the program after completion of two years of college study.
NUMBER OF STUDENTS ENROLLED:	None to date.
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	Department of Family Practice & Community Health University of Minnesota Health Sciences Center Minneapolis, Minnesota 55455
PROGRAM DIRECTOR:	John Verby, M.D.
PROGRAM TITLE:	Physician's Associate
STAGE OF DEVELOPMENT:	Planning
CURRICULUM:	This is a scholarship program whereby third year medical students will be provided an opportunity to associate themselves with selected physicians or groups of physicians in non-metropolitan areas in the state. The students will associate themselves intimately with the preceptors, participating in all aspects of patient care in home, office, and hospital. Two quarters of credit will be given for this work. Students may elect to remain in the physician's associate status for a period of up to five years before returning to the medical school.
DEGREE OR CERTIFICATE AWARDED:	Two quarters of credit will be earned, to be applied to the medical degree.
ENTRANCE REQUIREMENTS:	Students will be selected from the incoming class of the medical school on the basis of application and other indications of genuine desire to eventually practice in a small community. Students in their second year may also be selected.
NUMBER OF STUDENTS ENROLLED:	None to date
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	Veterans Administration Hospital 54th Street and 48th Avenue South Minneapolis, Minnesota 55417
PROGRAM DIRECTORS:	Clyde E. Blackard, M.D. Chief of Urology Russell Church, R.N. Course Director
PROGRAM TITLE:	Urological Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The 12-month program encompasses at least 250 hours of formal classroom lectures, demonstrations and quizzes. Emphasis will be placed on: 1. Anatomy and physiology of the genito-urinary tract; 2. Catheterization; 3. Urological instruments; 4. Urological radiographic techniques; 5. Urological procedures; 6. The urological patient.
CERTIFICATE OR DEGREE AWARDED:	Certificate
ENTRANCE REQUIREMENTS:	1 1/2 years of experience as a nursing assistant or its equivalent in such paramedical fields as: Laboratory Service, Physicial Medicine and Rehabilitation, or Radiology.
NUMBER OF STUDENTS ENROLLED:	Information not available
NUMBER OF STUDENTS GRADUATED:	Information not available

INSTITUTION:	Tranining Center for Physician Assistants United States Medical Center Springfield, Missouri
PROGRAM DIRECTOR:	Robert L. Brutsche, M.D. Medical Director Federal Bureau of Prisons United States Department of Justice Washington, D.C. 20537
PROGRAM TITLE:	Physician Assistant Training Program
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The curriculum is provided in a basic training program and in an advanced training program. The objectives are to provide the student with the necessary background for screening patients, the methodology for initiating appropriate differential diagnostic procedures, the appreciation for compliance with guidelines regarding the scope of participation, and to provide him with cross-training in laboratory, radiology, pharmacy, nursing, physicial therapy, surgical assistance, dental assistance, safety and sanitation. Training is provided for state and local prisons and non-prison systems when space is available. The basic training program includes two quarters of lectures (374 hours) and on-the-job training (346 hours). The advanced training program includes review, on-the-job training, and observation.
DEGREE OR CERTIFICATE AWARDED:	A certificate is granted from the Bureau of Prisons.
ENTRANCE REQUIREMENTS:	1. Experience in the health field at the level attained by military corpsman; 2. High school diploma or equivalent; 3. Final acceptance requires a security clearance.
NUMBER OF STUDENTS ENROLLED:	8 men enrolled.
NUMBER OF STUDENTS GRADUATED:	4 graduates; 2 assistants from state prisons have trained for one quarter.

INSTITUTION:	Dartmouth Medical School
PROGRAM DIRECTOR:	Nicholas Danforth, M.D. Director Nugget Arcade, P.O. Box 146 Hanover, New Hampshire 03755
PROGRAM TITLE:	MEDEX
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The training is divided into two phases: (1) Three months of university training with emphasis on the transition from military medicine to civilian medicine. Physician preceptors will be among those participating in the university training portion of the program; (2) Twelve months of practical training under the guidance of preceptors.
DEGREE OR CERTIFICATE AWARDED:	Certificate
ENTRANCE REQUIREMENTS:	Former military corpsmen who have served on independent duty or have received advanced training qualifying them for independent duty, having formal medical training ranging from 640 to 1,900 hours.
NUMBER OF STUDENTS ENROLLED:	22
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	Brooklyn-Cumberland Medical Center and Long Island University, Brooklyn Campus 121 DeKald Avenue Brooklyn, New York 11201
PROGRAM DIRECTOR:	Arnold Lewis, M.D.
PROGRAM TITLE:	Medical Services Associate Program
STAGE OF DEVELOPMENT:	Presently a pilot project with "seed" money for the training of classes of 24 students for the next three years. The first class of 24 students started on February 2, 1970.
CURRICULUM:	Medical services associates will train for two years, year round, to prepare them to assist physicians in general practice, and in the areas of general internal medicine and surgery. The program will include didactic courses in the basic concepts of human anatomy, physiology, pathology, pharmacology, English, mathematics, sociology, psychology, medical ethics, and medical terminology. Each participant will be exposed to approximately one added year of clinical experience working in the medical care areas of the Brooklyn-Cumberland Medical Center. They will be taught to take routine parts of medical histories, perform physical examinations, participate in and assist with procedures performed by the physician, assist at operations, review the patients' charts for routine procedures and spot-check developments in the course of the disease process in each individual patient.
DEGREE OR CERTIFICATE AWARDED:	The first students will be granted a joint Brooklyn-Cumberland Medical Center/Long Island University certificate. Degree granting programs at both the A.A.S. and B.S. levels are planned.
ENTRANCE REQUIREMENTS:	Candidates are recruited predominantly from the Fort Greene/Bedford-Stuyvesant area of Brooklyn. Both recently discharged medical corpsman and high school graduates or the equivalent will be selected from those expressing a desire to enter the health field and who have exhibited academic and personal qualities indicating motivation and

capacity for success. Although academic achievement tests will be given, primary emphasis will be given to a personal interview with evidence of motivation and psychological adaptability stressed.

NUMBER OF STUDENTS ENROLLED: 24 students will be enrolled for each of the first three classes.

NUMBER OF STUDENTS GRADUATED: None to date

INSTITUTION:	School for Orthoptists and Ophthalmic Assistants Box 1, Edward S. Harkness Eye Institute Columbia-Presbyterian Medical Center 635 West 165th Street New York, New York 10032
PROGRAM DIRECTOR:	Philip Knapp, M.D.
PROGRAM TITLE:	Orthoptics and Ophthalmic Assisting
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	Training consists of a total of 18 months. A two month basic course is offered by the American Orthoptic Council. This course consists of lectures in such subjects as optics, neurology, and eye anatomy, given in the summer at various universities around the country, currently at the University of Iowa. Sixteen months of lectures and clinical training are given in the Department of Ophthalmology of Columbia-Presbyterian Medical Center.
CERTIFICATE OR DEGREE AWARDED:	Certificate from Presbyterian Hospital; certificate awarded by the American Orthoptic Council upon successful passing of written, oral, and practical examination.
ENTRANCE REQUIREMENTS:	At least 2 years of college are required; preference is given to college graduates. Applicants must have taken or plan to take the two-month basic course offered by the American Orthoptic Council.
NUMBER OF STUDENTS ENROLLED:	4
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	New York City Borough of Manhattan Community College City University of New York Division of Health Services 134 West 51st Street New York, New York 10020
PROGRAM DIRECTORS:	Blanche R. Reid, Ph.D. Head, Health Services Division Professor Franklin Fitz
PROGRAM TITLE:	Medical Emergency Technicians
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	Students are trained in emergency techniques for working on ambulances or in emergency departments. Curriculum for the first year includes English composition, sociology, mathematics, anatomy and physiology, developmental psychology, general biology, and medical emergency techniques. Second year curriculum includes social problems, microbiology, speech, conversational Spanish, music or art, and emergency medical techniques. Students have spent time alternating between the intensive care unit and emergency room at Poly Clinic and Roosevelt Hospital. They also spend some time in the communications section at the Police Department.
DEGREE OR CERTIFICATE AWARDED:	A.A.S. Degree (Associate in Applied Sciences)
ENTRANCE REQUIREMENTS:	High School diploma or equivalent; at least one year of high school science or experience as a military corpsman is preferred.
NUMBER OF STUDENTS ENROLLED:	48
NUMBER OF STUDENTS GRADUATED:	23

INSTITUTION:	Marine Physician's Assistant Training School U.S. Public Health Service Hospital Staten Island, New York 10304
PROGRAM DIRECTORS:	Mr. James Hensley Director of Training Mr. Ronald Haberberger Director, Clinical Education
PROGRAM TITLE:	Marine Physician Assistant Training School
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	Students are trained to meet medical emergencies, both medical and supportive, with knowledge and independent judgement. The program consists of about 660 instructional hours and 470 hours of practical experiences. The nine-month training includes basic instruction to prepare the physician assistant in the absence of the physician aboard ship, to meet medical emergencies with knowledge and independent judgement. The program includes courses in anatomy and physiology, environmental health and preventive medicine, medical and surgical conditions, patient care, pharmacology, clinical laboratory, first aid, and practical experience in surgical techniques.
DEGREE OR CERTIFICATE AWARDED:	Each student receives a certificate issued by the Public Health Service and a license from the U.S. Coast Guard, to work on Merchant Marine ships.
ENTRANCE REQUIREMENTS:	High school diploma or equivalent; former military corpsmen preferred.
NUMBER OF STUDENTS ENROLLED:	39
NUMBER OF STUDENTS GRADUATED:	112

INSTITUTION:	U.S. Public Health Service Hospital Staten Island, New York 10304
PROGRAM DIRECTOR:	Mr. James Hensley Director of Training
PROGRAM TITLE:	Orthopedic Assistant
STAGE OF DEVELOPMENT:	Will be Operational in September, 1971.
CURRICULUM:	The general education core consists of courses in English, mathematics, hygiene, social sciences, physical education, and electives. The health service core includes biology, advanced safety service, and techniques of patient care. The orthopedic assistant core consists of emergency room techniques, introduction to physical therapy, cast and traction application, orthopedic diseases and injuries, office procedures and care of supplies and equipment, operating room techniques, and principles of prosthetics and orthotics. The degree requires a total of 66 credits. The two-year course will also include practical experience as assistant to orthopedic surgeons in several affiliated hospitals.
DEGREE OR CERTIFICATE AWARDED:	A.A.S. Degree from community college
ENTRANCE REQUIREMENTS:	A high school diploma or its equivalent is required. The program is directly aimed at recruiting returning veterans who have had some paramedical experience in the military services and who are not being absorved by civilian facilities. In addition, underemployed individuals from the communtiy will be considered.
NUMBER OF STUDENTS ENROLLED:	50 will be in first class
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTIONS:	Duke University Medical Center Department of Pathology and Veteran's Administration Hospital Department of Pathology Durham, North Carolina 27706
PROGRAM DIRECTOR:	Kenneth A. Broda Teaching Supervisor
PROGRAM TITLE:	Pathology Assistant Program
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The program length varies from one to two years, depending on the student's past education, experience and progress. The first six months are devoted to instructional classroom and laboratory work; the remainder of the course to practical experience in the Department of Pathology and various allied departments. Classes begin in June of each year. Lectures and laboratories cover such subjects as human anatomy and physiology, histology, bacteriology, pathology, radiologic technique, and photography. The practical rotation periods are in the autopsy suite, histology, bacteriology and photography.
DEGREE OR CERTIFICATE AWARDED:	Certificate from Duke University and the Veteran's Administration Hospital
ENTRANCE REQUIREMENTS:	Selection of students will be made from the following: 1. Graduate (or equivalent) of a four-year accredited college. 2. Graduate (or equivalent) of a junior college with academic studies. 3. High School graduate with at least two years of experience as a hospital corpsman. An aptitude test is required of the prospective student.
NUMBER OF STUDENTS ENROLLED:	4
NUMBER OF STUDENTS GRADUATED:	3

INSTITUTION: Duke University School of Medicine
P.O. Box 2914 CHS
Durham, North Carolina 27706

PROGRAM DIRECTOR: D. Robert Howard, M.D.
Department of Community Health Sciences

PROGRAM TITLE: Physician's Assistant

STAGE OF DEVELOPMENT: Operational

CURRICULUM: The educational curriculum covers a period of 24 months. The preclinical portion covers an academic period of 36 weeks and is divided into three phases rather than two semesters. The first and third phases are each six weeks in duration and the second phase, twenty-four weeks. The first phase includes courses in the history, philosophy, and ethics of medicine, basic clinical laboratory, Medical terminology, chemistry, animal experimentation, and community health. The second phase includes microbiology, anatomy, physiology, biology, pharmacology, physical evaluation, diagnostic procedures, animal surgery, and clinical psychiatry. The third phase includes electrocardiology, radiology, data processing and patient evaluation.

The clinical curriculum of fifteen months consists of nine months of required rotations, and six months of elective rotations. It is during this aspect of the training program that the student is expected to develop expertise in the application of his preclinical learning. Areas covered are general medicine, pediatrics, surgery, internal medicine, allergy and respiratory disease, cardiology, dermatology, endocrinology, gastroenterology, hemotology, hyperbaric medicine, industrial medicine, nephrology, neurology, radiology, neurosurgery, ophthalmology, orthopaedic surgery, otolarynology, plastic surgery, and urology.

Duke University School of Medicine

DEGREE OR CERTIFICATE AWARDED:	A "Physician's Assistant" Certificate for completion of the 2-year program; a B.S. degree plus certification after 4 years of training.
ENTRANCE REQUIREMENTS:	1. A high school diploma or its equivalent 2. Experience of at least 2 years in the health field (such as corpsman, LPN).
NUMBER OF STUDENTS ENROLLED:	77
NUMBER OF STUDENTS GRADUATED:	36

INSTITUTION:	Bowman Gray School of Medicine Wake Forest University Division of Allied Health Programs Winston-Salem, North Carolina 27103
PROGRAM DIRECTORS:	Leland E. Powers, M.D. Director, Division of Allied Health Programs Katherine H. Anderson, M.D.
PROGRAM TITLE:	Physician's Assistant Training Program (includes training in specialty areas)
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The 24-month program is divided into three phases: Phase 1--A basic course in clinical and bioscience principles, required of all students (6 months). Phase II - intensive training in the specialty tasks of the student's choice (6 months). Phase III - supervised practice in the hospital, clinics, and in private practitioners' offices (12 months).
DEGREE OR CERTIFICATE AWARDED:	For students with less than 3 years of college credits, a certificate will be issued. For students with 3 years of college upon entering the program, a B.S. degree is awarded.
ENTRANCE REQUIREMENTS:	High school and 2 years of college credit, or training and 3 years of experience as a medical corpsman. Minimum S.A.T. score of 800.
NUMBER OF STUDENTS ENROLLED:	20
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	University of North Dakota School of Medicine Grand Forks, North Dakota 58201
PROGRAM DIRECTOR:	Gerald Bassett, M.D. Professor, Department of Community Medicine
PROGRAM TITLE:	MEDEX
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	After training at the medical school for three months, the Medex is assigned for a year to a preceptor who is a physician in general practice. For these twelve months, he assists the physician by learning and applying primary care skills under his close supervision.
DEGREE OR CERTIFICATE AWARDED:	Certificate indicating completion of the MEDEX training program.
ENTRANCE REQUIREMENTS:	Former medical corpsmen trained to a level of independent performance.
NUMBER OF STUDENTS ENROLLED:	18
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	Cincinnati Technical Institute 3520 Central Parkway Cincinnati, Ohio 45223 in conjunction with: Good Samaritan Hospital Deaconess Hospital St. Francis Hospital
PROGRAM DIRECTOR:	Mrs. Nancy Walters, Director Department of Health Technologies
PROGRAM TITLE:	Surgical Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The two-year course includes five 10-week terms per year. Students alternate terms between formal didactic courses at the Cincinnati Technical Institute and clinical experiences in the cooperating hospitals. The first didactic term includes courses in chemistry, anatomy and physiology, laboratory techniques, medical profession, and surgery. The second didactic term includes courses in communications, mathematics, chemistry, anatomy and physiology, and surgery. The third didactic term includes communications, mathematics, anatomy and physiology, pharmacology and microbiology. The fourth includes technical writing, economics, sociology, pathology, and surgical assisting; and the last didactic term includes speaking techniques, human relations, physics, emergency procedures, pathology, and a surgical seminar. The clinical experiences are varied in order to give students a variety of experiences.
DEGREE OR CERTIFICATE AWARDED:	A.A. degree
ENTRANCE REQUIREMENTS:	Students must be high school graduates, and have satisfactory recommendations, acceptable scores on entrance examinations, and physical qualifications necessary for performance of surgical duties. A personal interview is also required.
NUMBER OF STUDENTS ENROLLED:	Approximately 24
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	University of Cincinnati Medical Center Division of Urology 3231 Burnet Avenue Cincinnati, Ohio 45229
PROGRAM DIRECTOR:	Arthur T. Evans, M.D. Professor and Director Division of Urology
PROGRAM TITLE:	Urologic Physician's Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The first nine months of this 2-year program are devoted primarily to didactic instruction. During three 12-week quarters, students take the following clinically-oriented courses: biochemistry, anatomy, physiology, microbiology, pathology, pharmacology, patient evaluation and diagnosis, urological evaluation and diagnosis, urology, and the history and ethics of medicine. The last 15 months are devoted to clinical instruction in urology and closely related fields. Students spend time in the endoscopic suite, the urologic in-patient and out-patient services, and surgery, and may elect rotations on certain related services or in a private urologic practice per arrangement with the director.
DEGREE OR CERTIFICATE AWARDED:	Urologic Physician's Assistant Certificate
ENTRANCE REQUIREMENTS:	1. A high school diploma 2. At least 3 years of medical experience or 2 years of college 3. Submission of scores on the Scholastic Aptitude Test 4. Submission of all academic records at the high school level and beyond 5. Two letters of recommendation from medical supervisors or academic instructors Exceptions may be made in unusual cases.
NUMBER OF STUDENTS ENROLLED:	13
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	Cleveland Clinic Hospital 2050 East 93rd Street Cleveland, Ohio 44106
PROGRAM DIRECTOR:	Mr. James E. Zucker Assistant Administrator
PROGRAM TITLE:	The Corpsman
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The one year program combines both didactic studies and clinical experience, primarily in the intensive care areas, with the ultimate goal of providing an individual with technical and patient care skills which supplement those of physicians, nurses, and various technicians. Courses to be taken at Cuyahoga Community College include Principles of Medical Science, and Microbiology. Instruction will also be given in inhalation therapy, chest physiotherapy, radiology, electrocardiography, and medical instrumentation. The program is hospital and institution-oriented.
DEGREE OR CERTIFICATE AWARDED:	The Cleveland Clinic Educational Foundation and the Cuyahoga Community College will award a joint certificate to each corpsman.
ENTRANCE REQUIREMENTS:	Medical corps experience in the military service or three years of hospital experience, high school graduation or its equivalent, and satisfactory performance on the ACT (American College Test).
NUMBER OF STUDENTS ENROLLED:	10-15 in each class--two classes per year, beginning in January and July.
NUMBER OF STUDENTS GRADUATED:	Information not available.

INSTITUTION:	The Ohio State University College of Medicine School of Allied Medical Professions 410 West 10th Avenue Columbus, Ohio 43210
PROGRAM DIRECTOR:	James P. Dearing, B.S. Associate Director
PROGRAM TITLE:	Circulation Technology
STATE OF DEVELOPMENT:	Operational
CURRICULUM:	The program involves four years in time. The first two years are on the preprofessional level completing basic University requirements for a baccalaureate degree and certain prerequisite courses for the program. The last two years are in the professional division completing specific courses in Circulation Technology relating to the physiology, anatomy, pathology, and engineering aspects of hemodialysis, heart/lung bypass, research and medical instrumentation. During the fourth, or senior year, the students participate in the clinical open/heart and hemodialysis programs and also critique and design research projects for the advancement of the technology.
DEGREE OR CERTIFICATE AWARDED:	Bachelor of Science in Allied Health Professions with a major in Circulation Technology.
ENTRANCE REQUIREMENTS:	1. High School degree or equivalent 2. Two years preprofessional education at an accredited college or university including certain prerequisite courses 3. Application including personal interview
NUMBER STUDENTS INVOLVED:	12
NUMBER STUDENTS GRADUATED:	None to date. First class of six graduates to graduate in June, 1971.

INSTITUTION:	Cuyahoga Community College 7300 York Raod Parma, Ohio 44130
PROGRAM DIRECTOR:	Jim Burnette Assistant Director of Technical Education
PROGRAM TITLE:	Surgical Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	This is a two year program. Courses include English, Biology, Health Technology, Medical Assisting Technology, Surgical Assisting, Social Sciences, and Humanities. Surgical Assisting courses involve both lecture and clinical experience.
DEGREE OR CERTIFICATE AWARDED:	Associate in Science Degree
ENTRANCE REQUIREMENTS:	High school graduates may apply. Persons without a high-school diploma may apply and demonstrate aptitude for college-level instruction by completing the GED high school equivalency examination which is adminstered by the college.
NUMBER OF STUDENTS ENROLLED:	35
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	University of Oklahoma School of Medicine Department of Community Health 800 Northeast 13th Street Oklahoma City, Oklahoma 73104
PROGRAM DIRECTOR:	Dr. Tom Lynn, Chairman Department of Community Health
PROGRAM TITLE:	Physician's Assistant
STAGE OF DEVELOPMENT:	Planning
CURRICULUM:	This is to be a one-year program. Students would spend 6 months in didactic training at the university and 6 months with a physician preceptor in a rural area.
DEGREE OR CERTIFICATE AWARDED:	None
ENTRANCE REQUIREMENTS:	Students must have past experience as independent duty corpsmen in the armed forces.
NUMBER OF STUDENTS ENROLLED:	None to date (estimate 6-12 per class).
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	University of Oklahoma School of Medicine Department of Community Health 800 Northeast 13th Street Oklahoma City, Oklahoma 73104
PROGRAM DIRECTOR:	Dr. Tom Lynn, Chairman Department of Community Health
PROGRAM TITLE:	Physician's Associate
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	This is a 2-year program. Students spend ten months studying at the medical center and 14 months in clinical experiences at the Veteran's Administration Hospital.
DEGREE OR CERTIFICATE AWARDED:	Bachelor of Health Degree
ENTRANCE REQUIREMENTS:	Students must have at least 60 hours of college credits upon entering and at least two years of experience in direct patient contact.
NUMBER OF STUDENTS ENROLLED:	7
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION: Hahnemann Medical College and Hospital
230 North Broad Street
Philadelphia, Pennsylvania 19102

PROGRAM DIRECTORS: Myra Levick, M.Ed., A.T.R.
Paul Jay Fink, M.D.

PROGRAM TITLE: Graduate Psychiatric Art Therapists

STAGE OF DEVELOPMENT: This program is in its fourth year.

CURRICULUM: This program consists of 2 parts. The first is an 11 month internship, which is based on a 40 hour week, and two 5 1/2 month clinical rotations. The week is divided into approximately 15 hours in didactic lectures, 18 hours clinical experience, 1 hour individual supervision with a psychiatrist on the staff, 1 hour individual supervision with an art therapist on the staff, and 1 hour a week small group supervision. The material covered in the courses is normal and abnormal psychology, psycho-analytic theory, art therapy theory, group dynamics, and an overview of other psychiatric theories. The clinical rotation provides supervised experience with emotionally disturbed and brain-damaged children for 5 1/2 months, and 5 1/2 months with adolescent and adult mental patients in partial and full-time hospital settings.

DEGREE OR CERTIFICATE AWARDED: At the end of the 11 month internship, the students receive a certificate from the Department of Mental Health Sciences stating that they have fulfilled all the requirements satisfactorily for this period. They then have the option to take a qualifying exam (comparable to graduate comprehensive examination) and, if they pass, may enroll in the graduate school and proceed to write their theses for an M.S. Degree in Mental Health awarded by the Medical College. The M.S. Degree was accredited in 1969. To date, 27 students took the qualifying exam and passed it, 16 are currently working on their M.S. thesis.

ENTRANCE REQUIREMENTS:

1. The student must be a graduate of an accredited college with a Bachelor of Fine Arts, Bachelor in Art Education, or its equivalent.
2. Completion of an application form.
3. Three character and personal evaluation forms.
4. College transcripts.
5. Scores from the Miller Analogies Tests.

NUMBER OF STUDENTS ENROLLED:	1st class, 6 students - September 1967 2nd class, 9 students - September 1968 3rd class, 20 students - September 1969 4th class, 20 students - September 1970 5th class, 20 students - September 1971 20 students is the maximum number they plan to accept in future years.
NUMBER OF STUDENTS GRADUATED:	Of the 35 students enrolled in the first three years, 2 dropped out of the program 33 received their certificates, 29 are currently employed as art therapists, and 3 students are expected to receive their Masters Degree in 1971.

INSTITUTION: Hahnemann Medical College and Hospital
Department of Mental Health Sciences
314 North Broad Street
Philadelphia, Pennsylvania 19102

PROGRAM DIRECTORS: Hugh Rosen, ACSW
Paul Jay Fink, M.D.

PROGRAM TITLE: Mental Health Technology

STAGE OF DEVELOPMENT: Fully operational

CURRICULUM: Two-year program. The junior year is comprised of didactic seminar-type courses exclusively. The students are taught developmental psychology, psychopathology, group and family process and the role of culture in mental illness and mental health. They also become acquainted with the structures and functions of mental health organizations with strong emphasis on community mental health centers. The senior year requires 40 hours weekly for an 11-month period of a supervised clinical training experience. The focus of the training is the acquisition of skills in a specialty of the student's choice. Included in the 40-hour week of the senior year are 5 ongoing seminars covering activities and subject areas related to the concomitant field training. Readings and discussions flowing from these seminars are intended to broaden further the student's knowledge in the bahavorial sciences, family theory, social and community resources and the use of drugs.

DEGREE OR CERTIFICATE AWARDED: Bachelor of Science Degree

ENTRANCE REQUIREMENTS:

1. Minimum of 60 hours (semester) of college credit.
2. Completion of application.
3. Character references and personal interview.
4. College transcripts.

NUMBER OF STUDENTS ENROLLED: 25 accepted each September for junior class

NUMBER OF STUDENTS GRADUATED: None (will graduate 5 students in June, 1971)

INSTITUTION:	University of Texas Medical Branch Galveston, Texas 77550
PROGRAM DIRECTOR:	Robert W. Ewer, M.D. Department of Medicine
PROGRAM TITLE:	Clinical Associate (with subtitles indicating more specific areas of training, for example: Clinical Associate in Pediatrics).
STAGE OF DEVELOPMENT:	Operational with respect to the "core" curriculum.
CURRICULUM:	The duration of the training program is four years except when transfer of credit and waiver by examination is acceptable. A "core curriculum" common to several Allied Health Professions has been established. The student is given a choice of allied health fields upon completion of certain liberal arts and medically oriented basic science courses for which full academic credit is given. The student is trained to assist the physician in the basic aspects of medical care: (1) To interview, (2) To examine, (3) To test, (4) To treat, (5) And to maintain continuity of communication and observation in its most broad sense. Purely technical skills are subservient, and vary with the field of special interest and endeavor.
DEGREE OR CERTIFICATE AWARDED:	A Bachelor of Science Degree upon satisfactory completion of both "core" and clinical training.
ENTRANCE REQUIREMENTS:	An excellent high school record, transferable credits, waiver by examination for credit for previous experience that is related to required courses, and an aptitude for ethical and compatible human relationships.

University of Texas
Medical Branch

NUMBER OF STUDENTS ENROLLED:	Twenty in the "core" curriculum; none in the Clinical Associate Program. Enrollment capacity in the Clinical Associate program is four students annually until an adequate faculty is available.
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION:	Eye Institute Department of Ophthalmology Baylor College of Medicine Texas Medical Center Houston, Texas 77025
PROGRAM DIRECTOR:	Louis J. Girard, M.D. Chairman, Ophthalmic Training Programs
PROGRAM TITLE:	Basic Science Course for Ophthalmic Assistants
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The course lasts 8 weeks with a twelve-month period of preceptorship recommended upon completion. The first 5 weeks are devoted to lectures in basic sciences as related to ophthalmology. The remaining 3 weeks are composed of demonstrations and workshops in various clinical procedures. During the period of preceptorship, the student works under supervision, preferably in a hospital clinic, in order to acquire proficiency in various clincial tests.
DEGREE OR CERTIFICATE AWARDED:	Information not available.
ENTRANCE REQUIREMENTS:	Successful completion of high school with typing ability is required. However, two years of college is recommended. Applicant must be sponsored by an ophthalmologist.
NUMBER OF STUDENTS ENROLLED:	Information not available.
NUMBER OF STUDENTS GRADUATED:	46

INSTITUTION:	University of Washington Department of Preventive Medicine School of Medicine Seattle, Washington 98105
PROGRAM DIRECTOR:	Richard A. Smith, M.D. Associate Professor
PROGRAM TITLE:	MEDEX
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	After training at the medical school for three months, the Medex is assigned for a year to a preceptor who is a physician in general practice. For these twelve months, he assists the physician by learning and applying primary care skills under his close supervision.
DEGREE OR CERTIFICATE AWARDED:	Certificate indicating completion of the MEDEX training program.
ENTRANCE REQUIREMENTS:	Former medical corpsmen trained to a level of independent performance.
NUMBER OF STUDENTS ENROLLED:	Approximately 25 per class. Three classes per year.
NUMBER OF STUDENTS GRADUATED:	14

INSTITUTION:	Alderson-Broaddus College College Hill Philippi, West Virginia 26416
PROGRAM DIRECTOR:	Hu C. Myers, M.D. Myers Clinic Philippi, West Virginia 26416
PROGRAM TITLE:	Physician's Assistant
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The curriculum covers a period of 4 years and consists of training in liberal studies, (includes English, speech, and social sciences) medical science, and clinical rotations. Required courses total 125 to 129 semester hours. Students are encouraged to enroll in elective courses to enrich their total educational experience. The clinical experience begins in the third quarter of the first year. It accelerates with each quarter through the tenth. From the eleventh through the fourteenth, it is a full-time clinical clerkship off campus. The last quarter is 1/3 liberal studies, 1/3 clinical clerkship, and 1/3 senior seminar. Required clincial rotations are medicine, surgery, intensive care, outpatient clinic, and doctor's office. Electives can be in pediatrics, urology, orthopedics, ear, nose, and throat, clinical research, obstetrics, psyshiatry, community health and preventive medicine.
DEGREE OR CERTIFICATE AWARDED:	B.S. in Medical Science
ENTRANCE REQUIREMENTS:	High school diploma, demonstration of good scholarship, high character, and strong motivation; satisfactory test data on S.A.T. or A.C.T., at least 10 units in college preparatory subjects.
NUMBER OF STUDENTS ENROLLED:	95
NUMBER OF STUDENTS GRADUATED:	None to date

INSTITUTION: Marshfield Clinic
Marshfield, Wisconsin 54449

PROGRAM DIRECTOR: Francis N. Lohrenz, M.D.
Chairman, Physician Assistant Committee

PROGRAM TITLE: The Physician Assistant: Oncology (study of tumors)
Gastroenterology
Pediatric
Ophthalmologic
Neurosurgical
General Practitioner
Orthopedic

STAGE OF DEVELOPMENT: Developmental

CURRICULUM: Oncology--Learns the administration and calculation of intravenous doses and evaluation of toxicity of chemotherapeutic drugs in order to care for and supervise courses of specific chemotherapeutic drugs as directed by the physician, and to check patient who are seen frequently during course of chemotherapy; discharge summaries.

Gastroenterology--Learns how to inject BSP dye, perform secretin tests and esophagoscopies, and small bowel biopsies, in order to be able to perform all of these procedures at the direction of the physician.

Pediatric--Learns to perform physical examinations of newborn, to instruct mothers who breast feed babies, their adjustment to feedings, and early postnatal care. Projected duties include housecall visits three weeks after discharge.

Ophthalmologic--Learns about refraction, visual fields, tests for glaucoma, and how to assist with cataract surgery in order to be able to perform refractions, visual field evaluations, tonometry, and to act as assistant during cataract surgery.

Neurosurgical--Scrubs with neurosurgeon, prepares patients for diagnostic procedures, helps with spinal taps, does discharge summaries, makes rounds.

General Surgical--First assistant in surgery, 4-6 hours a day, dressings, makes rounds, attends conferences.

Orthopedic--Puts on casts, screens patients for the orthopedic surgeons, does discharge summaries, scrubs and acts as assistant during orthopedic surgery.

In general, these programs involve about three months of on-the-job training before the trainee becomes fully functional. At the conclusion of the training period, the trainees are retained by the clinic as members of the staff.

DEGREE OR CERTIFICATE AWARDED: None

ENTRANCE REQUIREMENTS: Students with some sort of medical training are preferred. These include former medical corpsman, registered nurses, and those with experience in health research laboratories.

NUMBER OF STUDENTS ENROLLED: One in each of the courses.

NUMBER OF STUDENTS GRADUATED: One from each course.

PROGRAMS FOR EXTENDING NURSING ROLES

INSTITUTION:

University of Arizona
College of Medicine
Department of Community Medicine
El Rio Santa Cruz Neighborhood Health Center
332 South Freeway
Tucson, Arizona 85705

PROGRAM DIRECTORS:

Project Director:
Herbert K. Abrams, M.D.

Medical Director:
Peter D. Mott, M.D.

Nursing Director and Program Chairman:
Emily Bale, R.N.

PROGRAM TITLE:

Family Nurse Practitioner

STAGE OF DEVELOPMENT:

Operational since spring, 1970, for staffing of the Neighborhood Health Center only.

CURRICULUM:

A 12-month program interweaving classroom and clinical experience with on-job-training in (1) Pediatrics, (2) Adult Medicine, (3) Obstetrics, (4) Advanced Social Work (5) Mental Health For Families.

The course aims to train registered nurses to be capable of any number of the following roles which she may later elect:

(1) well-child care, including history-taking, physical examination, initiation of immunizations, laboratory and screening techniques, counseling management of common illnesses and follow-up of children in the home or office;

University of Arizona
Family Nurse Practitioner

(2) the same array of skills in Adult Medicine, as well as the management of certain chronic diseases; (3) pre-natal, post-partum care and family planning, including history-taking, physical examinations, screening procedures and counseling; (4) a combination of these roles.

DEGREE OR CERTIFICATE AWARDED: Pending

ENTRANCE REQUIREMENTS: License to practice as a registered nurse. Public Health Nursing experience desirable. Employment in the Neighborhood Health Center a requirement in 1970-71.

NUMBER OF STUDENTS ENROLLED: 7

NUMBER OF STUDENTS GRADUATED: 0

INSTITUTION:	University of California School of Public Health, Earl Warren Hall Berkeley, California 94720 University of California School of Medicine, Davis; State of California, Department of Public Health; and Highland Hospital, Oakland.
PROGRAM DIRECTORS:	Jean G. French Project Director Constance E. Roth Project Coordinator Division of Public Health Nursing
PROGRAM TITLE:	Family Health Practitioner
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The object of this program is not to train nurse technicians, but to present a well-rounded educational program, providing the public health nurse with sufficient knowledge and skills so that she is capable of using sound judgment, does not need constant supervision and can, therefore, assume a more independent role. During the first 12 months of the program, students will receive background knowledge and skills in community medicine, physical diagnosis, and clinical management of all age groups through lectures, seminars, clinical demonstration, and supervised clinical practice in primary care settings. The final six months of the program will be a rotating clinical field experience in appropriate primary care units selected in accordance with their readiness to utilize the nurse practitioner and to provide a meaningful experience for the student.
DEGREE OR CERTIFICATE AWARDED:	MPH degree

University of California
School of Public Health, Earl Warren Hall

ENTRANCE REQUIREMENTS: Applicant must be a qualified public health nurse with a baccalaureate degree and a minimum of two years experience in the area of community health. The nature of the experience should be such that it provides the opportunity to apply public health nursing skills, assume responsibility, and take independent action. References from employers must show evidence the nurse has demonstrated certain abilities and is secure and innovative, comfortable with responsibility, capable of independent decision making, has an inquiring mind and interest in clinical medicine, and is committed to giving high quality care. Academic qualifications should relfect a minumum grade point average of 3.0. Special attention is given to previous academic performance in clinical and biological sciences.

NUMBER OF STUDENTS ENROLLED: 6 (Now classes of 8 or more to be admitted anually)

NUMBER OF STUDENTS GRADUATED: None to date.

INSTITUTION: Loma Linda University
School of Nursing
Loma Linda, California 92354

PROGRAM DIRECTORS: Ruth M. White, R.N., M.S., M.P.H.,
Nursing Instructor

Medical Consultants:
Department of Pediatrics
Richard L. Tompkins, M.D.
Naomi K. Pitman, M.D.

PROGRAM TITLE: Pediatric Nurse Associate

STAGE OF DEVELOPMENT: The project proposal is being written. The first level of instruction started Fall 1970. (Second and third parts of sequence will be offered after the project proposal has been approved and the program reviewed by pediatric and nursing practice organizations.)

CURRICULUM: This program will encompass nine units. The initial course is three units and involves laboratory practice as well as theory. Arrangements have been made with the neighboring health departments for nurses on their staff to obtain the laboratory practice in the on-the-job child health conferences. The purpose is twofold: To prepare nurses for the specific role of Pediatric Nurse Associate within an ambulatory care setting; and, secondly, to foster better utilization of nurses in the delivery of health services in the community. Instruction is to build competence in the physical and developmental assessment of the child, including his history and recording, counseling of mothers and teaching of parents, management of minor illnesses and follow-up of the children in the home and community.

Loma Linda University
Pediatric Nurse Associate

CURRICULUM (cont'd.):	Students are assisted with role reorientation, the process of collaborating and in increasing decision-making competence. Affects of culture, poverty and environmental factors are incorporated.
DEGREE OR CERTIFICATE AWARDED:	Certificate at completion of nine units.
ENTRANCE REQUIREMENTS:	Students may take first level in the senior year of the baccalaureate program in nursing. Nurses with a baccalaureate degree, including preparation in Public Health Nursing, may register for the course. They must have a license to practice in the state of California. References and personal interview determine the students' personal qualifications.
NUMBER OF STUDENTS ENROLLED:	14 in the first level.
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION: Harbor General Hospital
UCLA School of Medicine
1000 W. Carson Street
Torrence, California 90509

PROGRAM DIRECTOR: Joseph W. St. Geme, Jr., M.D.
Professor of Pediatrics
UCLA School of Medicine and
Chief of Pediatrics
Harbor General Hospital

PROGRAM TITLE: Nursing Pediatrist Program

STAGE OF DEVELOPMENT: No longer operational

CURRICULUM: The program is constructed to prepare nurse to function as a vital cog in child health care team, in close working relationship with and under the supervision of the pediatrician. The length of the program is 12 months.

1. Basic and clinical pediatric science: 4 months. Didactic lectures and seminars in the basic sciences, as they relate to child health, in normal growth and development, common childhood illnesses and problems, mental health and parental-child relationships. Intensive instruction in history-taking and physical science material.

2. Clinical experience: 8 months. Will include participation in daily activity of physician teams in normal neonatal unit (1 month), regular ward-service (1 month), acute care clinic (3 months), and specialty clinics (3 months), emphasizing here well-child care, cardiology, neurology and learning disorders, dermatology. Will also utilize community clinical resources, such as public health well-child clinics and group practice settings.

DEGREE OR CERTIFICATE AWARDED: Certificate stating that nurses have completed the 12 month program in satisfactory fashion.

ENTRANCE REQUIREMENTS: Information not available.

NUMBER OF STUDENTS ENROLLED: Information not available.

NUMBER OF STUDENTS GRADUATED: Information not available.

INSTITUTION: University of Colorado
School of Nursing
4200 East Ninth Avenue
Denver, Colorado 80220

PROGRAM DIRECTOR: Elda R. Popiel, R.N.
Professor, School of Nursing

PROGRAM TITLE: Pediatric Nurse Practitioner

STAGE OF DEVELOPMENT: Fully Operational

CURRICULUM: The intensive sixteen-week Pediatric Nurse Practitioner Program provides an opportunity for nurses to expand their role in providing health care for children. The focus of study is the well child in the family, school, and community settings. Academic and clinical study areas include University of Colorado Medical Center and selected health care facilities in the community of Denver. The course titles of the areas of study are as follows:

1. Evaluation of Child Health (8 weeks)--Emphasis is on developing the nurse's skills in taking the health history, performing physicial examinations, analyzing health problems, and in health counseling. Classroom work and practice in community child care centers are offered concurrently;

2. The Nurse's Role in Community Child Health (8 weeks)--The focus of this course is on nursing management of common physical, psychosocial, and developmental problems of childhood with continued development of the nurse's evaluation and counseling skills. Practice in community child care settings continues. The nurse studies patterns of independent nursing practice which effect changes in health care systems.

University of Colorado
School of Nursing

DEGREE OR CERTIFICATE AWARDED:	Certificate stating they have satisfactorily completed the program.
ENTRANCE REQUIREMENTS:	Graduation from a National League of Nurses accredited baccalaureate program, employment in a setting concerned with health of children and their families in the community, and availability for the entire educational program.
NUMBER OF STUDENTS ENROLLED:	10
NUMBER OF STUDENTS GRADUATED:	70

INSTITUTION:	University of Colorado 4200 E. 9th Avenue, P.O. 2418 Denver, Colorado 80220
PROGRAM DIRECTORS:	Henry K. Silver, M.D. Nancy Nelson, M.D. Mrs. Elda Popeil, R.N.
PROGRAM TITLE:	School Nurse Practitioner Program
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The one-year program is conducted in two phases. The first phase is conducted at the University of Colorado Medical Center in Denver, where each nurse receives approximately four months of intensive theory and practice in child care and school health. This phase is a clinically-oriented educational program and includes evaluation and management of the well child, identification of various school health problems including care of emergency situations. The second phase of the program extends over an eight month period during which time the nurse applies her newly-acquired knowledge and skill under supervision in the public school setting.
DEGREE OR CERTIFICATE AWARDED:	Certificate
ENTRANCE REQUIREMENTS:	B.S. in nursing and R.N.; two letters of personal reference and two letters of professional reference; a cooperating school system which has made formal agreement to employ the nurse following this experience; plans to have available medical backup when she returns to the school; completion of application; availability for telephone or personal interview. Priority will be given to school nurses who are from school districts which will assume a significant portion of the economic responsibility for the nurse's education.
NUMBER ENROLLED:	4
NUMBER GRADUATED:	4

INSTITUTION:	University of Connecticut Health Center Department of Pediatrics School of Nursing McCook Hospital Two Holcomb Street Hartford, Connecticut 06112
PROGRAM DIRECTORS:	Medical Director - Louis I. Hochheiser, M.D. Nurse Coordinator - Lynn Schilling, R.N., M.A.
PROGRAM TITLE:	Pediatric Nurse Associate Program
STAGE OF DEVELOPMENT:	First class enter January, 1971
CURRICULUM:	A four-month course to prepare nurses for providing well child care and counseling as well as management of common pediatric illness, either in the Pediatric Ambulatory Clinic, through the Visiting Nurse Association, or the private pediatric practitioner's office. The course is given in the same setting that pediatric house officers and students are training to allow role changes to evolve, both for the nurses and physicians. In addition, some aspects of curriculum development, role changes, and physician/nurse satisfaction are to be evaluated.
DEGREE OR CERTIFICATE AWARDED:	Certificate
ENTRANCE REQUIREMENTS:	Licensure as a Registered Nurse and a B.S. degree. Individual exceptions to the B.S. degree can be made.
NUMBER OF STUDENTS ENROLLED:	6 per class - two classes per year
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	Yale University School of Medicine Department of Pediatrics 333 Cedar Street New Haven, Connecticut 06510
PROGRAM DIRECTORS:	Thomas F. Dolan, Jr., M.D., Medical Director Katherine Nuckolls, R.N., Ph.D. Nursing Director
PROGRAM TITLE:	Pediatric Nurse Practitioner
STAGE OF DEVELOPMENT:	Operational since October 1969
CURRICULUM:	A one year on-the-job educational and training program with two main objectives: 1. Prepare the trainee to assume an expanded role in an ambulatory setting. 2. Assessment of content for curriculum construction of new advanced nursing program in the Yale University School of Nursing. The program is loosely structured and consists of didactic instruction in history-taking, interviewing, and physical examination. The trainees work in the O.P.D. as part of the medical team and gradually accept increasing responsibility for a panel of patients which they follow.
CERTIFICATION:	None
ENTRANCE REQUIREMENTS:	B.S. degree

This project is to be phased out in October 1971.

A second program leading to a Master's degree at the Yale School of Nursing, of which the aforementioned program is part, began in the fall of 1970. Additional formal training include regularly scheduled courses at the School of Medicine and Public Health, research seminars and a thesis is required. Nurses are expected to follow either an "ambulatory" tract or "inpatient" tract. They will be designated clinical nurse specialists on graduation. Program is similar to the now extant programs in obstetrics and midwivery and psychiatry at the Yale University School of Nursing.

INSTITUTION:	Rush Presbyterian-St. Luke's Medical Center 1753 West Congress Parkway Chicago, Illinois 60612
PROGRAM DIRECTORS:	Albert L. Pisani, M.D. Co-Director Iris R. Shannon, R.N. Co-Director Assistant Chairman Division of Nursing
PROGRAM TITLE:	Pediatric Nurse Associate
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The 16-week course consists of training in physical assessment, diagnosis, and clinical experience.
DEGREE OR CERTIFICATE AWARDED:	None
ENTRANCE REQUIREMENTS:	Registered nurse; employed in an ambulatory pediatric nursing setting; commitment from a pediatrician to be her preceptor and assurance that she would be allowed to function in the new role in her work setting.
NUMBER OF STUDENTS ENROLLED:	Six
NUMBER OF STUDENTS GRADUATED:	Twenty-two

INSTITUTION:	Frontier Nursing Service Wendover, Kentucky 41775
PROGRAM DIRECTORS:	Gertrude Isaacs, D.N. Sc. Nursing Co-Director W. B. Rogers Beasley, M.D. Medical Co-Director
PROGRAM TITLE:	Family Nursing Program
STAGE OF DEVELOPMENT:	Developmental
CURRICULUM:	This is a full-time one year demonstration program which is service oriented. It is designed to prepare nurses to assume an extended role in the provision of primary family health services, including increased responsibility for : 1. assessment (diagnosis) of the health status of the family and its members in relation to ecological factors; 2. initiation of selective preventive measures; 3. management of health and health related problems indigenous to the area, using mutually (nursing and medical) agreed upon diagnostic and treatment measures; and 4. provision of emergency services in the absence of the physician. This includes consultation with and referral to other members of the health team. The program is offered in an ambulatory care setting with outpost nursing and inpatient care facilities for provision of comprehensive, primary family health services.

CURRICULUM: (Cont'd)

The first trimester focuses on diagnosis and management of common health problems of the individual and his family; the second trimester on parental and child care, focusing in prenatal, postnatal care, the child under six, and family planning; the third trimester offers an option of Outpost Family Nursing or Advanced Nurse-Midwifery. Approximately one-third of the time is devoted to mastering theory.

DEGREE OR CERTIFICATE AWARDED:

Certificate

ENTRANCE REQUIREMENTS:

Completion of basic program in nursing with a license to practice as a registered nurse, and a minimum of six months, preferably twelve months, of generalized staff experience. Prospective students are asked to join the staff one to two months prior to admission for orientation to the service.

NUMBER OF STUDENTS ENROLLED:

Seven experimental students; nine nurse-midwifery students.

NUMBER OF STUDENTS GRADUATED:

16 as of April, 1971

INSTITUTION:	University of Maine Continuing Education Division Office 96 Falmouth Street Portland, Maine 04103
PROGRAM DIRECTOR:	George W. Hallett, Jr., M.D. Chief of Pediatrics Maine Medical Center Portland, Maine 04103
PROGRAM TITLE:	Pediatric Nurse Associate
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The curriculum is developed to be covered in a 16-week period. The program is designed to develop an expanded role of the nurse in providing total health care to children. The nurse will be trained to give comprehensive well-child care, to identify and appraise acute and chronic illness, to manage minor problems, and to give temporary aid in emergencies with the support and consultative services of the medical profession. The faculty is composed of pediatricians, nurses, and specialists in both medical and paramedical areas. These persons both lecture and assist the students in clinical practice. Patients will be presented in many clinical settings -- nursery, in-patients, out-patients, specialty clinics, and well-baby clinics. The nurse will be trained to see patients on her own, obtaining the history, doing a complete physicial examination (including the use of otoscope, ophthalmoscope, and stethoscope), performing a few simple laboratory procedures, and reaching conclusions about the patient's status and needs. Major focus will be placed on well-child care and the primary care of minor illness.
DEGREE OR CERTIFICATE AWARDED:	A pediatric Nurse Associate Certificate. Certificate presented by the Continuing Education Division of the University of Maine stating the essential content of the course, its duration, and the participation of the Maine Medical Center.

ENTRANCE REQUIREMENTS:

1. State of Maine License.

2. Defined job role on completion of program. An additional requirement is that the nurse return for one day once monthly to the Maine Medical Center for a period of eight consecutive months for follow-up study.

Weighing heavily in candidate selection, but not essential, are previous training and experience, agency recommendation, and geographical area. Priority will be given to nurses currently working with the underprivileged.

NUMBER OF STUDENTS ENROLLED: 6

NUMBER OF STUDENTS GRADUATED: 12

INSTITUTION:	Massachusetts General Hospital Bunker Hill Health Center 73 High Street Charlestown, Massachusetts 02129
PROGRAM DIRECTORS:	Medical Directors: Alfred Yankauer, M.D. John P. Connelly, M.D. Nursing Director: Priscilla M. Andrews, R.N.
PROGRAM TITLE:	Pediatric Nurse Practitioner Program
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	A 16-week on-the-job educational program with two main objectives: (1) to prepare registered nurses for the specific role of pediatric nurse practitioners within a primary pediatric ambulatory care setting; and (2) to promote change in current practices of delivering ambulatory pediatric health care. The course includes 171 hours of classroom teaching and 148 hours of clinical practice. Content seeks to build upon the knowledge and experiences with which registered nurses come to the program, and to provide additional capabilities in history-taking and recording, patient counseling and teaching, assessment of the total health status of children, handling of patients' telephone inquiries, management of common illnesses and follow-up of children in the home and community. In addition, there is emphasis on: (1) the decision-making process; (2) the conflict of role reorientation; (3) teamwork and interprofessional realtions; and (4) the problems of delivery of health services to children and their families.
DEGREE OR CERTIFICATE AWARDED:	Certificate

Massachusetts General Hospital
Bunker Hill Health Center

ENTRANCE REQUIREMENTS:	All applicants must have completed basic nursing education in a National League for Nursing accredited school of nursing and be licensed as a registered nurse. An applicant must be employed in a comprehensive pediatric care setting where expanded nursing skills can be applied. The applicant and employer must have a commitment for the participant's continuing education after the completion of the Pediatric Nurse Practitioner Program.
NUMBER OF STUDENTS ENROLLED:	about 20
NUMBER OF STUDENTS GRADUATED:	77

INSTITUTION	Children's Hospital of Michigan Department of Pediatrics Wayne State University College of Medicine Detroit, Michigan 48207
PROGRAM DIRECTORS:	Medical Director - Paul V. Woolley, Jr., M.D. Co-Medical Director - Leslie Pensler, M.D.
PROGRAM TITLE:	Pediatric Nurse Practitioner Program
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	Four month, full-time program with intent to train nurses to become primary vendors of well baby care. The course trains her to expand her role in the care of patients and to actually perform some of the services previously provided by the physician. History and physical diagnosis are stressed as are growth and development. She will also be able to identify the acutely ill child that will need the expertise of a pediatrician. Particular attention is given to the various specialties and community service necessary to provide total care of the child.
DEGREE OR CERTIFICATE AWARDED:	Certificate
ENTRANCE REQUIREMENTS:	Completion of basic nursing course in an approved nursing school.
NUMBER OF STUDENTS ENROLLED	None at present
NUMBER OF STUDENTS GRADUATED:	Two-September 1969

INSTITUTION: Washington University, School of Medicine
Division of Health Care Research and the
Edward Mallinckrodt Department of Pediatrics
4550 Scott Avenue
St. Louis, Missouri 63110

PROGRAM DIRECTOR: Lawrence Kahn, M.D.

PROGRAM TITLE: Pediatric Nurse Practitioner

STAGE OF DEVELOPMENT: Operational

CURRICULUM: The program is eight months in duration and begins each September. It is divided into two periods of four months each, the first being a didactic period and the second being a period of precepteeship. The course is designed to prepare qualified nurses with the skills to provide primary ambulatory pediatric care within the scope of nursing practice. The instruction is based at the St. Louis Children's Hospital and the Division of Health Care Research of Washington University School of Medicine. Faculty is derived from the staff of the St. Louis Children's Hospital, particularly by those whose interests include ambulatory care.

The didactic period includes lectures, conferences and demonstrations stressing the techniques of history taking and physical examinations. Emphasis is also placed on growth and development and common pediatric problems. The major goals of the program are to provide the trainees with the appropriate skills in disease recognition, family counseling and education in several areas of ambulatory pediatrics including routine well baby and well child care, parent counseling in the matters of child rearing including anticipatory guidance.

The second four-month period includes clinical experience in the offices of private pediatricians, as well as the Out Patient Department of the St. Louis Children's Hospital and the Well Baby Clinics of St. Louis County.

A fuller description of the program is available for distribution on request.

Washington University, School of Medicine
Division of Health Care Research and the
Edward Mallinckrodt Department of Pediatrics

DEGREE OR CERTIFICATE AWARDED:	A Pediatric Nurse Practitioner certificate is awarded upon completion of the program.
ENTRANCE REQUIREMENTS:	Applicants must be registered nurses, licensed in the state of Missouri. A B.S. degree in nursing from an accredited program is preferred but not required. Experience in pediatric nursing is desirable. A personal interview is recommended. Selection will be based on the candidate's experience, academic achievement, and willingness to adapt to new situations and to assume new responsibilities.
NUMBER OF STUDENTS ENROLLED:	Six
NUMBER OF STUDENTS GRADUATED:	Three will graduate in September 1970.

INSTITUTION:	Albert Einstein College of Medicine 1300 Morris Park Avenue Bronx, New York 10461
PROGRAM DIRECTOR:	Bertrand M. Bell, M.D. Director Ambulatory Care Service Jacobi Hospital Pelham Parkway and Eastchester Road Bronx, New York 10461
PROGRAM TITLE:	The Nurse Physician Surrogate
STAGE OF DEVELOPMENT:	Operational, pending funds for continuation
CURRICULUM:	The program consists of formal didactic lectures given by physicians, physician surrogates, social workers, and hospital administrative personnel, and on-the-job training. Students are taught the fundamentals of history and physical examination, relevant sociology, physiology and pharmacology. The trainee is trained to detect changes in the clinical status of patients, to be certain that patients comply with therapeutic regimens, and to act as the patient's medical advocate making certain that once the physician is made aware of "a change," appropriate action is taken. She renews prescriptions, and changes medication within limits. On-the-job training in association with a physician continues and reinforces the principles outlined in the didactic lectures. Ultimately each student is capable of functioning as a surrogate follow-up physician.
DEGREE OR CERTIFICATE AWARDED:	Pending
ENTRANCE REQUIREMENTS:	Trainees will be chosen from among the registered nurses already employed by the hospital and at large to fulfill the need of the hospital.
NUMBER OF STUDENTS ENROLLED:	6
NUMBER OF STUDENTS GRADUATED:	8

INSTITUTION:	Albert Einstein College of Medicine 1300 Morris Park Avenue Bronx, New York 10461
PROGRAM DIRECTOR:	Bertrand M. Bell, M.D. Director, Ambulatory Care Bronx Municipal Hospital
PROGRAM TITLE:	The Triage or Screening Professional
STAGE OF DEVELOPMENT:	Planning
CURRICULUM:	The trainee would be trained to decide on whether a person is sick or not sick, if sick, "how sick." With this decision she becomes a traffic control person directing patients to the proper resource for care. Her training will be identical to that of the nurse physician associate at the same institution except that her on-the-job training will differ. She will in general be older, more experienced, and have the capacity to rapidly make decisions.
DEGREE OR CERTIFICATE AWARDED:	None
ENTRANCE REQUIREMENTS:	Participants will be selected from registered nurses already on the staff of the hospital.
NUMBER OF STUDENTS ENROLLED:	None to date.
NUMBER OF STUDENTS GRADUATED:	None to date.

INSTITUTION:	Dr. Martin Luther King, Jr., Health Center and the Montefiore Hospital 3674 Third Avenue Bronx, New York 10456
PROGRAM DIRECTORS:	Harold Wise Project Director Miss Stella Zahn Project Director
PROGRAM TITLE:	Public Health Nurse Practitioner Program
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The program is divided into two orientation areas. Four to six weeks of didactic training is given in the areas of pediatrics, obstetrics, community health advocacy, and the team approach to health care. Continuing in-service orientation is given in conjunction with a special health care team. The emphasis is on producing nurses as generalists rather than specialists to work in home care and in the practitioner role in the clinic. Graduates work with the Dr. Martin Luther King, Jr. Health Center.
DEGREE OR CERTIFICATE AWARDED:	None. A master's degree program is being planned.
ENTRANCE REQUIREMENTS:	The R.N. degree. R.N. graduates of bachelor programs or with public health experience are preferred.
NUMBER OF STUDENTS ENROLLED:	20 nurses are currently being trained while on the Center staff.
NUMBER OF STUDENTS GRADUATED:	25 to 30 graduates. All of the nurses at the center have taken this program.

INSTITUTION: University of Rochester
School of Medicine and Dentistry
260 Crittenden Boulevard
Rochester, New York 14620

PROGRAM DIRECTOR: Robert A. Hoekelam, M.D., Associate Professor of Pediatrics and of Health Services
260 Crittenden Boulevard
Rochester, New York 14620

PROGRAM TITLE: Pediatric Nurse Practitioner

STAGE OF DEVELOPMENT: Operational

CURRICULUM: As this publication was being printed, the curriculum was undergoing revision. The following is a summary of the original curriculum which is being modified.

The course of instruction was of four months duration. During the first month there was lectures and discussion periods five mornings a week. Afternoons were devoted to study and clinical projects and patient contact. During the second, third and fourth months, three mornings were occupied with lectures and discussion periods and two mornings were spent doing precepted clinical work in the clinic or private office. During the year following the four months of formal training, the pediatric nurse practitioner is required to return to the training center one day monthly for formal continuing education.

CERTIFICATE AWARDED. A certificate of completion is planned to be awarded to all who have completed the training.

ENTRANCE REQUIREMENTS:

1. Licensure as a registered professional nurse.

2. Knowledge of child development as demonstrated by one of the following:

   a. Satisfactory completion of a course in child development within three years at a college or university.

   b. Presently taking a course in child development at a college or university.

   c. Satisfactory results on an examination selected by the Reivew Committee covering the subject matter.

University of Rochester
School of Medicine and Dentistry

NUMBER OF STUDENTS ENROLLED:	4-7 in one course. Currently one course per year. Planning for two courses per year with ten students in each.
NUMBER OF STUDENTS GRADUATED:	18

INSTITUTION:	Good Samaritan Hospital Cincinnati, Ohio 45220 Division of Community Pediatrics University of Cincinnati College of Medicine
PROGRAM DIRECTOR:	Donald J. Frank, M.D. Good Samaritan Hospital Cincinnati, Ohio 45220
PROGRAM TITLE:	Pediatric Nurse Associate
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The sixteen week program provides 192 hours of classroom instruction and planned clinical experience in an approved ambulatory pediatric setting. The course is designed to prepare registered nurses for increased responsibility in primary health care services for children. Emphasis is placed on: growth and development; nutrition; the health history; the basic physical examination; counseling and health guidance; and management of common childhood illness. The trainee is assigned to work with a pediatrician preceptor during her clinical practice. This collaborative experience allows both nurse and physician to identify and work through conflicts involved in role reorientation.
DEGREE OR CERTIFICATE AWARDED:	None
ENTRANCE REQUIREMENTS:	All candidates must be registered nurses, preferably in Ohio, and be employed in an ambulatory pediatric setting. The pediatrician with whom the nurse works must agree to provide on-the-job supervision and guarantee her the opportunity to function in an expanded role in her practice setting.
NUMBER OF STUDENTS ENROLLED:	10
NUMBER OF STUDENTS GRADUATED:	21

INSTITUTION:	St. Christopher's Hospital for Children Children and Youth Program Philadelphia, Pennsylvania
PROGRAM DIRECTOR:	Victor C. Vaughan, III Comprehensive Group Health Services 2539 Germantown Avenue Philadelphia, Pennsylvania 19133
PROGRAM TITLE:	In-Service Education for Ambulatory Pediatric Nurse
STAGE OF DEVELOPMENT:	Early Operational
CURRICULUM:	12-week program: Total 180 hours. Average 15 hours per week, to include the theory and practice in a clinic and community setting. 1. Health supervision of preschool children including physical and developmental appraisal and parent guidance. 2. The recognition and management of common acute episodes of illness and accidents. Emphasis is given to working with other members of the health team in a neighborhood health center.
DEGREE OR CERTIFICATE AWARDED:	None
ENTRANCE REQUIREMENTS:	Registered Nurse - Diploma or Degree
NUMBER OF STUDENTS ENROLLED:	3
NUMBER OF STUDENTS GRADUATED:	4

INSTITUTION:	Allegheny County Health Department Maternity and Infant Care Project 3447 Forbes Avenue Pittsburgh, Pennsylvania 15213
PROGRAM DIRECTORS:	Virginia E. Washburn, M.D., Chief, Division of Maternal and Child Health Allegheny County Health Department Lawrence A. Dunegan, M.D. Donna Nativio, R.N.
PROGRAM TITLE:	Pediatric Specialist Program for Public Health Nurses
STATE OF DEVELOPMENT:	Operational
CURRICULUM:	This is an 18 week on-the-job training program consisting of 50 hours of lecture, discussion, and demonstration and supervised clinical experience in at least 35 sessions of the MIC Infant Clinic and/or Allegheny County Health Department well child conferences. Emphasis is placed on interviewing techniques, history-taking, nutrition, normal growth and development, physical examination and immunization. The aim of the program is to prepare nurses to assume increased responsibility in the delivery of well child services including management of minor pediatric illness.
ENTRANCE REQUIREMENTS:	Limited to qualified Public Health Nurses employed by the Allegheny County Health Department.
DEGREE OR CERTIFICATE AWARDED:	Certificate
NUMBER OF STUDENTS ENROLLED:	Four nurses
NUMBER OF STUDENTS GRADUATED:	Twelve nurses as of September, 1970.

INSTITUTION: Memphis and Shelby County Health Department
814 Jefferson Avenue
Memphis, Tennessee 38105

PROGRAM DIRECTORS: George S. Lovejoy, B.S., M.D., F.A.A.P.
Associate Professor of Pediatrics
University of Tennessee College of Medicine;
Director,
Memphis and Shelby County Health Department

Jackie J. Cox, B.S., M.D.
Resident in Public Health
Maternal and Child Health Program
Memphis and Shelby County Health Department

PROGRAM TITLE: Pediatric Nurse Clinician

STAGE OF DEVELOPMENT: Completed first phase of training in June 1970.

CURRICULUM: The program is designed to give an aggressive inservice training program to diploma nurses or degree nurses who will function in an expanded role in child care under the close working relationship and supervision of a pediatrician.

The length of the program is 16 weeks. Each of these weeks is comprised of two informal lecture-discussion sessions by a practicing specialist who is on the faculty of the University of Tennessee College of Medicine. Each session is from 1 to 2 hours in length. There are also two preceptor type training sessions each week of from 2 to 4 hours in a clinical setting, with the physician to nurse ratio 1 to 1, or, 1 to 2.

1. Specialists in varied fields discuss, in an informal setting, in a 1 to 4 or 8 relationship, problems related to that field; answer questions and conduct an in-depth discussion. Each session lasts from 1-1/2 to 2 hours. Materials are given for study and review at home as well as during training hours.

Memphis and Shelby County Health Department
Pediatric Nurse Clinician

2. Clinical experience. The clinical teaching experience is composed of two sessions per week of 2 to 4 hours with physician to nurse ratio as 1 to 2. This is a preceptor type training, seeing patients together as they come into the clinic with complete discussion of all entities seen, methods of handling, treatments to be given and follow-up. In these settings there is great opportunity to pursue in-depth the weaknesses which are found in the individual nurse's knowledge. The emphasis is on nurmality and variations from normal with heavy emphasis on entities to be recognized but not to be treated. During the remainder of the week the nurse functions in the capacity of a health department nurse.

CERTIFICATION OR DEGREE AWARDED: A certificate from the Memphis and Shelby County Health Department stating that the nurse has completed the 16-week program in a satisfactory manner.

ENTRANCE REQUIREMENTS: Either diploma or degree nurse, with at least six months' experience in a large metropolitan health department.

NUMBER OF STUDENTS ENROLLED: 8

NUMBER OF STUDENTS GRADUATED: 4

INSTITUTION:	Eye Institute Department of Ophthalmology Baylor College of Medicine Texas Medical Center Houston, Texas 77025
PROGRAM DIRECTOR:	Louis J. Girard, M.D. Chairman, Ophthalmic Training Programs
PROGRAM TITLE:	Ophthalmic Nursing Course
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The course is six weeks in duration. The first week is devoted to lectures in the basic sciences. The second and third weeks will consist of didactic teaching in surgical techniques, operating room techniques, and care and maintenance of ophthalmic surgical instruments. Instruction is also given in management of the eye patient in the ophthalmologist's office, use of the lensometer, perimetry, tonometry, simple basic refractions, and muscle imbalances. Clinical experience will be provided in the various eye departments of the affiliated hospitals. During the fourth, fifth and sixth weeks the student may choose special instruction in certain subjects such as ophthalmic surgical techniques, strabismus, clinical photography, tonography, or care of the contact lens patient. The program consists of 90 hours of doctor's lectures, nursing discussions and demonstrations, and 150 hours of planned experience in the courses described.
DEGREE OR CERTIFICATE AWARDED:	A Certificate of Proficiency is granted from Baylor College of Medicine.
ENTRANCE REQUIREMENTS:	Applicants should be registered nurses already engaged in ophthalmic work or those who desire to prepare for this type of work.
NUMBER OF STUDENTS ENROLLED:	Information not available.
NUMBER OF STUDENTS GRADUATED:	90

INSTITUTION:	Wilford Hall USAF Medical Center Lackland AFB San Antonio, Texas 78236
PROGRAM DIRECTOR:	Howard H. Johnson, Colonel, USAF, MC Chairman, Department of Pediatrics Wilford Hall USAF Medical Center
PROGRAM TITLE:	Pediatric Nurse Practitioner
STAGE OF DEVELOPMENT:	Operational
CURRICULUM:	The program consists of a series of lectures and demonstrations and supervised experience in the outpatient clinic, the newborn nursery and to a limited extent the inpatient service. Regular departmental conferences will be attended when applicable to the nurses training. The program covers six months. Major emphasis will be on practical clinical sessions involving the examination of well children and those with minor illnesses under the close supervision of a pediatrician. Training in the use of visual and auditory screening tests as well as developmental screening tests will be given. Purpose is to train selected Air Force nurses to act as pediatric associates in carrying out well-child care, screening tests, counseling services and identification and management of minor illnesses.
DEGREE OR CERTIFICATE AWARDED:	Certificate of Course Completion.
ENTRANCE REQUIREMENTS:	Registered nurse on active duty with US Air Force in Regular or Career Reserve Status. Degree preferred, but not mandatory. Minimum of two years active duty with at least one year in pediatrics.
NUMBER OF STUDENTS ENROLLED:	3
NUMBER OF STUDENTS GRADUATED:	Information not available

INSTITUTION:	University of Virginia School of Medicine Department of Pediatrics Charlottesville, Virginia
PROGRAM DIRECTOR:	Robert E. Merrill, M.D. Professor of Pediatrics Department of Pediatrics
PROGRAM TITLE:	Nurse Clinician Training
STAGE OF DEVELOPMENT:	Operational, First course completed.
CURRICULUM:	The object of this program is to train registered nurses to adequately complete general history taking and recording plus general physical examination with a view toward detecting abnormality in contradistinction to normality; where abnormality is found, to insure physician attention on an emergency or elective basis, as may be appropriate. In addition, they are trained to provide complete well baby care independently and to independently provide advice and therapy for minor pediatric problems. The course lasts sixteen weeks and consists of nine seminars and nine two-to-three hour practical exercises each week. The time spent in supervised activity each week is approximately thirty-three hours, minimum.
DEGREE OR CERTIFICATE AWARDED:	Certificate as Nurse Clinician
ENTRANCE REQUIREMENTS:	Applicant must be a registered nurse, preferably with at least two or three years of practical experience.
NUMBER OF STUDENTS ENROLLED:	4-12
NUMBER OF STUDENTS GRADUATED:	4

PLANNED OR OPERATIONAL PROGRAMS NOT SUMMARIZED IN DETAIL

The following list includes programs which have been called to the attention of the Professional Requirements Branch, but for which detailed information is lacking. Programs marked with an asterisk (*) indicate those which are definitely or probably for the purpose of extending nursing roles.

CALIFORNIA

Title Unknown*
Martin Luther King Health Center
Watts
Los Angeles, California

Title Unknown*
Dr. Walter Tassem
Permanente Group of Southern California
1505 North Edgemont Street
Los Angeles, California 90027

Emergency Service Technician
Albert M. Elton
Executive Vice President
Casa Loma College
12502 Van Nuys Boulevard
Pacoima, California 91331

Physician's Assistant
Dr. Woodbury Perkins
Director of Medical Education
Mercy Hospital and Medical Center
4077 Fifth Avenue
San Diego, California 92103

Title Unknown*
Dr. Henry R. Schinefield
Permanente Medical Group
2200 O'Farrell Street
San Francisco, California 94115

CALIFORNIA (continued)

Nurse Practitioner*
Mrs. Jeanne LeBrun
Clinical Lecturer
Department of Community and Preventive Medicine
Stanford University Medical Center
Stanford, California 94305

Physician's Assistant
Dr. Michael T. B. Dennis
Director, Physician's Assistant Training Program
Stanford Medical Center
Stanford, California 94305

CONNECTICUT

Surgical Assistant
Alfred Sadler, Jr., M.D.
Blair Sadler, J.D.
Yale University
School of Medicine
New Haven, Connecticut 06510

DISTRICT OF COLUMBIA

Title Unknown*
Mrs. Rena D. Harris
Chief of Nursing Services
Department of Health
Health Services Administration
1905 E Street, S.E.
Washington, D. C.

DISTRICT OF COLUMBIA (continued)

Physician's Assistant
Albert S. Braverman, M.D.
D. C. General Hospital
Washington, D. C.

Title Unknown
P. W. Joy
Associate Administrator for Program Development
George Washington University Medical Center
Washington, D. C.

Ophthalmic Technician
Peter Evans, M.D.
Georgetown University Hospital
3800 Reservoir Road
Washington, D. C. 20007

Physician Assistant
Lawrence Crossman
Executive Officer
U. S. Department of Justice
Bureau of Prisons
Washington, D. C. 20537

Physician's Assistant
Dr. James Bacos
Washington Hospital Center
110 Irving Street, N.W.
Washington, D. C. 20012

Physician's Assistant - Cardiology
Dr. James Bacos
Washington Hospital Center
110 Irving Street, N.W.
Washington, D. C. 20012

FLORIDA

Expanded Nurse*
Dr. Pauline Barton, Chairman
Department of Nursing, Graduate School
University of Florida
Gainesville, Florida 36201

Professional Assistant and Associate
Dr. R. A. Henry
Box 712
University of Florida
Gainesville, Florida

FLORIDA (continued)

Health Care Administrator
Miss Anastasia M. Hartley
St. Petersburg Junior College
6605 5th Avenue North
St. Petersburg, Florida 33733

GEORGIA

Anesthesia Assistant
Dr. P. P. Volpitto, Project Director
Anesthesia Assistant Program
Medical College of Georgia
1459 Gwinnett Street
Augusta, Georgia 30902

Physician's Assistant
Georgia State College
33 Gilmer Street
Atlanta, Georgia 30303

Physician's Assistant
Dr. Robert E. Reynolds
Medical College of Georgia
School of Medicine
Augusta, Georgia 30902

ILLINOIS

Title Unknown*
Dr. John A. McLaren
Evanston Hospital
Diagnosis and Treatment Center
Evanston, Illinois 60204

IOWA

Orthopedic Assistant
Frank Mulhern, Head
Health Occupations Education Department
Kirkwood Community College
6301 Bowling Street, S.W.
P. O. Box 2068
Cedar Rapids, Iowa 52406

Pediatric Clinic Associate
University of Iowa Medical Center
Iowa City, Iowa

KANSAS

Title Unknown*
Dr. Herbert C. Miller
University of Kansas Medical School
Kansas City, Kansas 66102

KENTUCKY

Electroencephalography Technician
Dr. Harry D. Jamison
University of Kentucky
Limestone and Euclid
Lexington, Kentucky 40506

Radiation Dosimetrist
Dr. Sayeg
University of Kentucky
Lexington, Kentucky 40506

Title Unknown*
University of Kentucky
Lexington, Kentucky 40506

MARYLAND

Family Health Supervisor
Dr. A. Golden
Johns Hopkins University
School of Hygiene and Public Health
615 North Wolfe
Baltimore, Maryland 21205

Primary Care Associate*
Dr. James Hudson
Johns Hopkins Hospital
School of Medicine
Department of Pediatrics
Baltimore, Maryland 21205

Community Health Representative
Dr. Richard Unrich
Chief, Office of Special Services
Indian Health Service
7915 Eastern Avenue
Silver Spring, Maryland 20910

Title Unknown*
Dr. Marion Murphy, Dean
School of Nursing
University of Maryland
Baltimore, Maryland

MARYLAND (continued)

Title Unknown
University of Maryland
Baltimore, Maryland

MASSACHUSETTS

Expanded Nurse*
Dr. Howard N. Jacobson
Boston Hospital for Women
221 Longwood Avenue
Boston, Massachusetts 02115

Surgical Assistant
Dr. Gerald Austin
Massachusetts General Hospital
32 Fruit
Boston, Massachusetts

MINNESOTA

Title Unknown*
Alma G. Sparrow, R.N.
University of Minnesota
College of Medical Sciences
2016 16th Avenue South
Minneapolis, Minnesota

MISSOURI

Physician Assistant
William Akers
Medical Administrative Officer
Box 4000
Springfield, Missouri

NEBRASKA

Title Unknown
University of Nebraska
Medical Center
Lincoln, Nebraska

NEW MEXICO

Family Nurse Practitioner*
Dr. Robert Oseasohn
University of New Mexico
Albuquerque, New Mexico

NEW YORK

Baccalaureate Program in Health Administration
Steven M. Schneeweiss
Ithaca College
Ithaca, New York 14850

Physician's Assistant
Dr. Victor Sidel
Chief of Community Medicine
Montefiore Hospital
111 East 210 Street
New York, New York

Title Unknown*
Dr. Nicholas Cunningham
Mt. Sinai School of Medicine
Department of Community Medicine
Fifth Avenue and 100th Street
New York, New York 10029

Title Unknown*
Dr. Shirley Mayer
Assistant Commissioner of Health
New York City Department of Health
125 Worth Street
New York, New York

Cardiopulmonary Technician
Edmund J. McTernan, Dean
School of Allied Health Professions
State University of New York
Stony Brook, New York 11790

NORTH CAROLINA

Title Unknown*
Miss Audry Booth, R.N.
Regional Medical Program
Roxboro Road
Durham, North Carolina

OHIO

Anesthesia Assistant
Dr. J. S. Gravenstein
Project Director, Anesthesia Assistant Program
Case Western Reserve University
2109 Albert Road
Cleveland, Ohio 44106

OHIO (continued)

Nurse Practitioner*
Dr. Frank Ellis
Commissioner of Health
Cleveland Department of Health
Cleveland, Ohio

OKLAHOMA

Physician's Assistant
Dr. John Shearer
Oklahoma State University
Stillwater, Oklahoma 74074

OREGON

Family Physician's Assistant
Dr. Laurel Case
Assistant Professor and Head
Division of Family Practice
University of Oregon Medical School
Portland, Oregon 97201

PENNSYLVANIA

Health Department Nurse*
Dr. Pearl Pitt
Philadelphia Health Department
Community Nursing Services
500 South Broad Street
Philadelphia, Pennsylvania 19146

Title Unknown*
Dr. Charles Hertz
University of Pennsylvania Hospital
Pediatric Department
Philadelphia, Pennsylvania 19104

Emergency Medical Technician
Dr. Peter Safar
Department of Anesthesia
University of Pittsburgh
School of Medicine
Pittsburgh, Pennsylvania 15213

TENNESSEE

Family Nurse Practitioner*
Dr. Luther Christman
Vanderbilt University
Medical School
Nashville, Tennessee 37208

TEXAS

Title Unknown
Allied Health Careers Institute
El Centro College of Dallas
County Junior College District
Main and Lamar Streets
Dallas, Texas 75202

UTAH

MEDEX
Hillman Castle, M.D.
Intermountain Regional Medical Program
50 North Medical Drive
Salt Lake City, Utah

WASHINGTON

Cardiopulmonary Technician
Dr. Paul Shields
Spokane Community College
Spokane, Washington

WISCONSIN

Title Unknown*
Dr. Charles Lobeck
Professor of Pediatrics
University of Wisconsin Medical School
Madison, Wisconsin

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NEW CAREERS.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, WASHINGTON, D.C. OFFICE OF THE SECRETARY.
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PUB DATE - NOV69 48P.

DESCRIPTORS - *WELFARE SERVICES; *HEALTH SERVICES; *EDUCATIONAL STRATEGIES; *PROGRAM DESCRIPTIONS; *DISADVANTAGED GROUPS; PROGRAM PLANNING; PROGRAM DEVELOPMENT; VOCATIONAL EDUCATION; EMPLOYMENT PROGRAMS; COMMUNITY INVOLVEMENT; DIRECTORIES
IDENTIFIERS - NEW CAREERS

ABSTRACT - A MAJOR CONCERN OF THE CENTER FOR COMMUNITY PLANNING IS TO ASSURE THAT RESIDENTS OF MODEL NEIGHBORHOODS AND OTHER CONCERNED INDIVIDUALS AND INSTITUTIONS ARE MADE AWARE OF BETTER METHODS OF PROVIDING HEALTH, EDUCATION, AND SOCIAL SERVICES. THEREFORE, THIS PAPER EXPLAINS THE NEW CAREERS CONCEPT, A METHOD THAT OFFERS BETTER SERVICES WHILE EMPLOYING THE PEOPLE FOR WHOM SERVICES ARE INTENDED. SPECIFICALLY, THE PAPER DESCRIBES THE NEW CAREERS APPROACH WHILE THE APPENDIXES PROVIDE ADDITIONAL INFORMATION SUCH AS AN INVENTORY OF RELATED FEDERAL LEGISLATION AND A SELECTED BIBLIOGRAPHY. NAMES AND ADDRESSES OF REGIONAL HEALTH, EDUCATION, AND WELFARE PERSONNEL WHO MAY BE ABLE TO GIVE ASSISTANCE TO PROGRAM PLANNERS ARE INCLUDED. (AUTHOR/JS)

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FOREWORD

A major concern of the Center for Community Planning is to assure that residents of Model Neighborhoods and other concerned individuals and institutions are made aware of better methods of providing health, education, and social services. This paper is designed to explain the New Careers concept, a method that we feel has the potential to provide better services while employing the people for whom services are intended.

The body of the paper describes the New Careers approach. Appendix A contains write-ups of particularly good New Careers programs across the country. Appendix B is a partial inventory of HEW legislation that is relevant to funding New Careers programs. In Appendix C can be found a selected bibliography of other New Careers publications, New Careers centers that provide technical assistance, and HEW Regional personnel who will also be able to give assistance. The Regional personnel are familiar with the legislation mentioned in Appendix A.

Sidney L. Gardner
Director
Center for Community Planning

November 1, 1969

NEW CAREERS

"New Careers" describes a pattern of administration by which an individual can advance vertically from one job to another as his skills and knowledge grow. A New Careers system has many entry points so that a person can start working without traditional academic degrees and, through on-the-job training and related education, learn what he needs to keep advancing. A high school drop-out can start work in a school and eventually become a teacher. What makes New Careers different from systems in which individuals work their way through school is the planning, restructuring, and provision of a career ladder; the system is geared to helping people advance.

The concept of New Careers has special relevance today to human service programs in urban areas. For example, the legislation establishing the Model Cities Program states that a purpose of the Act is "to provide educational, health, and social services necessary to serve the poor and disadvantaged in the area...(and) maximum opportunities for employing residents of the area in all phases of the program and enlarged opportunities for work and training." Under applications of the New Careers concept, men and women who have been unemployed and underemployed because of a lack of traditional job qualifications have a chance to work where

their skills are needed and to develop new skills in a situation in which they have opportunities for career advancement. These work opportunities can be new jobs or old jobs with redefined entrance qualifications. Everyone may gain: the recipient of services, because he may receive better services; the employee, because he has a chance to advance as far as his abilities and interests will take him; and the employer, because he uses each staff member at the highest level of his ability. For example, in New York City nurse aides are becoming licensed practical nurses and in Chicago, Vietnam veterans are becoming teachers through New Careers programs. Descriptions of the above programs and three others appear in Appendix A.

HEW Involvement with New Careers

The Department of Health, Education, and Welfare is committing time, staff, and resources to the encouragement of New Careers programs at the local, State, and Federal levels in both the public and private human service sector. The Department is doing this because it recognizes that its own activities in health, education, and welfare will work better when the New Careers concept is applied. The human service sectors of the economy are among the fastest growing. By the mid-1970's, the projected need for health manpower

will increase by 105%, that for education manpower by 95%, and that for welfare manpower by 83% over current levels. This means hundreds of thousands of job opportunities. Not enough professionals with the traditional degrees in education, medicine, and social work are graduating from school to meet the projected demand for their services. This seems a likely place, therefore, to make use of people who do not have the traditional professional or academic credential but who can help provide the needed services.

Approximately 80 current HEW programs relate to New Careers projects. Acts such as the Health Manpower Act of 1968, the Social Security Act Amendments of 1967, the Vocational Education Act Amendments of 1968, and the Juvenile Delinquency Prevention and Control Act of 1968, provide authority to fund elements of New Careers Programs. Other Federal programs of concern to HEW, such as the Model Cities Program and Neighborhood Service Center Program, are excellent vehicles for the application of the New Careers concept, with their intention of involving and employing the community and improving human services. Model Cities supplemental money is potentially available for New Careers programs; it is also possible to fund programs by combining several Federal sources. In Minneapolis, for example, 180 New Careerists are funded under the Scheuer Amendments.

Title I money of the Elementary and Secondary Education Act is used to pay for training for their supervisors. Appendix B lists some of the major legislative authorities for New Careers and the agency administering the legislation.

The New Careers Approach

The New Careers approach differs from other personnel administration approaches in several significant ways. A New Careerist in theory has the opportunity to start at the highest job level his skills enable him to perform and advance as high as his abilities will take him through on-the-job training and related formal education. He should have a chance to grow in the same job and receive increasing responsibility and salary.

He has the chance to develop basic skills that will enable him to transfer from one human service job to another with minimal additional training. The skills developed should promote job permanence and career possibilities. Both professional and non-professional personnel in an agency with a New Careers program have the chance to improve their skills and their performance level through more training. To summarize, the New Careers approach gives every employee a chance for increased upward, diagonal and lateral mobility as can be seen in the following case study.

New Careers in Action

Mrs. James Carter is now 26 years old and the mother of three children, ages 5, 7, and 8. She dropped out of high school in her senior year to get married. Although she wanted to continue her education, she had to take care of her children. Last year, with two of her children in school and one in kindergarten, she went to work - as a waitress at a neighborhood snack shop. She was interested in early childhood education, but did not have even a high school degree and couldn't afford to give up her job to go to school. At night, she had to stay with her children, while her husband worked on the night shift at a milk processing plant. The New Careers approach offered the opportunity for Mrs. Carter to develop her interest in education while working.

The town in which the Carters live has a New Careers project in education run by the Board of Education in cooperation with Pretoria University, a nearby University. Possible advancement within the program ranges from teacher aide through teacher and related professions. Mrs. Carter applied to the Board of Education and was hired as a teacher aide a year ago. After three weeks of orientation in studying such fields as early childhood development, she started work in an elementary school classroom while the

teacher worked with individual students. When school closed at three o'clock, she went to the local high school to take a course leading to a high school equivalency certificate.

A month ago, Mrs. Carter received her high school equivalency certificate and was promoted to teacher assistant. This school year her duties will be more related to the instructional process and she will receive a higher salary. At Pretoria University, Mrs. Carter has started work on an Associate of Arts Degree. She will receive nine credits for her classroom experience; her tuition is paid by the school system.

It will take Mrs. Carter about three years in a work-study situation to get her A.A. Degree. At that time, she will be promoted to teacher associate. If she wishes, she can switch to a related field such as educational counselling and work as a counselor associate. The Board of Education will continue to pay her tuition if she wishes to continue at Pretoria toward a Bachelor's Degree. The teacher Mrs. Carter worked under as an aide and assistant is working toward a Master's Degree in Psychology at Pretoria; her tuition is also paid by the Board of Education.

Setting Up a New Careers Program

Job Development

Opportunities for advancement exist because of the way jobs are structured within the agency following a New Careers approach. As a first step to developing jobs, the functions and goals of the agency are examined and then the tasks that need to be done to achieve these goals are identified. Each staff member and representatives of the wider community--the educational institutions, the credentialling groups, such as the civil service and local merit groups, the professional associations and trade unions, and residents, for example--should be involved in this New Careers planning process. The actual tasks that are to be done are grouped together as jobs with the requisite skills clearly spelled out, forming a ladder of distinct positions requiring progressively more advanced skills and training. People are placed in jobs according to their skills and training and given the chance to advance to higher level jobs through more training and education. Throughout the agency there is a more appropriate engineering of jobs through careful definition of what needs to be done and the lowest level at which the task can be performed. A health clinic, for example, through analysis of client needs, might find that to expand its services to the neighborhood, it must

expand its staff. In addition to physicians, the physicians skills should be channeled efficiently through the proper use of other medical helpers, such as medical technicians, practical nurses, registered nurses, and community workers.

In line with this analysis, the agency must develop realistic job descriptions with realistic qualification requirements. These descriptions should be positive and specific statements of the tasks to be performed at each job level. A career sequence -- a graduated list of jobs -- should be developed during this process. This is the career ladder. The ladder indicates how a person can progress from one job to another. These ladders and job descriptions need to be flexible enough to accommodate changes in functions of the agency and in technology. For example, greater use of teaching machines might necessitate changes in job descriptions, because different staff skills might be required.

Relevant Institutions

Because the job descriptions and career ladder reflect the skills, training and education needed for each job, the agency must now consider how these can be provided. The educational institutions, for example, need to consider how the courses they offer can be changed to meet the needs of the New Careerist and how agency training might substitute for traditional course work. Community colleges are an excellent resource for training New Careerists. Credential-

ling groups must consider changing arbitrary requirements for employment to reflect the real skills needed, as specified in the job descriptions and career ladders.

Budget

The agency budget needs to be examined to see how resources can be better allocated to allow for a New Careers program. Under the New Careers approach, non-professionals would be employed at a lower salary cost than an equivalent number of professionals, but training costs might increase. The agency must check the availability of outside funds -- Federal, State, local, and private. An evaluation has to be made of the physical and staff facilities in the agency for training entry level new careerists.

Staff Participation

The major prerequisite to move into the operational phase is agreement among the existing staff of the employing agency that they are indeed willing to start such a program. Staff involvement from the start in the planning process should promote their acceptance of the program; participation will bring a more positive attitude. If individual staff are convinced that they will have the chance to perform at consistantly higher skill levels, they are more likely to favor the approach. A New Careers program needs agency

commitment to its continuation and a job ladder to become a new administrative system. (For further discussion, see Page 12.)

Training

With opportunity for upward mobility the key to the New Careers approach, training constitutes the means to make opportunity possible. Training should assist the individual develop the basic skills the entry position demands while he performs it and provide the base of education, information, and skills needed for career development.

Supervisors need to be trained to work with entry level New Careerists. The agency ought to develop basic courses that teach the functions of the agency, the organization and good work habits. Arrangements should be made so that New Careerists without high school diplomas can receive the education they need to pass equivalency tests or enter Young Adult Degree Programs. Educational institutions, such as community colleges, should offer the proper courses to the New Careerist that he needs to advance with entrance requirements he can satisfy.

All education and training needed for career advancement should be readily available -- geographically close and at no cost to the New Careerist. The New Careerist might also need such supportive services as day care and medical treatment in

order to work, and these should also be provided. Staff members at all levels should be given the chance to advance their skills through further training, on the job or at universities, paid for by the agency.

Recruitment

Because one of the important facets of the New Careers approach is the elimination of arbitrary qualifications for employment, qualifications truly necessary to a job must be defined and people who can handle the job recruited. Existing achievement tests don't necessarily indicate on-the-job ability. New means must be used, such as interviews, where oral rather than written skills will be revealed. The agency needs to seek people who are highly motivated regardless of their academic credentials. Men and women with knowledge of their community and its problems gained through working on the Model Cities Program are one potential source of recruits. The New Careerists should be offered from the start a livable wage plus the possibility of raises and promotions.

Evaluation

Once established, the New Careers concept should be an integral part of the agency's policies, one that is continually evaluated and up-dated and that begins at the

commencement of the program. Evaluation should examine, for example, whether or not the New Careerists are advancing, how well supervisors are doing, what impediments are present, and how well the agency's functions are being performed. There should be an analysis of the costs and benefit of the New Careers program and how this ratio compares with that of other progrrams.

Other Approaches

This description of what needs to done in planning a a New Careers program and implementing it is not meant to be exhaustive or detailed. There are many approaches to New Careers programs, but they all have to deal with the basic issues of planning, job analysis, training, recruitment, funding, community involvement and evaluation. The above description indicates how the many factors involved in a New Careers program fit together. There are many good publications that go into detail on specific aspects of New Careers programs and explain alternative approaches. The publications mentioned in Appendix C are general introductions; the reference sources in Appendix C can provide more detailed information. Several descriptions of particularly interesting programs appear in Appendix A.

Resistance to New Careers and Problem Areas

Any group attempting to establish a New Careers program should anticipate a number of problems which grow out of the need for genuine change in institutions in order to make a New Careers program successful. Professionals and professional associations are apt to offer resistance unless fully convinced that New Careerists present an opportunity for them to do more professional work rather than a threat to their positions; they may fear downgrading of their "professional" standards. Other employees are apt to resent any special consideration given to New Careerists. State and local merit groups may resist the requisite changes and waivers of existing job requirements. Universities and other educational institutions may resist since the New Careers approach provides for changes in entrance requirements, changes in course structure and credit for work experience. Established groups are apt to resist New Careerists who will tend to be Negroes and other minority poor. They must be encouraged to view the New Careers program as a means of upgrading the skills of these groups and as a chance to get more and better services performed.

Minneapolis, Minnesota accepted in September, 1969, a New Careers in teaching ladder under its civil service system. This is a move fought by the clerical union, who did not want New Careerists receiving higher pay than clerical workers.

It took many months of negotiating and legal decisions before the career ladder was accepted, but resistance was overcome.

The fact that New Careers is a permanent program, while most funds are available on only a yearly basis, presents another problem area. The agency setting up a New Careers program must try to obtain long term funding sources. The agency can approach this by adopting the New Careers approach as a part of regular agency operations to be included in the normal budgeting structure. In other words, New Careers must be treated like overhead and other ongoing expenses.

Cities have managed to resolve the funding dilemma. Minneapolis pays many of its teacher aides out of regular city education funds. The Hunter LPN to RN program in New York described in Appendix A receives funds from the city to pay the salaries for LPN's while they are in school. The key to such funding appears to be the proven usefulness of the job the New Careerists are doing.

To create a New Careers Program with all aspects working together and all necessary people and institutions involved, requires a long period of time. For example, the local civil service should change its entrance requirements and the local college some of its course offerings. The agency should have a training program developed by the time the

first New Careerists start. Most importantly, the career ladder, with at least the first three steps developed, must be planned before the program begins. Attempts to set-up advanced steps later haven't worked. Because the New Careers approach has no time limit, programs must be planned flexibly enough to allow for changes in the technology of human services.

Oakland and Minneapolis, described in Appendix A, are still in the process of developing their programs, and they have two of the best New Careers projects in the country. They have found that it is possible to generate necessary institutional change while New Careers programs operate.

Why New Careers*

An obvious question to be answered is: why should an agency attempt to implement the New Careers approach and why is HEW encouraging it?

The fact is that this is the best way to get better health, education, and welfare services while involving as employees a substantial number of the people to be

*This discussion has focussed on paid staff. The New Careers approach is, however, quite broad. Any person working in the human service area, paid or volunteer, can benefit from a system that allows opportunity for advancement to progressively higher levels of responsibility. Experience with volunteers has already shown that people, once they gain experience, can move up quickly into positions of greater importance to the life of the organization.

served. Further, necessary professional services will be more readily available to the poor when New Careerists can undertake some of the time-consuming tasks currently done by professionals. Because every staff member can perform at the highest level of his ability, better care will result through better use of staff. The amount of professional services available to the underprivileged will increase.

Even if a New Careers program does not meet all of its objectives or takes a long time to get going, the fact that agencies serving people are concerning themselves with employing the poor and untrained to provide an opportunity for career advancement is an important achievement. The New Careers approach is a continuous and evolving process with the potential for both direct and indirect benefit for those giving and those receiving services.

Appendix A

Organizations across the country have started New Careers programs. These brief descriptions will give an idea of the types of approaches being followed. The five programs discussed here are recognized as among the very best in the country. They are being run in different parts of the country and in different service areas, and all five are concerned with advancement beyond the paraprofessional level.

Chicago, Illinois

Chicago, Illinois has a Veterans in Public Service Project that applies the New Careers concept to returning Vietnam veterans. These men combine college education, funded partially by their GI benefits, with on-the-job experience in the public schools in Chicago. Most are studying to be industrial education specialists, a field in which more teachers are needed.

Special features of the program include:

1) Payment for 35 hours of work while actually employed 30 hours a week for a 52 week year;
2) Free tuition at Chicago State College where the course work is taught, so that the New Careerists can use their GI education benefits as a salary supplement;
3) Waiving of normal admission requirements at the college, but still must meet the regular B.S. Degree requirements for graduation;
4) About 16 credits at the college for on-the-job training that regular students don't receive;
5) Supervision by team leaders from Teacher Corps groups;
6) More demand for these men by school principals, because of their great ability relating to children, than the project has been able to meet.

Further information about the Chicago Program is available from:

Miss Jean Kehoe
Teacher Corps Coordinator
Chicago Board of Education
228 N. LaSalle Street
Chicago, Illinois 60601
(312) 332-7800

Oakland, California

The New Careers Development Agency (NCDA) funded by the Department of Labor, under the Scheuer Amendment to the Economic Opportunity Act, started with three objectives for the Oakland program:

1) entry level employment opportunities in the human services fields, such as health, education, welfare, neighborhood redevelopment, and public safety;
2) provision of maximum prospects for advancement and continued employment without Federal assistance;
3) combining necessary educational training, counseling, transportation, assistance, and other supportive services needed.

Special features of the program are that:

1) New Careerists are located in many public agencies. The NCDA and participating agency negotiate the plan for using the New Careerist. As each proposal is developed, contractual agreements are negotiated with top administrators.
2) After the contracts are signed with user agencies, the role of NCDA becomes one of expediting, coordinating, insuring quality control and evaluating the impact of the program.

3) An education uniquely designed for New Careerists is part of the program. This component is run with the cooperation of the user agencies and Merritt College. The New Careerists take both regular courses and special courses. The courses are credited within the college structure. New Careerists are granted college credit for their experience.

4) Hayward State College runs a seminar for the agency supervisors of New Careerists and grants credit for the course to a M.A. in Public Administration.

5) There are New Careerists in the administration component itself.

6) Agencies have agreed to pay from their operating budgets 50% of the salaries of those enrollees who are entering their second year of employment.

Further information about the Oakland Program is available from:

Ricardo Ontiverso
Executive Director
New Careers Development Organization
1013 Harrison Street
Room 203
Oakland, California 94607
(415) 832-7713

Minneapolis, Minnesota

Minneapolis has been a leader in developing New Careers programs in education. As of January, 1969, Minneapolis had 700 aides working in approximately half of the schools in the city. Special features of the program include:

1) A well defined career-ladder with three levels of positions delineated.
2) Commitment by the school district to employ permanently New Careerists who successfully complete the two-year program.
3) Recruiting of aides from the neighborhood without restriction as to education or previous work experience.
4) An increasing commitment of local and State funds as well as a variety of Federal funding.
5) College work, which is credited toward an A. A. degree plus credit for work experience.
6) Evaluation which shows that the intervention of aides does have an impact on the improved learning of children.
7) The possibility of lateral movement into counseling or social work.

Further information about the Minneapolis Program is available from:

Frederick V. Hayen
School Administration Building
807 Broadway Street, N. E.
Minneapolis, Minnesota 55413
(612) 332-4284 - Ext. 266 or 240

Albuquerque, New Mexico

The Albuquerque New Careers Program has a strong mental health services component. New Careerists are being trained to be mental health workers specializing in community health work and child care.

Among the special features of the program are:

1) Generic training at the University of New Mexico to provide a basic foundation of knowledge and understanding pertinent to all the human services. This training is built around the issues of the individual's relationship to work, to people, and to his community and his personal growth and development;
2) An experimental program through the University College to award an Associate of Arts Degree in Human Services to University of New Mexico New Career Trainees upon successful completion of their program;
3) Placement of the New Careerist if possible in a job in his own neighborhood to draw upon his personal knowledge of the area;
4) A four step ladder over a two year period leading to a responsible position among the mental health professionals;

5) Counting as 66% of the credits for an Associate of Arts Degree the New Careerists' work experience;

6) Close working relationship between the Albuquerque Model Cities staff and New Careers staff.

Further information about the Albuquerque Program is available from:

Carl Bruening
New Careers Generic Training
The University of New Mexico
1819 Roma, N. E.
Albuquerque, New Mexico 87106

New York, New York

A nurse aide can now become first a Licensed Practical Nurse and later a Registered Nurse by taking advantage of two New Careers projects in New York City, that the Department of Hospitals co-sponsors.

Special Features of the Nurse aid to LPN Program, sponsored by District Council #37, American Federation of State, County, and Municipal Employees (AFL-CIO), the Department of Hospitals, and the Board of Education include:

1) Entrance requirement of only an 8th grade education; Local #37 does run a high school equivalency course that nurse aides can take;
2) Payment of students for a forty hour week as nurse aides, while they work 20 hours and are in school the rest; training money pays the difference;
3) The 14 month course, run by the Board of Education, is the traditional LPN course;
4) Curriculum allows for the trainees' experience as nurse aides.

Hunter College Department of Nursing Education in cooperation with the New York City Health Services Administration and Department of Personnel, sponsors a program for LPN's to become RN's. Special features include:

1) Full-time work-study, with students employed as LPN's 20 hours a week and in school 20 hours a week;

2) Condensing of the R.N. program into 17 months, taking advantage of L.P.N. training;

3) Payment of the full 40 hour a week LPN salary by the City Department of Personnel while the LPN's work only 20 hours;

4) Some courses through the Hunter College of General Studies with 57 credits achieved during the 17 months of training toward a B.S. Degree in Nursing;

5) Clinical instruction through the Health Services Administration.

Further information is available from:

Nurse Aide to L.P.N. - Sumner M. Rosen
New Careers Development Center
184 Fifth Avenue
New York University
New York, New York 10010
(212) 989-7979

L.P.N. to R.N. - Dr. Marguerite Holmes
Chairman, Hunter College
Department of Nursing Education
440 East 26th Street
New York City, New York 10010
(212) MU 6-6800

Appendix B

NEW CAREERS LEGISLATION

The following listing of Acts contains those we feel are most directly related to New Careers. The Guide to Funding New Careers Programs, (Revised Edition), published by the New Careers Development Center, New York,University, 184 Fifth Avenue, New York, N. Y., 10010, gives a more extensive list.

Act	Description	Eligibility	Contact Agency
	General		
Economic Opportunity Act, Title II.	Provides assistance to disadvantaged persons to secure or qualify for entry-level jobs involving skill development toward more advanced jobs directed towards human and supportive services.	States, public and private non-profit organizations.	Manpower Administration U.S. Department of Labor Washington, D. C. 20210
	Education		
Education Professions Development Act, PL 90-35, Title V, Part B, Sec. 518(a)	Grants to attract persons in the community who have been otherwise engaged and to provide them through training with the qualifications necessary for a successful career in teaching and to obtain the services of teacher aides and provide them with the necessary training.	Local educational agencies through the State educational agency.	Bureau of Educational Personnel Development U.S. Office of Education Department of Health, Education, and Welfare Washington, D. C. 20202
Part D, Sec. 531(a)	Grants for programs and projects to improve the qualifications of persons serving or preparing in elementary and secondary schools or post secondary vocational schools or to supervise or train persons so serving.	States and local educational agencies with State approval, institutions of higher education.	Bureau of Higher Education U.S. Office of Education Department of Health, Education, and Welfare Washington, D. C. 20202

NEW CAREERS LEGISLATION

Act	Description	Eligibility	Contact Agency
Elementary and Secondary Education Act Amendments of 1967, PL 90-247			
Sec. 106	Provides funds for coordinated training programs for education aides and professional staff.	Local educational agencies through the State educational agency.	Bureau of Elementary and Secondary Education U.S. Office of Education Department of Health, Education, and Welfare Washington, D. C. 20202
Sec. 144	Grants to encourage the full and adequate use and acceptance of auxilliary personnel such as teachers aides.	States and local educational agencies through State educational agency.	"
Handicapped Children Early Education Act of 1968, Section 2.	Provides for the training and career advancement of para-professionals in the provision of early education services for the handicapped.	Public and private non-profit organizations and agencies.	Bureau of Education for the Handicapped U.S. Office of Education Department of Health, Education, and Welfare Washington, D. C. 20202

NEW CAREERS LEGISLATION

Act	Description	Eligibility	Contact Agency
Higher Education Act Amendments of 1968, PL 90-575, Title IX	Supports college education programs for part-time students for careers in the public sector.	Institutions of higher education.	Bureau of Higher Education U.S. Office of Education Department of Health, Education, and Welfare Washington, D. C. 20202
Vocational Education Act Amendments of 1968, PL 90-576, Title I			
Part C, Sec. 132(6)	Research funds available for support of New Careers training of para-professionals; in the use of para-professionals; and the evaluation of public service aide programs.	States, public and private non-profit agencies and institutions, local educational agencies.	Bureau of Research U.S. Office of Education Department of Health, Education, and Welfare Washington, D. C. 20202
Part D, Sec. 143	Funds available for programs or projects for young workers released from their jobs on a part-time basis for the purpose of increasing their educational attainment.	States, public and private non-profit agencies and institutions, local educational agencies.	Bureau of Adult and Vocational Education U.S. Office of Education Department of Health, Education and Welfare Washington, D. C. 20202

NEW CAREERS LEGISLATION

Act	Description	Eligibility	Contact Agency
	Health		
Health Manpower Act of 1968, PL 90-490, Title I, Part B, Sec. 772	Supports programs for the training of new levels of personnel in the Health Professions of Dentistry, Medicine, Osteopathy, Optemtry, Pharmacy, Podiatry, and Veterinary Medicine.	Schools of Dentistry, Medicine, Osteopathy, Optometry, Pharmacy, Podiatry, and Veterinary Medicine.	Bureau of Health Manpower U.S. Public Health Department of Health, Education, and Welfare 800 North Quincey St. Arlington, Va. 22203
Title II, Part B. Sec. 806	Funds available for experimental and special projects to expand nursing education programs and develop new programs of nursing education.	Public and private non-profit organizations, agencies, and institutions.	"
Alcoholic and Narcotic Addict Rehabilitation Amendments of 1968, PL 90-574, Title III.			
Part C., Sec. 243	Supplies funds to support professional and technical (non-professional) personnel in programs and centers for the prevention and treatment of alcoholism.	Public and private profit organizations and agencies.	National Institute of Mental Health Department of Health, Education, and Welfare Barlow Building 5454 Wisconsin Ave. Chevy Chase, Md. 20015

NEW CAREERS LEGISLATION

Act	Description	Eligibility	Contact Agency
Alcoholic and Narcotic Addict Rehabilitation Amendments of 1968, PL 90-574, Title III			
Part D., Sec. 252	Provides support for staffing as well as the training of professional and technical (non-professional) personnel of narcotic addict treatment and prevention projects.	Public and private non-profit organizations and agencies.	National Institute of Mental Health Department of Health, Education, and Welfare Barlow Building 5454 Wisconsin Ave. Chevy Chase, Md. 20015
	Welfare		
Social Security Act Amendments of 1967, PL 90-248, Sec. 210	To employ and train additional paid subprofessional staff emphasizing employment of recipients and other people of low income.	State and local public welfare agencies.	Division of Research and Demonstration Grants Social and Rehabilitation Service, Department of Health, Education, and Welfare Washington, D. C. 20201

1462

NEW CAREERS LEGISLATION

Act	Description	Eligibility	Contact Agency
Juvenile Delinquency Prevention and Control Act, 1968, Title II.	Provides funds for support of direct services, demonstration, and experimental programs of diagnosis, treatment, and' rehabilitation of delinquent youth. Built into these programs must be training for career opportunities as well as new types of careers.	States, local government, public and private non-profit organizations and agencies.	Director, Office of Juvenile Delinquency and Youth Development Social and Rehabilitation Service Department of Health, Education, and Welfare Washington, D. C. 20201
Vocational Rehabilitation Amendments of 1968, PL 90-391 Sec. 7(a)(2)C	Grants are made to develop new programs to recruit or train individuals for new careers in serving handicapped people. Such projects may be concerned with the establishment of new kinds of jobs, the redefinition or restructuring of jobs, the provision of work experience and related supporting services, the training of professional and managerial staff for the effective use of personnel on new careers and special recruitment activities.	State vocational rehabilitation agencies and other public and private non-profit agencies.	Rehabilitation Services Administration Social and Rehabilitation Service Department of Health, Education, and Welfare Washington, D. C. 20201

NEW CAREERS LEGISLATION

Act	Description	Eligibility	Contact Agency
Vocational Rehabilitation Amendments of 1968, PL 90-391 Sec. 7(a)(2)D	Grants are made to develop new programs to recruit and train handicapped individuals to provide them with new career opportunities in the fields of rehabilitation, health, welfare, public safety and law enforement, and other appropriate public service employment.	State vocational rehabilitation agencies and other public and private non-profit agencies.	Rehabilitation Services Administration Social and Rehabilitation Service Department of Health, Education, and Welfare Washington, D. C. 20201

Appendix C

Assistance of many types is available for starting New Careers Programs. The general reference materials mentioned in this Appendix go into greater depth than this paper in explaining the New Careers concept and how to start programs. The Technical Assistance Centers have as their chief function monitoring New Careers projects across the country and providing assistance to New Careers groups. They are prepared to respond to inquiries for aid.

The HEW Regional Office Personnel are knowledgeable about HEW funding sources and application procedures. The Social and Rehabilitation Service manpower specialist should be able to answer questions about the welfare legislation in Appendix B, the health manpower representative questions about health legislation, and the education specialist questions about education legislation. The Contact Agencies listed in Appendix B have overall responsibility for administering the legislation; the regional representatives in this Appendix either represent these agencies in the regions or can direct you to the appropriate regional representative.

General Reference Materials

1. Klein, William, William Denham, and Jacob R. Fishman. New Careers in Human Services: A Manual of Organization and Development. Washington: New Careers Development Program, University Research Corporation, 4301 Connecticut Avenue, N. W.

2. Lynton, E. F. The Subprofessional: From Concepts to Careers, New York: National Committee on Employment of Youth, 145 East 32nd Street, 1967.

3. Pearl, Arthur and Frank Riessman. New Careers for the Poor, New York: The Free Press, 1965.

4. Powledge, Fred. New Careers: Real Jobs and Opportunities for the Disadvantaged, New York: Public Affairs Pamphlets, 381 Park Avenue South, 1968.

5. Riessman, Frank and Hermine I. Popper. Up from Poverty: New Career Ladders for Nonprofessionals, New York: Harper & Row, Publishers, 1968.

6. Schmais, A. Implementing Non-Professional Programs in Human Services, New York: Center for the Study of Unemployed Youth, Graduate School of Social Work, New York University, 1967.

Technical Assistance Centers

New Careers Development Center and
Training Laboratory
New York University
184 Fifth Avenue
New York, New York 10010
(212) 989-7979

University Research Corporation
4301 Connecticut Avenue, N. W.
Washington, D. C. 20008
(202) 244-9210

Social Development Corporation
870 Market Street
San Francisco, California 94102
(415) 391-1790

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VT 013 774
THE USE OF ANALYTICAL TECHNIQUES IN THE MANAGEMENT OF PROGRAMS OF HEALTH MANPOWER EDUCATION.

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DESCRIPTORS - *DECISION MAKING; *MANAGEMENT; PROJECTS; *TECHNIQUES; SYSTEMS ANALYSIS; ECONOMICS; LOGICAL THINKING; STATISTICAL ANALYSIS; PROGRAMS; MATHEMATICAL APPLICATIONS; *MANAGEMENT EDUCATION; MANAGEMENT INFORMATION SYSTEMS; METHODOLOGY
IDENTIFIERS - HEALTH MANPOWER EDUCATION

ABSTRACT - IN THIS CONSIDERATION OF METHODOLOGIES, SOME OF THE CHARACTERISTICS AND PRINCIPLES OF THE FOLLOWING TECHNIQUES ARE PRESENTED: (1) SYSTEMS ANALYSIS, (2) ECONOMIC ANALYSIS, (3) STATISTICAL ANALYSIS, AND (4) LOGICAL ANALYSIS. EACH IS EXAMINED AS TO ITS CONCEPTS AND METHODS AND ITS POTENTIAL USES TO THE BUREAU OF HEALTH MANPOWER EDUCATION. DECISIONS CONCERNING THE MANAGEMENT OF BUREAU PROGRAMS ARE RELATED TO EACH OF THE ANALYSIS TECHNIQUES IN AN EFFORT TO IDENTIFY USEFUL APPLICATIONS FOR BETTER AND FASTER DECISION MAKING IN THE BUREAU'S FOUR PROGRAM DIVISIONS. IN ADDITION TO THE RECOMMENDATIONS MADE CONCERNING EACH TECHNIQUE, THE FOLLOWING GENERAL RECOMMENDATIONS WERE MADE: (1) TO PROVIDE ESSENTIAL PROGRAM MANAGEMENT INFORMATION, ANALYTICAL RESOURCES SHOULD BE MARKEDLY EXPANDED, ESPECIALLY THE CAPACITY FOR ECONOMIC AND SYSTEMS ANALYSIS, (2) ALL FOUR PROGRAM DIVISIONS SHOULD BE STAFFED WITH ANALYTIC TALENT FOR PLANNING AND EVALUATION, AND (3) THE DIVISION OF MANPOWER INTELLIGENCE SHOULD COORDINATE ANALYTIC ACTIVITIES WITHIN THE BUREAU. (MU)

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THE USE OF ANALYTICAL TECHNIQUES IN THE MANAGEMENT OF PROGRAMS OF HEALTH MANPOWER EDUCATION

BUREAU OF
HEALTH MANPOWER EDUCATION
National Institutes of Health

May 1971

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service **National Institutes of Health**

1477

FOR ADMINISTRATIVE USE ONLY

The Use of Analytical Techniques in the Management of Programs of Health Manpower Education

(A report prepared for the Director, BHME, NIH)

Office of Program Planning and Evaluation
Bureau of Health Manpower Education
National Institutes of Health
Department of Health, Education, and Welfare

May 1971

Contents

Introduction v

Systems Analysis
- The concept 1
- The method 3
- Bureau activities 9
  - System for DDH (11) NARS survey (11) DERF system (11) Reorganization of DDH (11) Dental Center Conversion (12) Health care simulation (12) Hospital use simulation (14) Anesthesiology manpower (14) Practice profiles (16) Nurse utilization (16)
- Potential applications 16
- Questions 22

Economic Analysis
- The concept 23
- The method 24
- Bureau activities 26
  - Dental education (26) Medical student financing (27) Basic Improvement Grantees (27) Postgraduate education (27) Brain drain (28) Market for nurses (28)
- Potential applications 28
- Questions 33

Statistical Analysis
- The concept 35
- The method 36
- Bureau activities 37
  - Expanded functions (37) Requirements for dentists (37) Fluoridation (38) Hospital manpower (38) Journal selection (38) Nursing research (38)
- Potential applications 39
- Questions 43

Logical Analysis
- The concept 45
- The method 45
- Bureau activities 47
  - Logical flow charts (47) Physical therapist (47) Program inventory (48) Continuing education (48) Physician's assistant (48) Legislative terminology (49)
- Potential applications 50
- Questions 52

Contents (Cont'd)

Recommendations 53

Glossary 61

Illustrative Applications of Systems Analysis 63

References 65

Personnel 69

1480

(3) Statistical Analysis is interpreted as the study of data reflecting BHME programs: numerical supply of manpower, requirements, trends...

(4) Logical Analysis is interpreted as the study of concepts and symbols associated with BHME programs: terms, definitions, meaning, inference, validity.

This is a propitious time to review current analytical activities in the Bureau, as well as to examine the potential of expanding such programs. Among the reasons:

First, the scope of BHME's responsibility is likely to be extended to a significant degree. Both the President and the Congress have proposed markedly increased Federal health manpower educational programs. The additional resources should be utilized with optimal efficiency.

Second, BHME has just undergone extensive reorganization. Two new divisions have been established: the Division of Physician and Health Professions Education; the Division of Manpower Intelligence. With severe constraints on recruitment, all analytical talent ought to be deployed to maximum advantage.

Third, the Agency--NIH--is now examining its role in Systems Analysis, Operations Research, and similar endeavors. The Bureau should be prepared to articulate its attitudes toward and its plans for systematic programmatic and managerial analysis.

Fourth, there is a perceptible increase in the number of requests to BHME for financial assistance in support of analytical projects--cost allocation studies, modeling, manpower and educational planning. More precise criteria for selecting such proposals will be required.

The Bureau of Health Manpower Education conducts and supports many analytical activities. The principal purpose of this study is to ascertain whether more of this analysis can assist decision-making in the planning, operation, and evaluation of Bureau programs.

0481

Introduction

To analyze is:

To separate;
To distinguish;
To ascertain the elements of anything complex.

Analysis is thus the resolution into simple elements--the opposite of synthesis. Examples of analysis include:

Chemical analysis--the resolution of a compound into its elements.

Optical analysis--the resolution of light into its prismatic constituents.

Mathematical analysis--the reduction of problems into equations.

This report concerns four types of analytical techniques of particular utility to the management of programs at this juncture of BHME's history. They are:

(1) Systems Analysis
(2) Economic Analysis
(3) Statistical Analysis
(4) Logical Analysis

Subsequently, we shall describe in detail, and illustrate, what each of these activities includes in its application to Bureau programs. For the present, some working definitions should suffice.

(1) Systems Analysis is interpreted as the study of the decision processes in BHME organization and programs: objectives, alternative strategies, estimated outcomes...

(2) Economic Analysis is interpreted as the study of the financial factors associated with BHME programs: cost, price, expenditures...

1482

The following illustrates some of the ways of using--for purposes of decision-making--the analytical tools described in this report:

(1) To find the optimum combination of a very large number of interrelated factors.

(2) To find the best solution, or at least a good solution, to problems involving uncertainty of future events.

(3) To find meaningful relationships among many interacting factors and to separate the important factors from the unimportant.

(4) To develop ways of collecting and processing significant data at minimum cost.

(5) To relate quantitatively the operational objectives of the individual segments of a business or government organization, or even individual workers, to the overall objectives of that organization.

(6) To test the sensitivity of any given solution to changes in controlling factors. [1]

. . .

The cooperation of many persons within the Bureau, elsewhere at NIH, and from the educational institutions is acknowledged and appreciated. Obviously it is infeasible to do justice to such a subject in a report compiled in a few weeks. The cited examples of analytical activities in BHME are illustrative only. Many noteworthy projects go unmentioned, yet have contributed significantly to program management. Hopefully this initial review will be succeeded by further examination of analytical endeavor within the National Institutes of Health.

E.A.C.

May 1971

Systems Analysis

The concept

Sometimes, in introducing a subject, one finds it more useful to begin by stating what the activity is not.

Systems analysis is not reducible to any of the following descriptions.

- "A highly technical effort characterized by excessive jargon, such as 'parameters,' 'algorithms,' etc."
- "PPB (Program Planning Budgeting) type of management reporting."
- "The elaborate drawing of schematic-type diagrams, often oversimplifying the planning-implementation process."
- "A boondoggle of mammoth proportions, which has cost various industries inestimable resources, with little return benefit."

As the term is used in this report, "systems analysis" means just that, namely, a method of distinguishing the elements (analyzing) of a system (an organized group of objects). When one speaks of applying systems analysis to the management of BHME programs, the intent is simply to address the decision process methodically, identifying significant events and processes.

In other words, we are using systems analysis in a broad, generic sense.

Here is E. W. Quade's definition.

> "...Systems analysis...can be characterized as a systematic approach to helping a decision-maker choose a course of action by investigating his full problem, search out objectives and alternatives, and comparing them in the light of their consequences, using an appropriate framework--insofar as possible analytic--to bring expert judgment...to bear on the problem..." [2]

So, the technique ought to represent a distinct advance over hunch, or subjective intuition, or feeling. And, of course, it has proven its value to many industries (e.g., the pharmaceutical, petroleum, and aircraft industries) by providing the instrumentality to study problems of management.

Examples:

...Planning and scheduling.

...Allocation of facilities and manpower.

...Equipment and materials utilization.

...Forecasting (demand, supply, price).

...Centralization vs. decentralization.

...Organization structure.

...Communication.

...Decision-oriented management information systems. [3]

Without belaboring the point, one can recognize the historical significance of systems analysis-related endeavor on the basis of a New York Times article on March 16, 1971. The Times listed 34 "Basic Innovations in the Social Sciences" since 1900. Of these, nearly half were in some respect related to systematic analytical technology:

Structural linguistics	Jakobson	1927-67
Game theory	Von Neumann	1928-44
Large-scale sampling	Hansen	1930-53
General systems analysis	Von Bertalanffy	1936
Input-output analysis	Leontief	1936-53
Linear programming	Kantorovich	1938-50
Statistical decision theory	Wald	1939-50
Operations research	Blackett	1941-50

1485

Computers	Bush	1943-58
Econometrics	Timbergen	1935-40
Simulation of economic systems	Klein	1947-60
Decision model	Simon	1950-65
Cost-benefit analysis	Hitch	1956-63
Simulation of social systems	McPhee	1956-66
Stochastic models	Coleman	1965

Leon S. White, of MIT, quotes a philosopher, John Dewey, to express the essence of systems analysis in its simplest terms:

> What is the problem?
>
> What are the alternatives?
>
> Which alternative is best? [4]

The method

What are some of the characteristic steps in conducting a systems analysis of a management problem in the Bureau of Health Manpower Education?

We ought to have in mind some framework of the types of management decisions that are made in the administration of Bureau programs and the processes involved. Suppose we list--in random order--some of the decisions relating to our programs, without regard to who makes the decision.

- The initial formulation of BHME's annual budget.
- The proposed definition of a Regional Office role.
- The decision on the amount of a Special Project Grant to be awarded to George Washington Medical School.

- The organizational framework of the Bureau.
- The scope of Continuing Education activities.
- Recruitment of senior staff.
- Collaboration with the National Medical Audio-visual Center.
- Identification of Operational Planning System objectives.
- Decentralization of grant activities.
- Relocation of the MEDIHC program.
- Scheduling of Review Committee meetings.
- Assignment of responsibility for Physician Assistant Program.
- Definition of manpower shortages.
- Selection of principal form of grant support (capitation or other).
- Priorities for awarding construction grants.
- Characteristics of an Area Health Education Center.
- Selection of the responsible organization to draft a report on licensure and certification.
- Selection of contractors for research on modeling.
- Expansion of the cost allocation study.
- Identification of means to recruit disadvantaged students into nursing careers.
- Influencing medical centers to institute curricular innovation.
- Implementation of TEAM concept in dentistry.
- Inclusion of post-doctoral training programs.
- Liaison with health professions and educational associations.

There is considerable utility to this exercise of specifying management decisions of the Bureau, particularly when they are superimposed on a "Management Activity Matrix." (This diagram has been adapted from White's paper, and draws on the thoughts of R. Anthony in his book, Planning and Control Systems: A Framework for Analysis.) It is worthwhile to ask, for instance, where the decision to implement TEAM (or any other major decision) fits in this matrix, and what steps should normally be required for the intelligence, design, and choice phases? (See page 6.)

The literature on the theory of systems analysis is extensive. For purposes of this report, a simple, illustrative description of the methodology should suffice. However, SA--when applied to the complex management decisions of BHME in a sophisticated manner--will be decidedly non-simple. Moreover, it will require the participation of technically trained experts. They may be logicians, systems engineers, economists, mathematical statisticians, computer programmers, or other professionals. But they must know SA technology--in a way most managers do not.

Leon S. White, in the course of a recent NIH-sponsored conference, described the methodology of SA. The following are excerpts of his remarks: (Readers familiar with SA may omit the following 4 pages.)

> The systems analyst specifies the problem, he identifies the relevant objectives and develops evaluation criteria, he defines alternative courses of action, he formulates models by which to predict the consequences or output of each alternative, he collects the data required to make the model operational and, then, using the criteria previously established, he evaluates the alternatives.
>
> Problem specification is invariably a non-trivial, time-consuming exercise. It may also be the most important factor in determining the ultimate success or failure of the analysis. Clearly, the work of specifying the problem cannot be carried out by the analyst in isolation. It begins with the decision-maker's description of what he thinks his problem is, and ends with an agreement between the analyst and decision-maker that the analyst's formulation, regardless of how different from the original statement, is acceptable to both parties. The process of problem specification is necessarily subjective and marked by the consideration of numerous trade-offs and judgments.

MANAGEMENT ACTIVITY MATRIX [5]

	(a) Intelligence	(b) Design	(c) Choice
Strategic Planning (1)	(1) (a)	(1) (b)	(1) (c)
Management Control (2)	(2) (a)	(2) (b)	(2) (c)
Operational Control (3)	(3) (a)	(3) (b)	(3) (c)

(1) "...the process of deciding on objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources..."

(2) "...the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives..."

(3) "...the process of assuring that specific tasks are carried out effectively and efficiently..."

(a) "...carried out by a manager when he searches his environment for conditions that call for a decision..." (Problem finding.)

(b) "...the manager is involved with the creation, development, and assessment of possible courses of action..."

(c) "...the manager selects a course of action..."

1489

The more inclusive the formulation, the greater the data requirements and multiplicity of objectives. On the other hand, a narrowly specified problem may omit important considerations and lead to the evaluation of an incomplete set of alternatives.

From the beginning, the systems analyst searches for a clear statement of the purposes and goals that underlie the problem he is attempting to define and help solve. Such a statement will, when formulated, reflect the experience, knowledge, values, and attitudes of the decision-maker, the systems analyst, and others whose expertise is incorporated. The statement will try to answer the most value-laden and elusive of questions: What are we trying to accomplish? Criteria are measurement scales that allow for a comparison of alternatives in the light of specified objectives. In the development of these measures, systems analysts consider four basic questions:

(i) How are the costs of each alternative to be measured?

(ii) How is the effectiveness of each alternative in reaching the objective to be assured?

(iii) What role does the time dimension play and what is the appropriate planning horizon within to assess costs and effectiveness? And,

(iv) How is the likelihood of implementation of each alternative to be measured?

Evaluation criteria are different from choice criteria, the criteria used by the decision-maker in the choice phase of the decision process to select a course of action. Clearly the two kinds of criteria are interrelated and the systems analyst will contribute to the development of the decision-maker's choice criteria, just as the decision-maker will influence the evaluation criteria used in the analysis. But unless the systems analyst and decision-maker have through their combined efforts succeeded in reducing the selection process to

a completely measurable, automatic routine, the choice remains with the decision-maker and the whole of the systems analysis can only realistically be viewed as an input to the little understood process by which decisions are made.

Given an initial problem specification, a tentative set of objectives and related evaluation criteria, the systems analyst can move to what has been termed the 'creative core of the analysis,' that of generating alternatives. Alternatives are simply means of achieving ends. But when the ends are complex and multiple, the alternatives to be considered are not obvious, and this is the usual case in a systems analysis problem. A fundamental role of the systems analyst here is to enrich the space of alternatives by formulating feasible courses of action not readily apparent to the decision-maker. The process of alternative generation directly confronts the questions: 'What is the problem?' and 'What constitutes a solution?'

The basic activity within a systems analysis that synthesizes the efforts of a problem specification, objectives and criteria development, and alternative generation, is that of model building. The term model is defined as a purposeful representation of something real or imaginary. In a systems analysis, such representations may range in character from the purely quantitative mathematical model to the basically qualitative verbal description. A recent RAND publication includes descriptions of the following models and modeling techniques: decision analysis, simulation, gaming, scenarios, game theory, relevance trees, forecasting, worth-assessment techniques, Delphi techniques, cohort analysis, 'a fortiori' analysis, and network analysis, as well as linear programming and guessing theory. Systems analysts develop models for a variety of purposes: to find and clarify problems, to evaluate proposed courses of action, to increase understanding about the environment within which action is to be taken, to serve as a basis for negotiation in an adversary proceeding, to describe part or all of the manager's decision-making process itself, and in some cases to reduce the choice process to a computer program that replaces the human decision-maker altogether. Descriptions of systems analysis usually emphasize the role of models in evaluating alternatives and in answering 'what if' type questions.

This summary of the methods of systems analysis (drawn from White and others) is intended merely to suggest what happens when a manager and a systems analysis team get together. There's much more to it than the few preceding pages indicate. As to the rationale for all this effort...

"Good analysis leads to better decisions." [5]

Bureau activities

In the broad sense of the term, BHME managers continually engage in "analysis" as a part of normal administrative responsibility--encountering problems, recognizing alternatives, deciding which alternative is best.

As described in the preceding section, systems analysis has seldom, if ever, been practiced in the Bureau. That is, the occasions when a rigorously trained SA team has worked with senior management--to specify a problem, identify objectives, develop evaluation criteria, define alternative courses, formulate a model to predict consequences, collect data, evaluate alternatives--such occasions are hard to find in the Bureau's history.

Reasons are readily cited why this technique has not been used more extensively. "There was insufficient time for the decision." "The decision involved intangible values which could not be translated into quantitative evaluation criteria." "There were so many political inputs that rational analysis was infeasible."

Indeed, there are many management decisions in BHME that do not readily lend themselves to this method. There are others that do.

Some BHME decisions have involved "systematically analytical" procedures. What kind of decisions?

The title of this report represents a deliberate choice: "The Use of Analytical Techniques in the Management of Programs of Health Manpower Education." This phrasing is intended to convey an interest both in management questions and in programmatic questions. Of course, the theoretical distinction between management and program is sometimes blurred in practice. (For example, DHEW's Operational Planning System (OPS) was originally designed for "management reporting"; in the case of health manpower educational reporting at NIH, the system bogged down over strictly a programmatic issue, namely, what should the program objectives

be?) Nonetheless, we can usually distinguish between the two types of activity. In BHME, management problems relate to organization, personnel, physical facilities, processing of correspondence, data systems, etc. Examples of programmatic decision focus on health manpower education and training: curriculum design, licensure, new types of health professions and occupations, location of educational institutions, student aid, etc.

Moreover, some of our decisions cluster around the Bureau as an organization (with management and with programs), while others relate primarily to the educational institution as such (with its academic and business management and its educational-research-service programs).

Accordingly, it is time to introduce our own matrix.

	BHME (B)		Institution (I)	
	Program (P)	Management (M)	Program (P)	Management (M)
Systems Analysis (SA)				
Economic Analysis (EA)				
Statistical Analysis (STA)				
Logical Analysis (LA)				

Like any taxonomy, this classification is arbitrary and somewhat artificial. But if it serves to reduce the instances in which we fail to define the focus of our interest (e.g., "...the application of systems analysis to NIH activities..."), its purpose will be well served. This matrix will be referred to in subsequent discussion (with initials designating cross-references).

1493

To return to our topic (examples of SA-type endeavors), which BHME projects illustrate the approach?

System Justification for DDH. One example of the use of systems analysis techniques is the study conducted in 1968 for the Division of Dental Health. The study related to data requirements, data processing, analytical techniques, and computer technology. Several exemplary reports were produced (among them "Report on the Assessment of Utilizing Computer Technology..." and "System Justification..."). Each report can serve as a prototype of SA-related endeavor in the Bureau. The latter report encompasses: Problem definition, problem resolution, objectives, alternatives, workload, cost, funding, personnel, organization... As a by-product of this analysis, the Division of Dental Health has learned to plan its survey and statistical analytical activity in more effective and efficient ways, taking into account the constraints of budget, data storage and retrieval, etc. (In the matrix shown on page 10, this would be classified as Systems Analysis-BHME-Management). (SA-B-M.)

National Archives and Records Service Survey. Among the antecedent events that led to the establishment of the Division of Manpower Intelligence was this study conducted in 1969-70. It was conducted in an SA-oriented manner, and developed a plan for a Health Manpower Information System. The recommendations included establishment of a center (DMI), development of an institutional profile system, development of a grant, loan, scholarship, and contract processing subsystem, and other proposals. (SA-B-M.)

DERF Data Capture System. The "Total System Description," prepared by the Data Systems Staff of OPPE in July 1970, exemplifies SA techniques. The document was a product of the endeavor initiated by the Director of DERF who, in November 1969, established a study team to design an automated data system that would provide information required for planning, analysis, and reporting. This computer-based system is now applicable to DPHPE and DN Construction Grant Programs.

Reorganization of DDH. The current reorganization of the Division of Dental Health included SA procedures in the planning and implementation stages. A Network Diagram was drafted in February 1971 illustrating the critical path from approval of functional statements to full implementation, scheduled for July 1, 1971. Events are numbered, responsibility assigned, milestones identified. (Activities include: distribution of

1494

projects, determination of budget priorities, assignment of trainees and field staff, revision of fiscal accounting system, preparation of work plans, etc.)

Parenthetically, it should be mentioned that DDH's Work Plan System incorporates much of the philosophy and methodology of the systems analytical approach. It is project-oriented. It clarifies "Division Targets" under the Branch or Office with responsibility (Care Development, Education Development, Manpower Studies, Preventive Practices, Social and Behavioral Analysis, Training, Regional Operations). (SA-B-M and SA-B-P.) The program management planning and reporting process of the Division of Dental Health provides an impressive example of the use of a wide range of analytical tools.

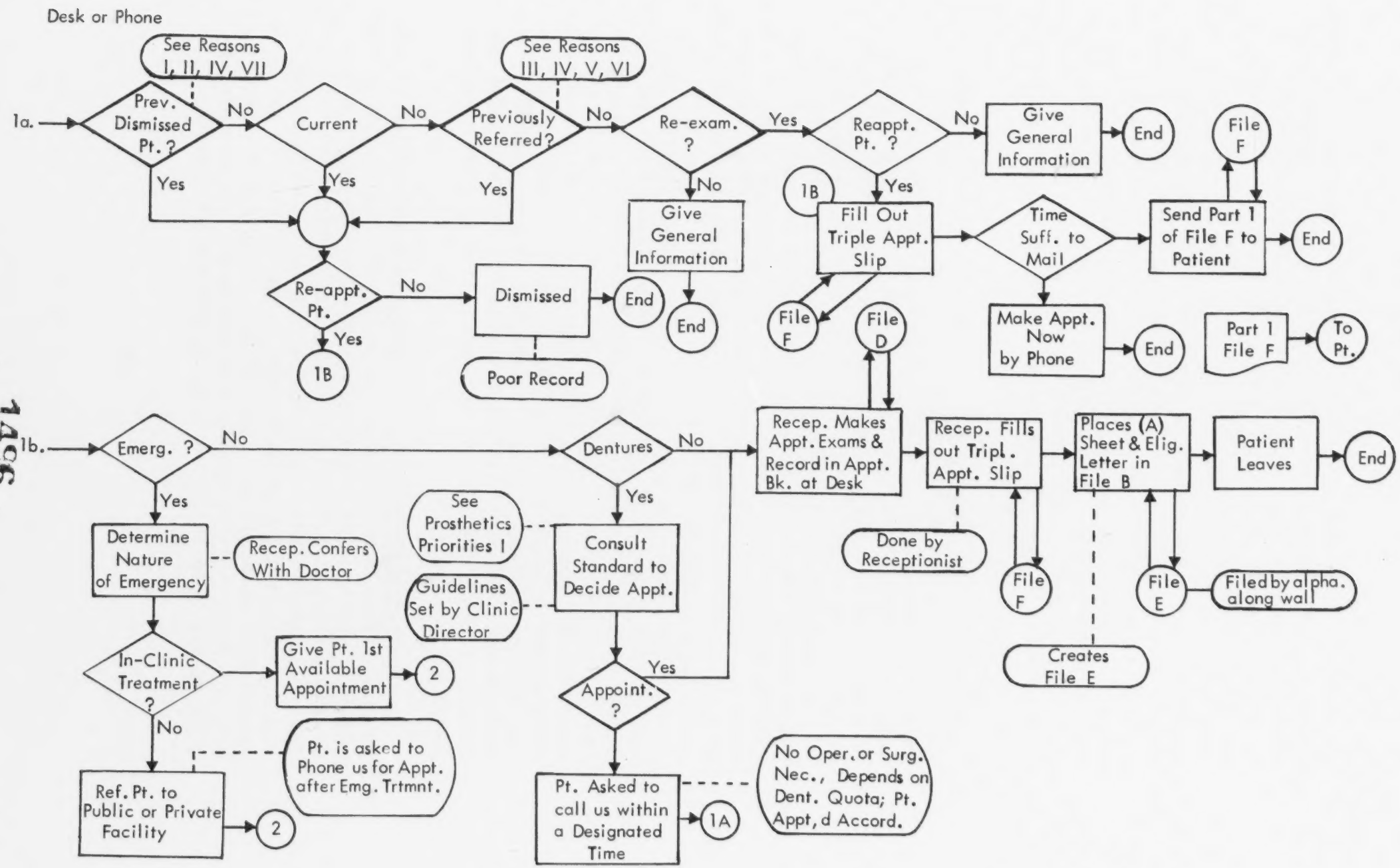
Dental Manpower Development Center conversion to training. Another SA example from the Division of Dental Health is the flow-chart material designed to aid the Louisville Center's transition from a research to training-oriented program. The professional staff at the Center needed to know what to retain, what to change, and at what rate (e.g., a certain amount of clinic work had to continue). The task of describing (in words) the simultaneous activities of four personnel (dentist and assistants) is extremely complex and cumbersome. DDH headquarters staff explained the flow-chart methodology to one professional in Louisville, who in turn taught the method to three assistants. The flow-charts produced (Figure 1) are remarkable in their clarity, depicting what would happen to a patient if he or she were to receive all possible services available, using as many appointments and as much staff time as necessary.

The collection of data for this project has been organized efficiently, with extensive coding to facilitate the interplay of data files. Not only have the data been analyzed to produce two published reports, but a copy of the tape has been provided to the University of Florida. There, students from the dental and engineering schools are conducting research and simulation, which would be infeasible without the flow-charts. (SA-B-P.)

Simulation model of health care demand. This project, contracted for in 1969 with Dr. Donald Yett, University of Southern California, was to develop a computer microsimulation model of the system of health care demand and utilization, and provision of medical services, and the derived demand for and supply of health manpower. The model (described in the Proceedings of the BHME Conference on Microsimulation) is presented

1495

Figure 1 EXAMPLE OF DDH FLOW DIAGRAM



1496

in the form of descriptive texts, charts, equations, and computer programs. The results are described as a "formulation and conceptualization of the model (Figure 2)." Two forms are shown. Mark I represents an "ideal" model. In view of limitations on the feasibility of applying Mark I, a scale-down version, called Mark II, is also formulated. The end product--i.e., the conceptualization--is now available for use in developing the next stages of the model. This should involve the implementation of a first-stage Mark II, during which interval the contractor will select attributes to be used in the model, assemble data to represent sectors of the health care system, develop computer subroutines to simulate the model, and then perform a simulation of the model to express the extent to which it fits actual historical data. (SA-B-P.)

Hospital use simulation. The objective of this contract (1969) with the Research Triangle Institute (Dr. Horvitz) was to develop computer application of submodels of the overall health manpower demand and supply model in hospitals. The computer programs have the capability for projecting demand for several categories of hospital manpower in a given locale, State, Region, or the Nation--the degree of realism dependent only on data availability. The programs permit simulation experiments by varying demand and service factors, and estimate cost effectiveness and benefits which can be attributed to health manpower policies. The models developed in this research can simulate: population generation and projection through time; hospital episodes for the simulated population; the health manpower required in a hospital setting to satisfy the simulated demand. These models are presented as descriptive texts, charts, equations, and computer programs. In addition, estimates were prepared of data representing translation of hospital care procedures into manpower requirements, for five occupational categories. The product of this research consists of techniques for forecasting hospital manpower requirements. As a subsequent step, it has been proposed to use the models for 10-year projections. (SA-B-P.)

Anesthesiology manpower. The Division of Allied Health Manpower financed an SA-oriented study of anesthesiology with special reference to the development of new types of allied health personnel. Emory University (in cooperation with Florida, Case Western Reserve, and Georgia) reviewed anesthesiology from the standpoint of manpower needs; prepared a report on "Anesthesia Task Analysis and Simulation"; investigated the development of physiological monitoring equipment; and proposed a program for "the Master of Medical Science in Anesthesiology."

1497

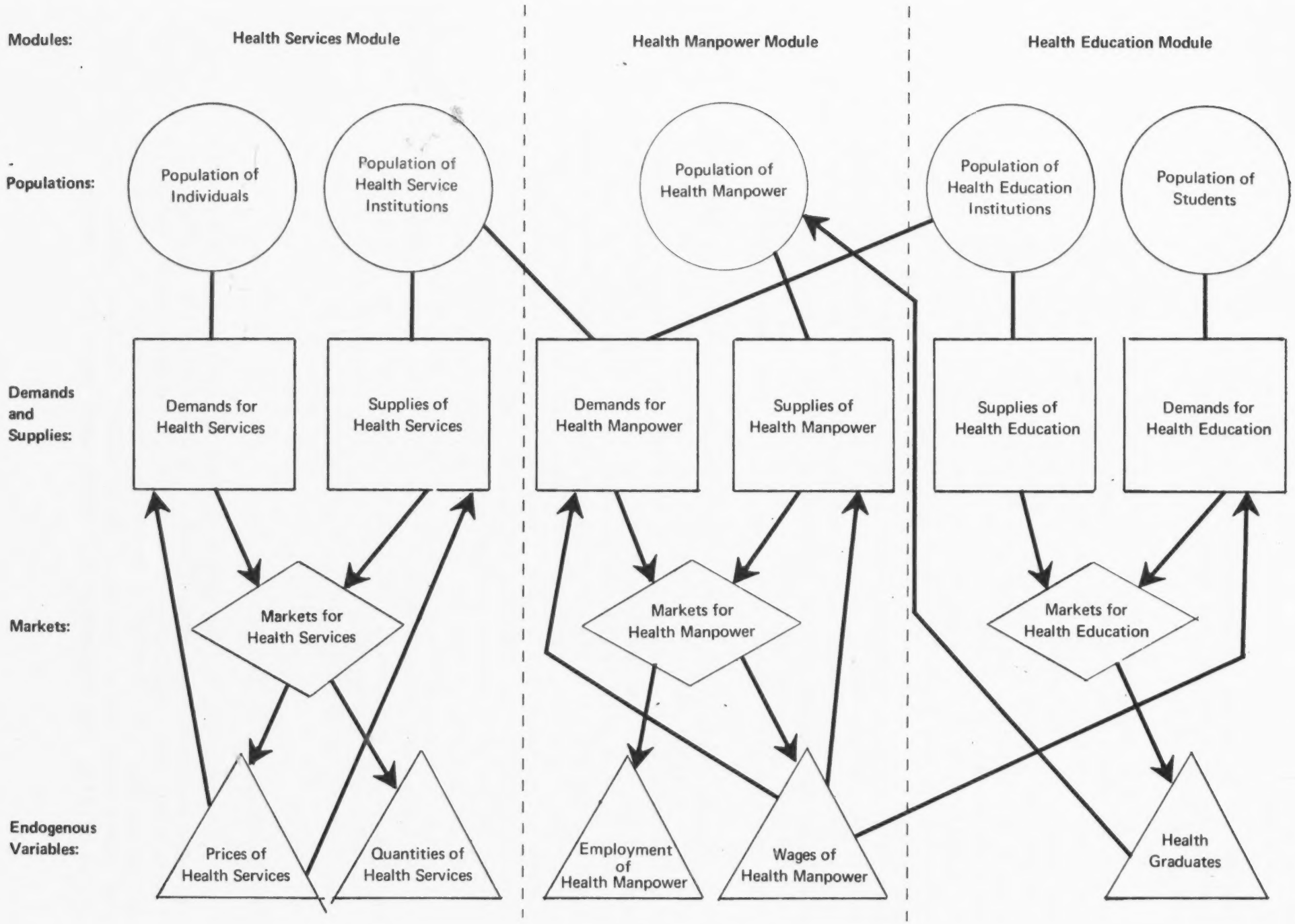


Figure 2

Overview of the Basic Structure of the Micro-Simulation Model

14138

The latter is being implemented at Emory. Dr. John Freeman, trained in engineering and systems analysis, conducted the task analysis. (SA-B-P.)

Practice profiles. This project aimed at developing a system by which the educational needs of practicing physicians could be identified from an analysis of their office practice patterns. On the basis of such profiles, the contractor assigned each physician a preceptor, drawn from the Wisconsin School of Medicine, to coordinate development of a continuing medical education program. "Pre" and "Post" course testing was accomplished by a computer medical test bank. The contract was subsequently expanded to enable participation by 60 Wisconsin physicians. An index of CME activities was developed. Dependency upon varying educational abilities of preceptors was eliminated by the use of a full-time medical education consultant. DPHPE has learned that physicians are not able to identify their own CME needs without such outside educational assistance. Program design, procedures, and computerized test bank material will be disseminated to other regions for CME use. (SA-B-P.)

Nurse utilization. Dr. Eugene Levine, Division of Nursing, directed a study that displays the use of a mathematical model. The Illinois Study Commission on Nursing was charged with developing a plan to match nursing resources to nursing needs in Illinois by 1980. Data were collected in 1967 in 31 hospitals in ten studies, including staffing, nursing needs, patient satisfaction with care, turnover, traffic patterns, etc. The data were subjected to multiple regression analysis (to determine how much of the variation in staffing among the hospitals could be explained by the factors studied), in which a model was developed. Using the technique, one is able to predict NHPD (nursing hours per patient day), which provides a hospital not with a measure of how many personnel it should have, but a baseline NHPD, against which the actual NHPD can be compared as to efficient utilization of personnel. In this study, a significant step was taken toward development of usable models to predict staffing.

Potential applications

Certainly the Bureau has had some valuable experience with systems-analysis type activities. In defining data needs--of the Bureau, DDH, and DERF--this approach to management has been quite useful. The Division of Dental Health plans its programs and administration in terms of SA methods. Perhaps other Divisions utilize the technique for management more than became

apparent in this brief survey. All of the Divisions of BHME are at least acquainted with the procedures: modeling, network diagrams, simulation, etc.

Nonetheless, the staff of the Bureau does not tend to approach problem-solving and decision-making by turning to systems analytical methods. Part of the reason for such reluctance is simply the dearth of trained, experienced analysts among BHME personnel (although expert consultants could be called on more often).

Other governmental and private organizations do use systems analysis much more extensively than the Bureau--or NIH generally--for planning, operations, and assessment. If there is a trend toward more reliance on SA within the Bureau, this trend assuredly should be encouraged.

Some of the current projects of BHME have SA features, and others recently proposed will use systems analytical concepts and methods. DAHM's development of occupational therapy job descriptions and curricula is illustrative. Two projects of the Division of Dental Health (Analysis of Tasks Performed in Dental Practice; Computer Content Analysis of Dental Job Knowledge), both of which extend through 1972, incorporate SA technique. Another example is the Division of Nursing's study of home health agencies to design effective use of nurse manpower and to establish indices to evaluate services.

When the Bureau confronts a particularly complex management problem of large dimensions, as, for example, planning the 5-year expansion of regional offices, or projecting a program of cooperation with the National Medical Audiovisual Center, or planning a VA-DOD-DHEW collaborative effort, the systems analysis approach could probably contribute efficiency and effectiveness. The full-scale, formalized analysis will prove most beneficial, however, to those programmatic problems with such a multiplicity of variables that clear thinking is impeded. The organization, financing, and delivery of health services presents an array of problems that demand a sophisticated planning and analytical technique. Wisely, the Health Services and Mental Health Administration has supported modeling research [6], and will undoubtedly use such analytical tools in program policy formulation and development. Similarly, the modus operandi of health professions educational institutions--their programs and management--challenge NIH to provide conceptual assistance as well as financial aid.

1500

As a matter of fact, the health programs that are likely to emerge as a consequence of the President's program and Congressional action are of such character that close collaboration within the Department of HEW during the 1970's is more imperative than in the past decade. Research, education, and service have become more interdependent. The reimbursement policies of the Social Security Administration have a direct effect on a medical center's capacity to conduct research and education programs. The planning of the education and training of health personnel is related to their utilization. "Shortages" and "maldistribution" are sometimes used as synonymous terms. Health Maintenance Organizations and Area Health Education Centers will share programmatic functions.

Accordingly, the systems analytical approach could well provide the managerial instrument to effect closer coordination among the health programs of this Department.

Of course, the potential role of the Bureau in assisting the development and application of educational modeling will have to be assessed carefully, if only because of the costs of some of these endeavors. Apart from costs, however, projects such as the Undergraduate Education (or JCL3W) Model, designed by the Health Sciences Functional Planning Unit at the University of Toronto, offer tremendous promise as a means of understanding the educational process. Such activity falls into the category of SA-I-P. It may be the most significant aspect of BHME's (or NIH's) future assistance programs for analytical projects.

Richard Wilson and his colleagues described this model in 1969 in the Journal of the Canadian Medical Associations [7]; only a synopsis will be presented here. (For an updated summary of subsequent events, see "Illustrative Applications," page 63 of this report.)

The objective of that analysis was "to assess and demonstrate the resource implications of alternative health sciences educational programs." The JCL3W simulates any undergraduate curriculum, utilizing "activities" (such as lectures, bedside clinics). These activities are described according to type, size of student group involved, and the resources required. The descriptions include:

1. The resources (staff, resident, patient, room...).
2. The department from which each resource comes.
3. The cost center responsible for the resource.
4. A code denoting the relationship between activity and resource.

The activities are combined into sets called curricula. The number of hours per week is stated, and the distribution of students indicated. Such activities generate input requirements, which are recorded on tape, from which they may be arrayed, individually as in totals, in thousands of possible combinations.

What is the rationale for this type of systems analytical approach? Wilson describes it as follows:

> The simulation model has furnished decision-makers with the detailed resource implications of different system parameters, chosen at their discretion, without actually creating the facilities or implementing the programs. In other words, they have rapidly obtained the answers to many "what if" questions relating to specific educational programs. The comparisons of alternative programs generated by the model are available in sufficient detail to illuminate bottlenecks or strains created by any policies or plans which might be considered.

The Faculty of Medicine at Toronto used this model to compare its curriculum with one similar to the Case Western Reserve University School of Medicine. Priority was given to the number of teachers and patients required to meet an increase in undergraduate enrollment and an alteration of curriculum. (These are two of the highest level objectives of BHME.) Some of the results generated by different assumptions (e.g., increases of enrollment from 175 to 250) in terms of patient contacts, hospital beds required, etc., are described in Wilson's paper. The Planning Unit has also analyzed questions about specialty training, such as: What is the minimum number of patients and teaching beds required to implement specialty training programs? Other models have been developed which examine the research requirements relating to alternative policies and the overall costs for the operation of the entire faculty.

The Duke University Medical Center is attempting to apply these models to its problems of medical education. Other institutions (e.g., Vermont) have expressed interest. A question facing the NIH and the Bureau is that of defining our appropriate role in fostering such research, development, and demonstration. The potential, it should be emphasized, is for all health professions, not just medicine. One role that deserves consideration is that of operating or supporting a clearinghouse of projects utilizing SA in management of health professions education programs (SA-I-P or SA-I-M). In the pre-National Health Survey

days, circa 1956, a Clearinghouse of Morbidity Statistical Studies was administered by the Public Health Service. Another potential role is that of providing direct support, by means of contracts or other mechanisms; this presupposes a well organized activity in the Agency monitoring the state of the art (to minimize the chance of duplication, and to avoid waste of funds).

At the NIH conference in February, Dr. Richard W. Judy [8] enumerated examples of the decisions in health science centers to which SA might be applied.

> In education: learning objectives; curricula; admission standards; quality standards; requirements for teachers, clinical material, beds, space; how many learners...
>
> In research: Why undertake it (to achieve specific results, to attract faculty, to provide a learning environment?); mix among programs (biomedical and clinical); how to optimally integrate human and other resources; funding; long-term implications if research support should atrophy...
>
> In patient care: Why undertake it (clinical material for teaching or research; to earn money; to provide primary care to community; to provide specialty care; to develop new models of delivery systems)?

In terms of potential application in health science centers, Judy feels that the investment of $250 thousand in improved management tools in any medical school could "immensely upgrade the quality of management decision-making."

> "My guess is that every dollar invested in management improvement in the next few years will return about ten dollars in terms of better quality of education, research, and service as well as in reduced capital and operating costs." [8]

If the Bureau (or NIH generally) could expand its staff of trained systems analyst personnel and broaden its experience, a worthwhile contribution to health professions education might be made by initiating a technical assistance program. The program could be designed to detail staff to institutions to aid in such projects as curricular revision. As an example of such a contribution, DDH responded this year to a request from the University

of Kentucky's School of Dentistry for the assistance of Miss Nancy Paquin to analyze a problem in scheduling. That school has now graduated several students in less than the full term. The school is developing a "totally free" curriculum that is adaptable to the capacities and interests of individual students. In lieu of traditional "requirements," students will graduate when they have attained specified "abilities." The present "scheduling board" is now so complicated that the communication problems are serious. Miss Paquin, a Systems Analyst in DDH, showed the staff how to translate such scheduling into simplified network analyses. The next problem, however, will be so overwhelming that computer technology will probably be required. That is: How to manage a "totally free" curriculum? Assume not one class each year of, say, 50 students (in lockstep) but, in effect, 50 individual "classes"--all operating at different rates. Just to deploy academic resources will require the collection of masses of data. Technical assistance in handling such problems will have to be found somewhere--in academia, within government circles, or elsewhere.

If there is a direct operations role for NIH here, clearly the SA cadre will have to be expanded, by recruitment, training, and by retraining. At some point, thought should be given to the feasibility and appropriateness of establishing a training program analogous to the Grants Associates Program for science administration.

Questions

1. Q. What is the difference between "systems analysis" and "operations research?" A. Many writers use the terms interchangeably, although, historically, they were applied at different times to different situations. There is more resemblance than difference between the concepts, since both refer to analysis of problems, objectives, constraints, alternatives, etc.

2. Q. Isn't most systems analysis heavily mathematically oriented? A. Alain Enthoven has emphasized that systems analysis is not synonymous with the application of mathematical techniques and that "much of the most important systems analysis work in the Department of Defense does not use them." [9] Likewise, computers are not an essential part of systems analysis.

3. Q. Since systems analysis encompasses problem definition (logic), cost-benefit (economics), data (statistics), among other analytical disciplines, why not group all topics of this report under "systems analysis?" A. It could be done, but the organization was selected principally to emphasize types of analytical activities. Besides, these disciplines have utility independent of any SA-oriented project.

4. Q. Does not the term, "systems analysis" represent only a portion of "systems development"--the total process encompassing "systems planning, analysis, technology, design, modeling economics, implementation, evaluation, management, and long-range planning"? A. Sometimes "SA" is used in this more restrictive sense (e.g., in the Kornbluh-Barnett Associates, Inc., brochure, quoted in Nancy Paquin's paper on SA). [10] We use the term "SA" more broadly.

5. Q. Isn't systematic planning of health programs a waste of time? A. Mary F. Arnold ("Health Program Implementation through PERT") cites this rhetorical question as an example of R. K. Merton's "Self-Fulfilling Prophecy." (1) Specific plans are not made; (2) potential problems are not, therefore, considered; (3) as a consequence, unforeseen changes have to be made in what plans there are; (4) thus, reinforcing the idea that it is a waste of time to make specific plans.

Economic Analysis

The concept

Many textbooks about economics define the subject quite generally as the science of "values," or the study of "resource allocation," or the analysis of "wealth." Paul Samuelson's definition is as follows:

> Economics is the study of how men and society choose, with or without the use of money, to employ scarce productive resources, which could have alternative uses, to produce various commodities over time and distribute them for consumption, now and in the future, among various people and groups in society. [11]

Despite general definitions, most of the material in these textbooks concerns the use of money:

...Income	...Monopoly
...Costs	...Supply
...Fund flow	...Discount
...Price	...Rent
...Capital investment	...Interest
...Stocks and bonds	...Wages
...Payments and dividends	...Productivity
...Demand	...Profits
...The market	...Wealth
...Competition	...Exchange
...Sales	...Banking
...Marginal revenue	

"Economic analysis," as the term is applied to BHME activities in this report, is also interpreted as relating primarily to money matters--especially to such topics as income, costs, fund flow, price, investment, and economic demand.

Economics has been called "the dismal science." Dismal or not, the extension of this type of technical analysis will become more imperative as the Federal role in health manpower education is expanded. With an annual appropriation in excess of half a billion dollars, BHME management ought to be not only more equipped to account for the propriety of expenditures, but to demonstrate the economic utility of public investment in educational programs.

The method

Samuelson's definition has particular application to the mission of the Bureau when viewed in terms of economic perspective. The programs do indeed involve society's "choices." "Scarce productive resources" are at issue, as well as "alternative uses."

Economics draws on sociology, political science, mathematics, probability, logic, statistics. There are basic economic principles and theories, many of them with direct bearing on governmental programs.

The analysis is that of observation or description, and, although its laws are not exact, economics finds patterns of probability with predictable clusters.

The economist is concerned about what commodities should be produced and in what quantities. Thus, for instance, he views health care in relationship to other goods and services; he understands "economic scarcity"; who should produce the services, and with what resources? Who is to benefit from the goods and services? How are these to be distributed?

Economists will be familiar with production, investment, and will be able to apply such laws as "diminishing returns" to health manpower educational programs. An economic analysis will often include input and output factors, as well as take into account economies of scale.

Within the context of a health manpower educational system, a BHME economist will examine examples of "competition"--among institutions, among professional roles, in the specialties, among occupations. For example, the potential of attracting former "medics" from service in the Navy to civilian health jobs is (in terms of economics) examined with particular reference to the salaries offered by competing employment. Price, opportunity, and the market become determinants of behavior--in addition to response to governmental exhortation.

Analysis of monopoly is part of economic methodology. In the education and training of physicians, for instance, only medical schools are producers. Are those schools abroad competitive? Do some U. S. schools compete "unfairly" with others?

The economic role of government in our mixed economy is critical, especially in relationship to existing medical centers. In large measure, the "market" will reflect governmental action.

Accordingly, such potential effects require expert analysis. Capital investment, balance between present consumption and future dividends--all this is highly technical (as well as political), and presupposes technical expertise and informed judgment.

Supply and demand are concepts given particular attention in economic theory and practice. One difference between the statistician's quantification of the supply-demand processes and that of the economist is the latter's attention to "effective" demand (including capacity to pay). The economist will be especially sensitive to such phenomena as market equilibrium between supply and demand.

Although the mechanics of recording and reporting assets and liabilities is the domain of the accountant, a qualified economist would be expected to be familiar with accounting principles. With "profit and loss" so vital to the survival of the academic institutions that are the clientele of BHME, the methods of income and expenditure flow will assume more prominence in the future. "Net worth," "reserves," "intangible assets," and such terms will be a part of this analysis.

Economic inequality and social stratification among the population will be studied by Bureau economists, especially as such differences affect health services and educational opportunity.

Physicians as a group have the highest income rate of any profession or occupation. It is incumbent upon economists to analyze this fact in terms of supply, demand, distribution, utilization, student aid, quality standards, and other factors.

By virtue of training, experience, and knowledge of methodology, the economists of BHME should be the best informed Bureau staff members on such subjects as the growth of government expenditure, revenues, trends in function, geographical analysis of government activity, and the ratio of total economic output devoted to public as contrasted with private goods.

National income and product are familiar indices, including the Net National Product, NNP, (sum of consumption plus net investment plus government expenditure) and the Gross National Product (NNP + depreciation). Inflation, deflation, business cycles ought to be increasingly studied as these factors influence health manpower education.

A Bureau economist should be well informed on alternative fiscal plans for financing BHME (and related) programs--interest subsidy, guaranteed loans, grants, contracts, loans. Each of the instruments designed to provide financial assistance has a range of advantages and disadvantages.

Analysis of costs will be a sine qua non of BHME program management for the foreseeable future: fixed and variable costs, marginal costs, average costs, unit costs, etc.

Bureau economists may wish to spend part of their professional time analyzing the concept of "risk," especially as it pertains to an institution willing to undertake a government-sponsored program, e.g., an accelerated production of health personnel.

"International trade" may not be of overwhelming interest to BHME economists, but the influx of foreign-trained physicians should be--especially as this process affects foreign and domestic economy and health services.

Perhaps this sample of topics (drawn from various textbooks, especially Samuelson's) is sufficient to refresh one's mind on the substance and methods of economic analysis. No economist in the Bureau need be an expert on Keynes, or on the Federal Reserve System, or any other one subject. But all such staff ought to think as economists do about the programs of health manpower education, and their analysis should certainly be built on the most sophisticated econometrics.

Bureau activities

Financial information on dental education. An annual survey of dental educational institutions, sponsored by the Council on Dental Education and the American Association of Dental Schools, was, at one time, partially supported by a DDH contract. One part of the Annual Report concerns financial information. In the 1969-70 publication, returns from 47 schools are classified into categories of total expenditures (e.g., research 11.0%, services and accommodations 20.6%, instruction 68.4%). The data are grouped by enrollment size, type of institution, source of income. There is a table showing the approximate cost of educating a dental student--although the data reflect the usual methodological problems of calculating such costs (dividing total expenditures in each category by the number of predoctoral students). (EA-I-P.)

Medical student financing. The 1970 publication, "How Medical Students Finance Their Education," prepared by Louis Smith and Anna Crocker, although statistical in methodology, provides a good example of attention to economic factors in manpower education. The study showed: that proportionately more students in public (than private) schools are married; that one-fifth of the medical students in 1967 came from families with incomes of $25,000 or more (compared to 2 percent of the population); that one-fifth of the fathers of medical students in 1967 were physicians or other health workers (compared to 1 percent of the population); that medical students come from families at the upper end of the educational scale; that some financial help was given to 65 percent of all medical students by their families; that $13.5 million was borrowed from HPEAA funds; that many students enter medical school with debts that were incurred for college expenses; etc.

Financial status of Basic Improvement Grantees. DAHM is surveying the institutions that have received Allied Health Professions Basic Improvement Grants. The contract will produce data reflecting a picture of the financial status of these educational programs. Information has been collected to show the total cost of the program and the proportion met from Federal funds. Preliminary results show that in 152 public institutions grant support accounts for 17.4 percent of total expenditures. In 54 private institutions grant support accounts for 25.9 percent of total program expenditures. Grant support ranges from 40 percent for X-ray technicians and 37 percent for inhalation therapy technicians to 15 percent for dental hygienists, 10 percent for dietary technicians, and 3 percent for food service technicians. The report, when completed, should offer a bench mark to DAHM staff and review committees in assessing the adequacy of the budget of applicants for Special Project Grants to develop or strengthen educational programs.

Postgraduate education. This project was directed at comparing the cost and the effectiveness for postgraduate medical education purposes of: (1) the lecture-demonstration; (2) the lecture-workshop; (3) the correspondence course; and (4) the programmed-instruction correspondence course. Among the findings: the standard textbook and programmed textbook required less time to affect learning gain on more exhaustive subjects than did either (1) or (2). The most economical methods were: standard textbook, programmed textbook, lecture-workshop, lecture-demonstration. (EA-B-P.)

Brain drain. Irene Butter has been the principal investigator of a research grant intended to analyze the effects of the international migration of physicians. Estimates have been made of the economic value of net losses or gains to each of the affected countries, and of the welfare implications resulting from such physician migration patterns. (Tentative findings were published in the August 1970 issue of the "Journal of Medical Education.") (EA-B-P.)

Market for nurses. Yett, Altman, and Feldstein made the principal contributions to the economic analysis aspects of nursing research in the 1960's, according to Faye Abdellah's review, "Overview of Nursing Research, 1955-1968." In his 1964 study, Yett measured the extent to which hospital nurses responded to changes in salary; he characterized the labor market in terms of turnover rates; ascertained the importance of factors contributing to employment; and appraised the probable consequences of alternative policy measures. Yett's 1968 study calculates the returns on educating nurses and physicians--utilizing capitalized present value and internal rates of return. Among Yett's most recent research is the development of an econometric model of the market for nurses. (EA-B-P.)

Potential applications

Just as systems analysis presents the Bureau with an opportunity to improve the efficacy of management decision-making, the extension of economic analysis offers BHME better understanding of the rationale of Federal programs of health manpower education.

Quite appropriately the Bureau has been increasingly challenged in recent months--by the Department, by the Office of Management and Budget, by such writers as Eli Ginzberg--to justify, in economic terms, the nature and scope of expenditure of public funds for health professions education and training.

Surely, there are no responsible members of the BHME staff who are complacent and thus satisfied to defend traditional programs of the Bureau on the basis of the fact that "Congress enacted the legislation in 1963, 1965, etc." Nor would anyone argue that Federal assistance to increase the supply and distribution of scarce health manpower is a "value-question not amenable to scrutiny by economic criteria." On the contrary, the professional staff of the Bureau is extremely cost-conscious, especially so in the light of the constraints of recent years

on operating funds, as well as a singular awareness of the precarious financial circumstances of the institutions that represent BHME's clientele.

What confronts the Bureau now is not the question of the utility of more sophisticated economic analysis, but how to muster the resources to get on with the job expeditiously and effectively. Formally trained economists are not in abundance among BHME staff.

By far the most concerted effort is being made in the area of institutional cost methodology and data collection. All parties--in and outside of government--recognize how limited are the cost allocation procedures of educational institutions. Yet, without more definitive information, it is virtually impossible to identify the basic causes for "financial distress." Fortunately, the DHEW Committee chaired by Robert Harris is currently examining this issue in detail; however, the cost data--the ultimate indices of institutional program management--are just beginning to be systematically assembled.

DHEW's "7-school study" conducted by the American Association of Medical Colleges was fundamentally a methodological study (although the illustrative data continue to be quoted, inappropriately, as representative).

The Bureau has negotiated contracts with a sample group of institutions (17) to conduct studies designed to produce individual institutional data. The institutions will report costs and income. This will, for the first time, allow an analysis of the various reasons for fiscal imbalances, and some projection of the effects of alternative forms of support.

In addition to contracts with the 17 medical centers, the Bureau has extended an existing contract with the AAMC to: (1) assist 14 additional medical centers to undertake cost-allocation studies; (2) develop, refine, and encourage the use of program cost-allocation techniques as an effective management tool for medical centers--in terms of satisfying their internal cost information needs and the requirements of external funding agencies and private sources; (3) develop normative data on medical center program costs; (4) conduct an in-depth analysis of the origin and interdependence of costs of operating the College of Medicine at the University of Iowa, i.e., an "input-output model," and (5) utilize program cost information to develop a program planning and budgeting system at the University of Florida Medical Center.

The Office of the Bureau Director is not the only component of BHME actively seeking institutional financial data. The Division of Allied Health Manpower, for example, is developing a contract with the Association of Schools of Public Health to analyze expenditures and income of these schools. The proposal calls for the development by the Association of a method that can be applied uniformly to individual schools in order to relate income and expenditures to program objectives.

When one turns to the subject of manpower supply and requirements, it must be conceded that insufficient attention has been paid to economic criteria. The research of Donald Yett, supported in the 1960's by the Division of Nursing did employ economic indices. Such criteria as "budgeted vacancies" (used in the recent hospital manpower survey) are economically defined. There has probably been, however, too strong a reliance on gross population ratios as a means of expressing requirements for health professional personnel. Perhaps it would be better to express the situation this way: Since the mid-1950's, many national manpower commissions have used the population-ratio technique, and it has served its purpose. Now it is time to complement such endeavors with additional methods--economic modeling among them.

This certainly does not mean that BHME analysts ought to abdicate their responsibilities for estimating how many health professionals are needed--simply letting the "market" determine the demand. But it does mean that requirements should be scrutinized in terms of possible surpluses as well as shortages, and trends watched very carefully as they respond to other factors in the economy, including competing professions, the price of professional services, the scope of access to medical care, etc.

Here is another area of great potential for collaboration with the Health Services and Mental Health Administration, namely, to identify the economic indices of manpower resource requirements--distribution, utilization, and the Bureau's derived function, education and training.

The economic implications of the influx of foreign-trained physicians (and any significant trend change) represents still another aspect of the supply-requirement subject.

A third array of potential projects can be characterized as educational "cost-benefit" analysis. What forms might this take in future economic analytical activities? One form is to

use such a criterion to select the most effective and/or efficient institution to carry out the mission of BHME. For instance, the proposed comparative study of various nurse training programs--baccalaureate, associate degree, diploma school--can be conducted with reference to cost-benefit. A simple comparison of past financial assistance to respective institutions and their corresponding outputs or enrollment increases provides the beginning of a cost-benefit study. The method also lends itself to occupational comparisons: How do the costs compare of training a physician, as contrasted with a physician assistant? What are the respective cost-benefit measures for evaluating an innovative curriculum of a medical center, as compared with a traditional curriculum?

As mentioned previously, one index of the efficiency of the various support mechanisms (grant, contract, loan, scholarship, interest subsidy, etc.) is to determine--how much; who pays; the quality of the product; and so forth. Bureau economist talent would be well deployed on this set of problems. For example, if the backlog of construction grant support will cost the Federal government N number of dollars, how much would alternative mechanisms cost? And who will pay?

Cost-benefit analysis has a bearing on the selection of the optimal governmental echelon to administer health professions educational programs, e.g., the State or the National level. Any policy decision about investment-return will likewise involve cost-benefit. For instance, a proponent of student aid for the medical profession should be prepared to justify such support in terms that differentiate the value from the assistance of, say, student nurses, wherein the ultimate remuneration of the profession will be far less than a licensed physician earns.

BHME has studied student assistance. The Smith-Crocker study ("How Medical Students Finance Their Education") will be supplemented by a DMI survey of all health professions, currently in progress. One of the principal reasons for providing student assistance is to assure equal opportunity to economically disadvantaged classes, a policy that is justifiable on several grounds. One such ground is simply the desirability of producing a more heterogeneous group of, for example, medical students. Clearly this goal, as well as the effect of such action, will have many socioeconomic ramifications.

There are many other opportunities for economic analytical projects that could facilitate the administration of educational and health service programs. DMI's current study of the effects

of Medicare and Medicaid on teaching hospitals ought to be illuminating. DAHM has proposed a contract with the Health Manpower Council of California to assess the impact expected from large-scale employment of the heads of households (primarily ex-servicemen) in lower level allied health jobs which traditionally have been held by single or married women with relatively low income requirements. There is need for the development of a major model of the Federal assistance programs directed to health service shortage areas--a topic suggested in President Nixon's Health Message.

Ultimately, we come back to the principal raison d'être for economic analysis and its most significant potential application: program review and justification. The potential is great, but the technically equipped human resources in the Bureau will have to be dramatically augmented.

Questions

1. Q. Do not "cost effectiveness" indices submerge the relevance of human values? A. "The term cost-effectiveness analysis is often misunderstood. It seems to suggest to some people a notion of cost-effectiveness that is somehow to be contrasted to...just plain effectiveness." [9] As Enthoven suggests, it might be better if we speak of effectiveness in relation to cost. "Cost-effectiveness analysis is nothing more than an attempt to identify the alternatives that yield the most effectiveness in relation to the money spent and other costs incurred." [9]

2. Q. What is the principal concept to be emphasized in economic analysis of health manpower supply and demand? A. The influence of the "market," e.g., salary levels, price of health services, competition....

3. Q. Economic policy decisions are made at the highest levels of government (Council of Economic Advisors; Joint Congressional Economic Committee). How can Bureau-level economic analysis expect to be influential? A. In-depth examination (of health manpower education policies) conducted by BHME staff thoroughly familiar with the health professions and knowledgeable about economic factors could have significant impact. Integration of the disciplines associated with health professions education and with economics can provide a new dimension to the caliber of analysis.

Statistical Analysis

The concept

Fortunately, BHME has had broad experience in compiling and interpreting statistical data. With long experience designing surveys, processing information, analyzing and publishing results, the statistical-analytical personnel of the Bureau constitute an excellent foundation for professional activities in this area in the years ahead.

Within the realm of educational and manpower statistics, the role of the BHME statistician relates to the traditional topics of measurement: frequency distributions, graphs, computation standards, measures of central tendency, variability, probability, sampling and reliability, correlation, regression and prediction, etc.

Many of the key questions about Bureau planning, administration, and evaluation are strictly statistical questions, amenable only to statistical inquiry, methodology, and analysis. Among the examples that come to mind:

(1) What are the trends in specialization among graduates of medical schools?

(2) How much is the requirement problem one of supply, as contrasted with distribution or utilization?

(3) Are the numbers of disadvantaged students entering nursing schools increasing? The proportion?

(4) Are the shortages of hospital manpower worsening or diminishing?

(5) How many health professions schools have increased their enrollment?

At least some of these are among our easier questions. That is, they involve statistical description only. But when we need evidence short of a complete enumeration in order to make a generalization (perhaps for policy making purposes), the statistician's life in the Bureau becomes complicated. Many of the

"cause-effect" questions put to our statistical staff are difficult, for example, "What proportion of the increase in student places over the last 5 years is attributable to Bureau grant programs?"

The method

The Bureau's statistical staff reduces masses of information to comprehensible form. The staff counts, measures variations, summarizes, simplifies, tests significance, tabulates, arrays in graphic or tabular form, and interprets. It is a primary responsibility of the statistical staff to see that our program and administrative statistics are collected in a careful and unbiased manner. [12]

The statistician can make enormously useful contributions to program management.

With respect to data collection, the statistician can:

1. Set up sampling programs so that the maximum of useful data can be collected at minimum cost and effort.

2. Design testing programs involving the simultaneous interaction of many different factors, and indicate the way these factors should be varied in order to yield the most information.

3. Reduce or eliminate bias in his data by the way he designs the data-collection programs and by careful testing of the data collected. [1]

With respect to data analysis, the statistician can perform these functions:

1. He will always be able to state the degree of confidence one can have in the answers he produces.

2. He will be able to reduce to any desired level the risk of drawing false conclusions (but only at the cost of collecting more information and of more intensive analysis of that data).

3. He will often be able to predict the probability of each of several possible outcomes for a future event.

4. He will be able to conclude whether a relationship probably exists between two factors or whether an apparent relationship is more probably due simply to chance.

5. He will be able to sort out the relationships among many different factors, all of which bear on the outcome of an event or activity, and to determine both the effect that each individual factor has on the outcome and the combined effect of the interaction of any two, three, or more of the factors.

6. Perhaps most important, he will be able to prevent needless errors in the analysis of data which an untrained person will unwittingly commit. [1]

Bureau activities

The health manpower Source Book series, initiated in the former Division of Public Health Methods in the 1950's is illustrative of the tradition of statistical compilation and analysis that is part of BHME heritage. The Division of Dental Health and the Division of Nursing have for many years conducted highly sophisticated studies of dental and nursing manpower respectively. Other Divisions have contributed to the literature. The Bureau's former Office of Manpower Resources (now incorporated into the Division of Manpower Intelligence) provided excellent analytical achievements.

Experimental program in expanded functions for dental assistants. Two recent papers by Dr. Lotzkar, Dr. Johnson, and Miss Thompson of the DDH staff illustrate the use of statistical methods to advance BHME program objectives (phase 1 base line and phase 2 training; phase 3 experiment with dental teams). There is a review of previous research (Klein, Waterman, PHS, Canadian Dental Corps, United Kingdom, Navy Dental Corps, Abramowitz, Hammons, etc.). The study methodology is described. (All procedures were coded and timed, and selected services were evaluated for quality assessment.) This study demonstrated, statistically, that assistants can be trained according to the expanded-function concept. (STA-B-P.)

Survey and requirements for dentists. The utility of the statistical survey method in identifying specific manpower requirements is demonstrated by two DDH publications: the

"1965 Survey of Dentists Licensed in Texas"; the 1967 "Future Dental Manpower Requirements." The former was a cooperative project of the Texas State Board of Dental Examiners and the American Association of Dental Examiners (under DDH contract). At the request of the Dental School Committee of the Texas Dental Association, DDH prepared the 1967 report to assist in assessing the need for additional dental training facilities in Texas. Regional and metropolitan area analysis demonstrated the need to increase formal training programs. (STA-B-P.)

Fluoridation. Although not focused on manpower per se, the fluoridation studies in 1965 (Horowitz, Law, Pritzker), 1968 (Horowitz, Heifitz, Law, Driscoll), and 1970 (Horowitz) are historic in their programmatic implications. This research incorporates statistical analytical techniques, e.g., comparing mean DMF (decayed, missing, or filled) teeth, by age, before and after fluoridation of school water.

Hospital manpower. The data collected in the DMI study (Losee-Altenderfer) are not strictly comparable to those collected in 1966 for AHA-registered hospitals because of changes in definitions of the various categories. However, the overall results show a 20 percent increase in employment and a 57 percent decrease in vacancies and additional needs for optimum care. For those categories of health personnel which can be compared, the largest increases in employment were for inhalation therapists and aides, cytotechnologist technicians, electrocardiographic technicians, and social work assistants and aides. The results show that, in spite of increases in employment and decreases in needs, there are many categories of health personnel in short supply in hospitals. The vacancy rate for dental hygienists is about 17 percent; for physical therapists, 15 percent; for occupational therapists, 11 percent; and over 5 percent for 15 additional categories. (STA-B-P.)

Journal selection. This project involves at least 20 medical journal editors and 40 consultants from five medical fields in an attempt to develop criteria for the selection of articles most relevant to clinical practice. The project, to be completed by June 1971, depends heavily on a complex survey methodology. The criteria thus developed should be suitable for wide-scale medical journal publication use. (STA-B-P.)

Nursing research. Reprint Series 70/1 (Abdellah) reviews 175 nursing research projects, supported in part by the Division of Nursing between 1955-1968. As expected, many of these projects utilized statistical methodology. The principal

categories of investigation encompassed clinical research; model and theory development; patient care systems; delivery of health services; the nurse role; economic systems; health manpower; communications; and faculty research development grants.

Potential applications

With respect to future statistical analysis in the Bureau, the prospects are encouraging. The Division of Nursing will be producing data as a result of a survey of nursing personnel in AHA (American Hospital Association) hospitals. The Division of Manpower Intelligence has developed a program to measure the distribution of black physicians in the United States. Profiles of educational institutions are being elaborated in DMI. DDH has under way a multivariant study of career development, and has also developed a project of computer-aided instruction in statistics. DAHM is proposing to contract with the Association of Schools of Public Health to survey the utilization, function, and further education of graduates of these schools.

Program (operating) statistics continue to be compiled by the Division of Physician and Health Professions Education, as well as by other divisions of the Bureau. For purposes of the Bureau, DMI's Analysis and Reports Branch (specifically, Miss Altenderfer) has assembled summary and composite tables of program statistics. This branch of DMI is now engaged in preparing a handy graphic and tabular resume of health manpower educational data (similar to NIH's "Basic Data" book, for which DRG provides most of the information). The preparation of such publications as BHME's Program Data book will require the closest coordination, within the Bureau and elsewhere at NIH. To illustrate, financial data from the Bureau's Financial Management Staff will undoubtedly be incorporated, and such information will have to represent BHME's official data.

This matter of organizational coordination of health manpower statistics (although not the subject of this report) deserves some brief additional comment. With DMI now established, the Director of that division, Dr. Lybrand, will soon be addressing his attention to the question of how components of BHME complement each other with respect to data processing, information storage and retrieval, statistical analysis and dissemination. Analogous questions of respective functional responsibilities will have to be clarified with organizations outside BHME. The Health Resource Statistics Division of HSMHA's National Center for Health Statistics compiles and publishes

1521

(but does not analyze) health manpower data. Dr. Rosenberg's Office of Resources Analysis at NIH does analyze manpower and educational data.

Perhaps the most urgent problem relating to coordination is to establish official "release points" for manpower statistics. As an example of the difficulties encountered when such coordination is missing, the following two events recently occurred simultaneously. The Bureau was preparing Congressional testimony which stated that there are shortages of physicians and that there is a distribution problem, while Secretary Richardson was publishing a New York Times article asserting that there are no gross shortages; instead the problem is one of distribution.

As suggested earlier in this discussion of statistical analysis, the Source Book tradition of health manpower data compilation has been most impressive, due mainly to the efforts of such staff as Mrs. Pennell, Mrs. West, Miss Altenderfer, and others. Compilation ought to--and will--continue. BHME is probably the most often quoted authoritative source in the literature with regard to supply data on health manpower. To an increasing degree, however, data collection and description should probably be supplemented by data analysis. By "analysis" we mean not only technical footnotes characterizing the sample, the methodology, the limitations of the data. Such details have always been considered with professional statistical skill. By "analysis" in a broader sense we mean something that will provide even greater linkage between statistics, scientific method, and program management decision-making.

This comment is not intended to imply that data collection has traditionally been of a "Wouldn't it be interesting to know..." variety. On the contrary, such projects have been selective, and often begun in response to requests from outside the Bureau. Nor should the comment be construed as advocating an "axe-grinding" approach to statistics-gathering, which would most certainly jeopardize professional standards. To the degree feasible and appropriate, however, more compilation and analysis ought to have an explicit rationale that is expressed in terms of the key programmatic and managerial problems of BHME, its component divisions, the NIH and the Department. In fact, this rationale should usually include specific hypotheses relating to potential decisions.

In considering future activity using this analytical tool--statistics--the Bureau of Health Manpower Education will want to devote considerable thought to the question of where such analysis

should be conducted. (Perhaps this question would lend itself to a "systems analysis" project.) BHME produces national figures, but also has done considerable examination of state and regional data. Some statistics on county distributions of manpower have been assembled within the Bureau. Question: Should BHME headquarters staff assume the burden for state, county, and local manpower statistical gathering? This topic deserves discussion within the Bureau. The Division of Allied Health Manpower is of the opinion that we are chasing a will-of-the-wisp by initiating state and regional surveys instead of relying on an alternative approach.

The alternative is to assist in the financing of the development--within the states--of program planning, analysis, and evaluation resources. One argument for this approach is that it will probably cost the Federal government no more than conducting (by contract) surveys from Washington. Another argument is that personnel resources in the states tend to be more knowledgeable about the factors that account for distribution patterns of health manpower. There is, for instance, a "shortage" of nurses in the State of Pennsylvania; yet the State exports graduates of nursing schools. This anomaly is attributable to salary level differentials--a factor that might escape analysis from a remote vantage point. But whether it would or not, a well developed capacity at the state level to conduct manpower planning analysis could further national programs. This suggestion of DAHM ties in with other activities, among them:

...The Comprehensive Health Planning programs of DHEW.

...The new authority of the National Center for Health Statistics to reimburse states for preparing data in machine-readable form.

...The increasing number of requests to the Bureau for technical assistance in developing health manpower surveys.

The mention of a potential role for states raises the question of how regional office staffs can increase the scope of their participation in BHME analytical activities. The regional offices may have significant contributions to make to all of the analytical endeavors identified in this report. But in the collection and analysis of manpower statistics for Bureau program planning and evaluation, the potential of regional office

personnel would seem to be of great importance. BHME staff in the regions are closer to and more familiar with manpower programs, Comprehensive Health Planning, and related activities. As the plan for development of regional offices is elaborated and implemented, attention should be given to the role of their professional staff in statistical analysis-program planning.

Questions

1. Q. Have not the Divisions (and the Bureau) for years utilized statistical analysis to further manpower programs? A. Yes--and often quite effectively. For many of BHME's highest priority problems, however, few data have been analyzed.

2. Q. How will this linkage between priority issues and statistical analytical capacity be established? A. An initial step would be for each division (and the Bureau) to sort in rank order its program priority problems.

3. Q. Is there a de facto basis for differentiating responsibility for data analysis at the divisional and Bureau levels respectively? A. Yes. The analytical activities of program divisions (DDH, DAHM, DPHPE, DN) are an aspect of their program planning and evaluation functions. DMI plans to concentrate on inter-divisional data (e.g., institutional statistics), composite arrays (e.g., hospital manpower), statistical standards and methodology, research techniques, inventories of Federal manpower programs, etc.--as these bear on analysis.

Logical Analysis

The concept

Aristotelian, or traditional logic is concerned with the forms of inference, distinguishing valid deduction from fallacious or specious reasoning. Modern, or symbolic logic extends beyond the syllogism into inductive and deductive implication, and into the theory of meaning. Mathematical logic forms the basis for such technological development as computer programming. The notational systems of symbolic logic can be as esoteric as any systems analyst's creation.

Virtually every textbook on modern logic covers not only deduction, induction, argument, validity, form, scientific method, but also devotes significant attention to the uses of language, especially problems of definition.

This latter--terminology--is of particular importance to BHME management of health manpower educational programs. Our decisions are often impeded by inadequate logical-linguistic analysis of such terms as "family practitioner," "returning veteran," "last-dollar support," "disadvantage," "educational research," etc.

The purpose of our analyzing the logic of language is to improve the communication associated with administration of health manpower educational programs. As he arranges the equations of a quantitative model, the systems analyst will be dealing with artificial languages--mathematics or symbolic logic. In discussing problems, objectives, criteria, alternatives, etc., the manager will be discoursing in ordinary language. And the clarity of the terms will be related to the clarity of the ideas.

The method

It is not the purpose of this section of the report to present an abridged course on logical analysis. Some review of the principal topics, however, will help identify how such analysis proceeds.

The subject is discourse, more specifically the statements, questions (real and rhetorical), and exclamations contained in discourse. Logical analysis is concerned with exposition and argument, distinguishing between discourse that merely states,

and discourse that gives reasons. In seeking the point of an argument, the analyst looks for logical indicators (e.g., "therefore," "hence," "thus"). He traces inferences from reasons to conclusions, differentiating between valid and fallacious inference.

There are many aspects of the methodology. One is to dissect, as it were, the anatomy of argument--to trace its structure (convergence, divergence, etc.). Another is to sort and reorder reasons.

The logical analyst is interested in meaning. He looks for semantical ambiguity and syntactical ambiguity.* He is alert to equivocation in language, and to vagueness.

In application to BHME management decisions, logical analysis is used to distinguish terms that denote (refer to a class) from those that designate (list characteristics) and from those that connote (suggest other characteristics). Similes and metaphors are recognized as such, and interpreted accordingly. The use and misuse of analogies is observed. Emotive language--used primarily to arouse feelings rather than convey meaning--is recognized in discourse.

The logician is sensitive to fallacious types of emotional appeals, e.g., identification with the audience, flattery, alarm, appeal to pity, the argument from illegitimate authority, and the ad hominem argument (directed to the man, not the issue). The professional analyst recognizes oversimplification and the technique of deliberate distraction (including equivocation, quibbling, and slanting).

Logical analysis devotes much attention to definition and meaning, especially to the testing of definitions (e.g., rule of substitution, rule of translation). The method searches for question-begging definitions, persuasive definitions, and circular definitions.

The nature of argument is the special domain of the logical analyst. He must be competent to recognize the premises of a deductive argument and the evidence of an inductive argument. He distinguishes between validity and truth, between a generalization and a hypothesis.

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*Example: Shortly after Mrs. Hughes christened the sailboat, she was afloat in Back Creek.

This type of analysis includes examination of logical forms and of the connections between statements ("and," "or" (meaning and/or) "or" (meaning mutual exclusion)). It includes studies of consistency and inconsistency, tautology (a statement that cannot be contradicted without self-contradiction), and redundancy.

Much of management decision starts with a dilemma. It is the task of the logician to recognize the forms of a dilemma and to advise the decision-maker how to "slip between the horns," "take the dilemma by the horns," or "rebut the dilemma."

Sorting and classification are logical procedures. A task of logical analysis is to differentiate arbitrary categories, special-purpose categories, and fundamental categories. [13], [14], [15]

If one had to reduce the substance of logical analysis--as applied to decision-making--to two questions, these two would serve:

"What do you mean?"
"How do you know?"

Bureau activities

Manual on logical flow-charts. In February 1971, the Division of Dental Health, Office of Technical Services, issued a reference manual for definitions and symbology to be used in the preparation of procedural charts, logical flow-charts, and block diagrams. The definitions and symbols are precise (e.g., "procedure," "operation," "method," "input-output symbol," "decision box," etc.). In data-processing, computer programming, and--to an increasing degree--in statistical reporting, rigorously defined terms and standardized symbols are essential. This discipline, borrowed from data-processing and SA-related activities, could be beneficial to the conceptualization of the basic terms and ideas associated with Bureau management and programs. (LA-B-M.)

Role of physical therapist. Under contract with DAHM, the American Public Health Association, with the American Physical Therapy Association in an advisory role, has completed a logical analysis of the functions of physical therapy support personnel. The objective is to improve the educational and certification procedures for associate degree level physical therapy assistants.

1528

Experts reviewed relevant legislation, job descriptions, utilization of personnel, training programs, etc. The report includes a model job description, a summary of required skills, and proposed standards in curriculum. Results indicate that--contrary to the official position of the American Physical Therapy Association--physical therapy assistants can be certified as fully qualified on the basis of experience and examination only. DAHM is now considering how to implement these findings. Implementation obviously presents organizational and political problems. If successful, a nonacademic certification basis for physical therapy assistants will extend career opportunities for allied health manpower who enter this field at the aide level. Such an arrangement would also recognize the qualifications of persons now functioning as physical therapy assistants, the majority of whom have not graduated from such a training program. (LA-B-P.)

Educational program inventory. What types of educational programs can be subsumed under the general title, "Allied Health"? This logical-linguistic inquiry is a part of the DAHM study conducted under contract with the American Association of Junior Colleges, which is preparing an allied health educational program inventory. The Association of Schools of Allied Health Professions is also preparing an inventory of senior college educational programs. Results of both surveys will be published in directories and circulated for the use of health and education planners. It is planned to update these directories so that educational trend data may be developed. The directories will serve as a sampling frame for allied health educational program studies and will provide basic data to assess the impact of Federal support. The logical analysis includes a classification scheme which classifies programs according to their occupational objective (rather than their curriculum content) and assigns standard titles while attempting to recognize only significant variation in objectives or methodology of these programs.

Continuing education. Sixty-three experts in the field of continuing medical education were convened in order to identify, define, and discuss the problems of evaluating CME programs for practicing physicians. The discussions of the concept is reflected in the proceedings of the conference and has been circulated to the medical education community. (LA-B-P.)

Physician's assistant. The diverse meanings of this term have been troublesome to the Bureau in its attempts to formulate program plans. For many months, individual members of

the Bureau staff selected their own preferred definitions:

> "...The nurse is the real assistant to the physician."
>
> "...The range of allied health professions and occupations represents physician extenders."
>
> "...A physician's assistant is a specialized professional category."

The logical disadvantages of such linguistic diversity are soon apparent. Internal communication becomes fuzzy--to say nothing of impressions created outside the Bureau. Accordingly, BHME staff began to provide a more precise conceptualization of the term, and to reduce its vagueness and ambiguity. Relevant contracts and projects were reviewed. An expository paper was written for the Director, NIH, in July 1969 (which was subsequently modified and published by Drs. Kadish and Long in the JAMA, May 1970). The Professional Activities Branch of the Division of Physician Manpower compiled, in June 1969, a list of PA programs in development (published as "Selected Training Programs for Physician Support Personnel," June 1970). The Division of Nursing reviewed its programs of student support, project grants, research projects, contracts (e.g., evaluations of programs to train pediatric nurse practitioners). DAHM examined its Developmental Grants for New Allied Health Professions. Out of all this came much better understanding of the concept, status, issues, and problems associated with developing a national program for training physician support personnel. Although the Department has not clearly assigned program responsibility for PA activities to the respective agencies (nor has there been adequate differentiation of responsibilities within the Bureau), the analytical effort of BHME (including the March 1970 report, "Physician Manpower Extension") did facilitate understanding. The Collins-Bonnyman study ("Physician Assistant, Nurse Associate") drew heavily from BHME analysis. The Ad Hoc Committee on Allied Health Professionals of the American Society of Internal Medicine proposed definitions for three categories of physician support personnel. The AAMC-NAS identified three types of physician's assistants. (LA-B-P.)

Legislative terminology. There are other occasions when the staff of the Bureau scrutinizes terms. Functional statements that define the scope and limits of BHME divisions, branches, and offices tend to be examined with meticulous care--for self-protection among other motives. Perhaps the best examples of precise definitions and scholarly linguistic usage

come from the Office of Legislation when specifications, draft bills, and Congressional testimony is prepared. Legislation (perhaps like computer programming) requires that terms convey clear meaning. The signal-to-noise ratio must be high. (LA-B-[illegible].)

Potential applications

The moral of all this may be the recognition of a need: the investiture--at critical points within the Bureau--of a new breed of technician, the logician-lexicographer.

The need is to develop and expand the Bureau's capacity and resources to analyze questions and terms and concepts rigorously. In the future, it will not be sufficient simply to say, "It depends on what you mean by that." BHME staff will have to do more of its own defining--producing its own stipulative and operational definitions.

Just as it requires well trained experts to do systems analysis professionally, corresponding expertise is essential to provide logical analysis--systematically, competently. There is a real art to producing, for example, definitions that are useful and operational. The analyst must be familiar with all the techniques of "explaining the use of words or signs." He must understand the relativity of definitions; must be able to clearly distinguish between stipulated and reported definitions. He should be able to recite the classical rules of definition--and apply them to the terms that are the foundation of BHME activities.

Several terms conspicuously requiring formal definition were mentioned earlier. There are many others: "primary care," "continuing education," "financially distressed institution," "shortage area," etc. BHME's recent collaborative effort to define an "area health education center" provided a convincing example of the essentiality of definition as a prelude to understanding--especially the comprehension of the purposes of an educational program activity.

If, indeed, systems analytical projects are expanded within the Bureau, the affinity to define will inevitably increase. But whether or not systems analysis occurs more frequently, definitions of new concepts will be needed. And whenever a consensus on a definition is reached, the proposed usage ought to be disseminated promptly--to all parties likely to use the term.

As for the other potential applications of logical analytical techniques, their expanded use is proposed as another means of improving the process of decision-making in the Bureau. Accordingly, all aspects of decision-making (meetings, conferences, discussions, staff papers, memoranda, correspondence--the events of administration) are appropriately planned, conducted, and assessed in terms of the criteria of logic: a clearly stated purpose, precise terms, explicit premises, valid reasoning, definite conclusions.

. . .

As a concluding thought to this brief review of analytical techniques for health manpower education, Richard Judy's words are noteworthy:

> It is unfortunately true that planners and administrators in health science centers are being asked to make decisions with neither management tools nor the management support staffs to allow them to do a good job. ... At present decisions must be made in what is essentially an informational darkness. If public and private contributors of financial support, patients, and students have a right to demand a better return on our investment in health sciences education, then health sciences administrators have a right to expect more understanding of the nature of their management problems and greater support in getting the management tools and staff to help them make better decisions. [8]

With an awareness of the enormous complexity of planning and administering the health programs of the 1970's, one can only add that all persons responsible for the endeavor--within and outside government--need the capacity for better decision-making.

Questions

1. Q. Isn't "logic" another term for "semantics"? A. No. Semantics is the study of meaning, especially verbal meaning. Logic--the study of reasoning--is broader.

2. Q. Since management decision-making involves so many nonrational, emotional elements, what utility is there to an emphasis of logic in this context? A. Logic offers criteria to differentiate the rational from the nonrational. Simply to recognize the latter presupposes the former.

3. Q. What are the most pressing needs for logical definition in BHME program decision-making? A. Defining the problem; specifying the product expected from the endeavor.

4. Q. Illustrate the potential contribution of logic to internal communication. A. Sometimes the frequency (and intensity) of disagreement is reduced. Example: "You have characterized your project as 'modeling' but you don't really have a 'model.'" "Oh yes I do!" Resolution of the disagreement: attempt to find terminological agreement by enumerating meanings. Is it an Iconic Model (a replica, a reproduction, a picture, facsimile, a scale-model)? An Analogic Model (representing an object by another set of properties, such as flow-chart)? A Symbolic Model (with mathematical or logical symbols that can be manipulated for problem-solving)? Other?

5. Q. To define is to impose a static constraint on a dynamic situation. A. Terms like "Area Health Education Center" need not be defined on a once-and-for-all basis. As the concept evolves, the terminology can be modified. What is essential is to attain at least temporary agreement during each phase of discourse.

Summary and Recommendations

This concludes a brief examination of analytical activities within NIH's Bureau of Health Manpower Education. We have reviewed several characteristics of the principles and practice of systems analysis, economics, statistics, and logic. We have at least glanced at some of the Bureau projects that draw on these disciplines, and have suggested potential applications that could facilitate decision-making. Better and faster decision-making.

All such effort can relate to what West Churchman calls "the Systems Approach"--with application to manpower educational planning, analysis, management, evaluation. Perhaps the term "systematic approach" would be preferable to characterize the style of administration being advocated, as contrasted with the alternative modes we all deplore and attempt to avoid (e.g., the frenetic--in response to exigencies; the passive--without creative innovation; the "gastronomical"--capricious and unpredictable). Logic forces precise definition of concepts, terms, objectives, the nature of the problem. Ironically, one of the most neglected of all critical questions is: "What would constitute an answer to the question?" (Not what is the answer, but what type of response would suffice as an appropriate reply.) Economics can provide the measurement-tool for costing out alternatives. Statistics can test our models, our representation of the situation we are endeavoring to understand.

And systems analysis offers the framework, the method. In fact, method is what all this is about. Thus, contemporary writers (like Kaufmann and Churchman), when they discuss operations research, frequently allude to the philosophers who analyzed and demonstrated useful methodology--Platonic dialectics, Descartes' rationalism, the philosophers of science, John Dewey, the Logical Empiricists. As Nietsche expressed it, "The most valuable riches are methods."

The recent history of management science has included classification of action methods (e.g., R. Claude and A. Moles, Methodologie--vers une Science de l'Action, Gauthier Villars, Paris 1964). We use action methods when we manage programs, when we think, create, infer. Here are but a few such methods:

Revising hypotheses. From a criticism of basic hypotheses, we construct a new system; e.g., from the faults of an organization, we construct a more efficient organization.

Dialectic method. A new system of hypotheses emerges from the destruction of the previous system. This requires the intervention of a dissenter.

Renovation method. Here the organization is modified, taking into consideration new facts, without modifying the objective. (Example: introducing punch cards without changing accounting principles.)

Analogical transfer. A phenomenon is examined from the viewpoint of another phenomenon. (Example: the concept of flux in physics applied to traffic flow.)

Phenomenological method. Associated with the philosopher Husserl. It means simply isolating a phenomenon from its background for purposes of study. The discarded connections may be taken into account later. (Example: frame-by-frame analysis of film.)

Teratological method. With this approach we formulate hypotheses beyond the normal limits of rationality, then imagine their effect in the given pattern. In management, we would consider extreme values of certain parameters in order to find a reasonable compromise.

Dichotomy method. Faced with a problem, we ask a series of questions which can be answered by yes or no. This is a classical procedure in mathematics for many demonstrations.

Matrices of discovery method. A rationalized study of the field of possibilities.

Then, there is the most familiar method of all in administration: brainstorming. (Some observers at NIH, preferring to emphasize other anatomical sites, characterize this method as "iron-bottoming.")

This preoccupation with analytical methods is intended to be far more than an intellectual exercise. The motive is strictly pragmatic. Again: How can the systems approach help our decision-making in the Bureau and elsewhere at NIH? The critical-path and network diagrams now being used by the Division of Dental Health can be of great value in such BHME projects as planning-implementing-evaluating the proposed Area Health Education Centers. A few techniques are listed in the Glossary of this report--and not merely for academic reasons. Input-output analysis can help us determine the levels of allied health training necessary under alternative plans for expanding health services. Linear programming is adaptable to projecting first-year places, faculty expansion, facilities construction--in order to attain specific numbers of active physicians. Mathematical logic offers precision to problem-definition. The Monte Carlo technique is basic to our micro-simulation models of health manpower requirements. Queing theory will make explicit the "time" or "waiting" requirements imposed by limited budgets.

Certainly not all of these techniques will help us with tomorrow's problems. But health manpower education, supply, distribution, and utilization will present problems the day after tomorrow's crisis, and in 1975, and in 1980. Long-term planning, in other words, has high relevance.

If further evidence is needed as to the essentiality of BHME's attention to management analysis, the remarkable incidence of planning-reporting systems should provide such evidence. President Johnson's directive in 1965 to all agencies to implement the Planning Programming Budgeting System has not been countermanded, although one hears less and less about PPBS in government circles these days. Congressional interest in management systems surfaces sporadically. A Special Subcommittee on the Utilization of Scientific Manpower--of the Senate Committee on Labor and Public Welfare--conducted a detailed study of systems analysis in 1967. As of this moment, the Department (of HEW) is: (1) requiring reporting under the Operational Planning System (OPS), (2) requiring reporting on Program Evaluation projects, (3) contemplating the introduction of a Health Planning and Management System for DHEW. NIH is also designing its planning-reporting system.

Meanwhile, other government agencies--apart from any reporting requirements imposed by higher echelons--are turning to more sophisticated analytical techniques in order to plan and administer their programs more responsibly. The Department of Labor's

conference on "Cost-Benefit Analysis of Manpower Policies" is illustrative. As mentioned earlier, the Health Services and Mental Health Administration is making significant effort to use simulation techniques to accomplish its mission. However brash it may sound to a traditionalist-administrator, industrial and governmental management will probably be revolutionized by the systems approach within this decade, just as the computer profoundly revolutionized organizational management in the 1960's.

If there has been too much of a didactic and hortatory tone in this report, it is perhaps excusable. First, there is the feeling that not everyone understands what the systems approach means. During the course of one interview in connection with this report, someone said: "Modeling? Computers? God help us!" (An apparent preference for the supernatural over the technological.) The myths about and the misunderstanding of systems analysis are formidable. And so the didactic becomes hortatory: to explain, to defend, to persuade. Secondly, if there are blatant instances of exhortation in the preceding pages, they probably reflect a felt urgency to go beyond our "conventional wisdom." Most of us have been concerned about the serious need in our society for physicians, dentists, nurses, physician assistants. To an economist like Donald Yett, a "labor shortage does not generally mean that additional manpower is 'needed' to satisfy a certain public policy goal. Simply described, an economic shortage exists when the amount of something demanded by the public exceeds the amount supplied at the existing market price." The economic criterion is another dimension which the Bureau ought to take into account more often.

Are there problems associated with an endeavor to expand the systems approach in BHME? The question is transparently rhetorical. One of the most troublesome aspects will be the need for all parties to learn new terminology. The systems analyst will report for duty armed with equations:

$$\int_0^T [R_i(t)-O_i(t)-C_i(t)]e^{-rt}dt = 0$$

The economist will want to discuss allocative efficiency, sub-optimal amounts, shadow prices, and monetized costs. The statistician will prefer to discourse on confidence limits, linear regression, and correlation.

The manager? This harassed soul, meanwhile, is plaintively seeking a prompt, sensible solution to the mounting backlog of construction grant applications!

Thus, this team--manager, economist, systems analyst, statistician, logician--will have to learn how to communicate easily and work together. That will take practice.

A report, such as this one, is just that--a collection of pages. An event. If it is not followed by action, the event is of historical significance only, the product destined for the local archives.

The following recommendations are merely part of this document. They are quite general. They are recorded so that we might think further about the subject and, hopefully, take some useful action. After all, as Churchman remarked: "The systems approach is not a bad idea."

Analytical activities in general

RECOMMENDATION ONE. *To provide the essential program-management information for improved decision-making in BHME, analytical resources should be markedly expanded, especially the capacity for economic and systems analysis.*

RECOMMENDATION TWO. *All four program divisions (DPHPE, DDH, DAHM, DN) should be staffed with analytical talent as resources for their respective program planning and evaluation responsibilities.*

RECOMMENDATION THREE. *The Division of Manpower Intelligence should coordinate analytical activities within the Bureau, including maintaining a current inventory of systems analysis projects germane to health manpower education and training.*

Systems analysis

RECOMMENDATION FOUR. *Whenever feasible, the Bureau should formulate its major program-management problems in a systems analysis mode, and should utilize the technique in the decision-making process.*

RECOMMENDATION FIVE. *Judicious selection of projects should be made for SA studies. The projects should be discrete, nontrivial, manageable, and adaptable to systems analysis techniques.*

RECOMMENDATION SIX. *In order to utilize SA teams effectively in BHME program administration, management should invite early and frequent participation by the team in the decision-making process.*

RECOMMENDATION SEVEN. *All BHME Divisions will have to emphasize the recruitment, training, and retraining of SA personnel. DMI should provide coordinative leadership, including early scheduling of an orientation-training program for BHME staff.*

RECOMMENDATION EIGHT. *To minimize the likelihood of duplication and optimize fruitful exchange of SA-activity information, close liaison should be maintained with other components of NIH, HSMHA, and other programs of DHEW--many of which are conducting or supporting SA projects.*

RECOMMENDATION NINE. *A Bureau Committee, under the auspices of DMI, should be established to develop criteria for selecting SA projects for contract support. Consultants should be utilized.*

RECOMMENDATION TEN. *In conjunction with other components of NIH (e.g., the Office of the Director, NIH; the Division of Computer Research and Technology), BHME should give highest-priority attention to the use of models of medical sciences centers (e.g., the Toronto models).*

Economic analysis

RECOMMENDATION ELEVEN. *The expansion of program cost allocation studies should signal the beginning of a major effort to characterize BHME programs in econometric terms. A five-year plan for economic analysis should be developed.*

RECOMMENDATION TWELVE. *In collaboration with HSMHA, an intensive study of health manpower requirements should be developed on the basis of economic indices--covering distribution, utilization, education, and training.*

RECOMMENDATION THIRTEEN. *Close liaison should be established with organizations (such as OMB) that advocate an economically oriented justification of Federal health manpower programs.*

Statistical analysis

RECOMMENDATION FOURTEEN. *With particular reference to analytical endeavors, DMI should conduct a study to differentiate the respective statistical responsibilities of DMI-BHME-Program Divisions-other agencies (e.g., the National Center for Health Statistics, the Center for Health Services Research and Development).*

RECOMMENDATION FIFTEEN. *Data compilation should continue (e.g., the Source Book type of quantitative description), but should be supplemented by more in-depth analysis, especially that bearing on the highest priority programmatic decisions of the Bureau.*

RECOMMENDATION SIXTEEN. *The proposal to develop a program of State health manpower planning and evaluation agencies should be discussed with HSMHA officials and deliberated with the Bureau.*

Logical analysis

RECOMMENDATION SEVENTEEN. *As an initial step in the development of plans for Bureau programs, the basic conceptual terms should be rigorously defined--except in those rare cases where it would be unwise to prematurely foreclose a concept (e.g., "expanded function auxiliary" leaves open whether dental hygienist, dental assistant, etc.).*

RECOMMENDATION EIGHTEEN. *Each Division should include among its staff one or more experts in logical-linguistic terminology. (Such personnel may be members of the SA cadre.)*

RECOMMENDATION NINETEEN. *In addition to assembling "reported" definitions, BHME should develop more "stipulative" definitions for program operations (e.g., "By the term, 'physician's assistant' we mean...").*

Glossary [1]

Game Theory	A means of determining, in certain situations of conflict, that strategy which is most likely to achieve the highest payoff.
Input-output Analysis	An analytical method of determining the change in the direct and indirect requirements for goods and services which will result from a change in demand for other related products.
Linear Programming	An analytical method of finding, from a large number of feasible combinations, the optimum combination of several limited resources to achieve a given objective.
Mathematical or Symbolic Logic	A method of logical reasoning in formal mathematical terms. As a language of reasoning, it has a great advantage over verbal language in that it is designed to be rigorously free of contradiction and ambiguity.
Monte Carlo Technique	A form of simulation that provides experimental, as contrasted to theoretical, answers to problems involving the complex interaction of many random events.
Queing Theory	A means of predicting the probable length and delay of a "waiting line" formed by random arrivals at a servicing or processing facility of limited capacity. It is used in problems in which one or more elements occur at a rate that management can neither control nor even predict precisely.
Systems Analysis	A major objective in the use of mathematical analysis is the application of its many techniques to the overall problems of management. Such application of analytic tools to broad technical and organizational systems has come to be termed "systems analysis."

Illustrative Applications of Systems Analysis

[Excerpted from reference 8.]

Research on systems models for university management began in the mid-1960's. By early 1971, such models had been implemented in several dozen institutions.

The first attempt was at the University of Toronto with the CAMPUS system. The second was the Cost Simulation Model (CSM) at the University of California.

The early CAMPUS research produced several lines of descent. The first: Toronto's Institute for the Quantitative Analysis of Social and Economic Policy. The second: the work of the Systems Research Group at Toronto. CONNECT/CAMPUS was developed, a modeling and information system now operating in more than a score of institutions.

CSM was the prototype for RRPM-1 developed by WICHE (Western Interstate Commission for Higher Education).

CAMPUS can calculate estimates of the costs of various modes and formats of operation. The model can also calculate estimated revenue. If budgets are expanding, the model can help assess the economics of enlarged ventures. The model can also show the implications of retrenchments. It highlights the relative sensitivity of cost variables and has program costing capability. CAMPUS can also simulate the economics of the educational mission for 10 years into the future. Institutions conduct cost studies, analyses of attrition, enrollment projecting, etc. CAMPUS provides a laboratory for studying an institution within the full context.

The RRPM system is a long-range planning model. The system provides a mathematical conversion of program activity to resource requirements. RRPM-1 draws information from a data base, including enrollment forecasts, student preference, staff and facility loading factors, salary, and other cost schedules. The RRPM-1 system computes resource predictions in terms of personnel, facilities, and dollars. In October 1970, eight institutions began the pilot test of RRPM-1. By April 1971, WICHE was scheduled to complete development of the system.

A third line of CAMPUS descent proceeds through the health science models at Toronto. The Undergraduate Model (UGEDUC)

was designed to calculate teaching loads, patient exposure, space, facilities.... Output is in terms of resource contact hours per week. The Specialty Training Model (TRANEE) computes the number of patients and the faculty consultation required to provide clinical experience. The Patient Generation Model (PRIMER) takes information on the profile of patients arriving at the teaching hospitals and assesses the financial and educational implications. The Resources and Funding Model (CIRCUS-CHIEFF) receives input from UGEDUC, TRANEE, and PRIMER and estimates the staff, facilities, and funds required to support programs, and the revenue derived from educational sources, health care fees, and research sponsoring organizations.

A new implementation of CAMPUS health science models has begun at Duke University Medical Center. It will involve the redesign of the Toronto models.

A health model is being marketed by KMB Associates. The Medical Facilities Planning Group at Stanford has produced a report on modeling. Case Western Reserve and Queens University schools of medicine have used documentation from Toronto's HSFPU.

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1548

VT 013 810
OREGON STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION UNDER THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. FISCAL YEAR 1971, PARTS I-III.

OREGON STATE BOARD OF EDUCATION, SALEM.
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PUB DATE - 71 293P.

DESCRIPTORS - *VOCATIONAL EDUCATION; *PROGRAM PLANNING; PROGRAM DEVELOPMENT; *STATE PROGRAMS; INTERAGENCY COOPERATION; MANPOWER DEVELOPMENT; *EDUCATIONAL NEEDS; *PROGRAM ADMINISTRATION; PROGRAM EVALUATION; EDUCATIONAL OBJECTIVES; EMPLOYMENT OPPORTUNITIES; WORK STUDY PROGRAMS; DISADVANTAGED GROUPS; RESEARCH PROJECTS; MANPOWER NEEDS
IDENTIFIERS - OREGON; VOCATIONAL EDUCATION AMENDMENTS OF 1968

ABSTRACT - THE STATE PLAN FOR VOCATIONAL EDUCATION IN OREGON, 1970-71, IS DESIGNED TO PROVIDE NEW DIRECTIONS FOR VOCATIONAL EDUCATION. THE PLAN ENCOMPASSES THE STANDARDS AND REQUIREMENTS ESTABLISHED IN THE NEW VOCATIONAL EDUCATION ACT AND RECOGNIZES THE NEED FOR THE ORDERLY DEVELOPMENT OF STATEWIDE PLANNING AND COOPERATION AMONG SCHOOLS, BUSINESS, LABOR, INDUSTRY, AND OTHER AGENCIES INVOLVED WITH MANPOWER DEVELOPMENT AND TRAINING. PART I OF THE PLAN DEALS WITH ADMINISTRATIVE PROVISIONS AND TREATS TOPICS SUCH AS FISCAL CONTROL AND FUND ACCOUNTING PROCEDURES, THE STATE BOARD, AND PROGRAM EVALUATION. PART II IS DEVOTED TO LONG-RANGE PROGRAM PLAN PROVISIONS AND DISCUSSES MANPOWER NEEDS AND JOB OPPORTUNITIES, AVAILABILITY OF VOCATIONAL EDUCATION, CAREER EDUCATION OBJECTIVES, AND VOCATIONAL EDUCATION PROGRAM NEEDS. THE ANNUAL PROGRAM PLAN PROVISIONS ARE INCORPORATED INTO PART III. MAJOR SECTIONS OF THIS PART INCLUDE DISADVANTAGED PERSONS, STATE RESEARCH AND TRAINING IN VOCATIONAL EDUCATION, EXEMPLARY PROGRAMS AND PROJECTS, AND WORK-STUDY PROGRAMS. (JS)

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OREGON STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION

under the
Vocational Education Amendments
of 1968

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STATE PLAN FOR THE ADMINISTRATION OF VOCATIONAL EDUCATION UNDER THE VOCATIONAL EDUCATION AMENDMENTS OF 1968

FISCAL YEAR 1971

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Part II Long-Range Program Plan Provisions

Part III Annual Program Plan Provisions

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INTRODUCTION

The programs of vocational education have long been served by a partnership between federal government, states, and local communities. Federal Vocational Education Acts and subsequent financial assistance have provided incentives to states and local educational agencies to plan, develop, and maintain appropriate programs of occupational preparation for both youth and adults.

With this long and honorable history, there has never been a time in our country when there needs to be more clear-headed thinking about the direction of education generally, and, specifically, vocational education. The State Plan for Vocational Education in Oregon for 1970-71 is designed to provide new directions for vocational education in Oregon. This plan encompasses the standards and requirements established in the new Vocational Education Act and recognizes the need for the orderly development of statewide planning and cooperation among schools, business, labor, industry, and other agencies involved with manpower development and training. There is probably no more exciting nor hopeful program on the educational scene than the plan as outlined in this proposal.

It is the aim of this plan to provide some new directions for vocational education, and hopefully, provide some basis for considering modification in other aspects of education.

Dale Parnell
Superintendent
Public Instruction

TABLE OF CONTENTS

Section		Page
PART I		
1.0	General	1
1.1	State Board	1
1.2	Public Hearings and Information	5
1.3	Minimum Qualifications of Personnel	8
1.4	Professional Improvement	16
1.5	Program Evaluation	19
1.6	State Reports	22
1.7	Cooperative Arrangements	22
1.8	Vocational Education Under Contract	23
1.9	Construction Requirements	25
1.10A	Effective Use of Results of Programs and Experience	26
1.10B	Opportunity for Hearing on Local Application	27
1.10C	Economically Depressed Areas or High Unemployment Areas	28
1.10D	Areas of High Youth Unemployment and Dropouts	28
2.0	Fiscal Control and Fund Accounting Procedures	31
2.1	Custody of Federal Funds	31
2.2	Expenditure of Federal Funds	31
2.3	Allotment Availability	31
2.4	Fiscal Records	33
2.5	Audits	33
3.0	State Vocational Education Programs	35
3.1	Allocation of Funds to Part B Purposes	35
3.2	Allocation of Funds to Local Educational Agencies for Programs, Services, and Activities	44
4.0	Vocational Education Programs for the Disadvantaged	71
4.1	Required Allocation of Funds to Certain Areas	71
4.2	Participation of Students in Nonprofit Private Schools	71
4.3	Noncommingling of Funds	73

Section | Page

Part I (cont'd)

5.0 Vocational Education Research and Personnel Training 75
- 5.1 State Research Coordinating Unit 75
- 5.2 Application Procedures 76
- 5.3 Notification to the Commissioner 79

6.0 Exemplary Programs and Projects. 81
- 6.1 Application Procedures 81
- 6.2 Program or Project Requirements. 83

7.0 Residential Vocational Education Schools 85
- 7.1 Procedures for Establishing Residential Facilities . . . 85
- 7.2 Requirements 88
- 7.3 Notification to Commissioner 89

8.0 Consumer and Homemaking Education. 91
- 8.1 Establishing and Operating Programs. 91
- 8.2 Required Content of Program. 93
- 8.3 Ancillary Services and Activities. 94

9.0 Cooperative Vocational Education Programs. 97
- 9.1 Procedures for Approval of Cooperative Vocational Education Programs 97
- 9.2 Requirements of Cooperative Vocational Education Programs 98
- 9.3 Ancillary Services and Activities. 103

10.0 Work-Study Programs for Vocational Education Students. 105
- 10.1 Procedures for Approval of Work-Study Programs 105
- 10.2 Requirements of Work-Study Programs. 106
- 10.3 Funds for State Plan Development and Administration. . . 108

APPENDICES

Legal Appendix — Page

Authority of State. 113

Certification of State Plan 113

Certificate of Attorney General: State Plan. 115

Certificate of Governor's Advisory Council for Vocational Education . 116

Authority of State Board and State Officials. 117

State Laws and Regulations Regarding Expenditures 117

Agreement of Cooperative Arrangement Between Oregon Board of Education and State Department of Employment 119

Certificate of Public Hearings and Public Notification. 123

Memorandum of Understanding 125

Cooperative Agreement Between Oregon Board of Education and Department of Vocational Rehabilitation 127

Executive Order No. 01-070-04: Governor's Manpower Coordinating Committee. 129

Executive Order No. 01-070-05: Governor's Advisory Council for Vocational Education. 133

Appendix, Other

Oregon Rules for Certification of Public School Teachers, Education Specialists and Administrators. 137

Occupational Clusters and Oregon Employment 155

Local Program, Long-Range Plan - for Vocational Education 157

Application for Regular Vocational Education Programs 169

Application for Special Purpose Programs. 175

Sample Research Coordinating Unit Structure 187

An Administrative Flow-Chart for Processing Research and Development Proposals 188

TABLE OF CONTENTS

Section		Page
PART II		
1.0	Manpower Needs and Job Opportunities	189
	1.1 Summary of Labor Demand and Labor Supply	189
	1.2 Sources and Recency of Data in Table 1 page 190	189
2.0	Analysis of Availability of Vocational Education	191
	2.1 Location of Areas with Particular Needs	191
	2.2 Location of Vocational Education Programs	191
3.0	State's Population Relating to Vocational Education Needs	215
	3.1 Population Characteristics	215
4.0	Vocational Education Program Needs	221
	4.1 Vocational Education Needs Which Will Receive Priority in Terms of the Disadvantaged and Handicapped	221
	4.2 Depressed Areas--Areas with High Rates of Unemployment	222
	4.3 Program Emphasis--New Careers and Public Service Occupations	222
	4.4 Summary of Oregon's Vocational Education Needs	223
5.0	Career Education Objectives	227
	5.1 Secondary Objectives	230
	5.2 Post-Secondary Objectives	230
	5.3 Adult Objectives	231
	5.4 Disadvantaged Objectives	231
	5.5 Handicapped	232
	5.6 Special Programs	234
6.0	Analysis of Oregon's Vocational Education Programs	237

TABLES

Table

PART II — Page

1 Employment Opportunities Related to Vocational Education Programs (Labor Demand and Supply Summary) 190

2 Analysis of State's Population Relating to Vocational Education Needs. 216

2a Population Characteristics and Vocational Education Needs. . . 217

2b Population of State. 219

2c Civilian Work Force, 1967. 220

3 Vocational Education Enrollment. 238

3a Occupational Cluster Enrollment. 239

4 Schools Offering Vocational Education. 241

5 Construction Projects. 241

6 Number of Teachers in Vocational Education Programs. 242

7 Teacher Training Enrollment. 243

8 Estimates of Funds Needed for Vocational Education 244

CHARTS

Chart

1 Oregon Districts Designated as Areas For The Planning and Development of Vocational Training Programs. 193

1a State of Oregon Districts. 195

1b Oregon Employment, Selected Categories 197

1c 1966-69 Employment Trends for Economically Depressed Areas With High Rates of General Unemployment in Oregon. 198

1d Areas With High Youth Unemployment 201

1e Reported Dropouts By County As A Percentage Of Average Daily Membership, Grades 9-12 For School Years 1968-69 And Previous 2 Years, Counties Designated As High Dropouts And Persistent High Dropouts in Most Recent Year Reported 203

1f Areas With Greatest Population Density In Oregon 205

1g Secondary Schools With 5 or More Occupational Fields Offered . 207

1h Community Colleges With 5 or More Occupational Fields Offered. 210

1i Number of Secondary and Community College School Districts Having Vocational Education Programs in Oregon 212

1j Secondary School and Community College Districts With Five or More Occupational Fields Offered 1969-70. 213

TABLE OF CONTENTS

Section		Page
PART III		
1.0	General	245
1.1	Summary of Allocation of Funds	245
1.2	Transfer of Allotments	245
1.3	Other Vocational Education Programs	245
2.0	State Vocational Education Programs	251
2.1	Instructional Programs	251
2.2	Guidance and Counseling Programs	259
2.3	Construction of Area Vocational Education Schools	259
2.4	Ancillary Services and Activities	260
3.0	Disadvantaged Persons	267
4.0	State Research and Training in Vocational Education	269
4.1	Research and Coordination Units	269
4.2	Grants and Contracts	269
5.0	Exemplary Programs and Projects	271
5.1	Planning	271
5.2	Establishment, Operation, and Evaluation	271
6.0-6.3	Residential Schools	273
7.0	Consumer and Homemaking Programs	275
7.1	Instruction	275
7.2	Ancillary Services	278
8.0	Cooperative Vocational Education Programs	281
8.1	Instruction	282
8.2	Ancillary Services and Activities	282
9.0-9.2	Work Study Programs	285

TABLES

Table

PART III — Page

1 Estimated Allocation of Funds for State Vocational Education Programs 287

2 Instructional Programs Planned Which Are Continuing or Expanding in FY 71 289

3 New Instructional Programs Planned in FY 71. 295

4 Summary of Instructional Programs Planned. 298

5 Construction Projects on Which Construction Will Start in Coming Year. 301

CHARTS

Chart

PART III

1 Federally Assisted Manpower Programs in Operation FY 71. . . . 247

2 Staffing Pattern 303

3 Staff Directory. 304

TABLE OF CONTENTS

Section		Page
PART I		
1.0	General	1
1.1	State Board	1
1.2	Public Hearings and Information	5
1.3	Minimum Qualifications of Personnel	8
1.4	Professional Improvement	16
1.5	Program Evaluation	19
1.6	State Reports	22
1.7	Cooperative Arrangements	22
1.8	Vocational Education Under Contract	23
1.9	Construction Requirements	25
1.10A	Effective Use of Results of Programs and Experience	26
1.10B	Opportunity for Hearing on Local Application	27
1.10C	Economically Depressed Areas or High Unemployment Areas	28
1.10D	Areas of High Youth Unemployment and Dropouts	28
2.0	Fiscal Control and Fund Accounting Procedures	31
2.1	Custody of Federal Funds	31
2.2	Expenditure of Federal Funds	31
2.3	Allotment Availability	31
2.4	Fiscal Records	33
2.5	Audits	33
3.0	State Vocational Education Programs	35
3.1	Allocation of Funds to Part B Purposes	35
3.2	Allocation of Funds to Local Educational Agencies for Programs, Services, and Activities	44
4.0	Vocational Education Programs for the Disadvantaged	71
4.1	Required Allocation of Funds to Certain Areas	71
4.2	Participation of Students in Nonprofit Private Schools	71
4.3	Noncommingling of Funds	73

Section | Page

Part I (cont'd)

5.0 Vocational Education Research and Personnel Training 75
- 5.1 State Research Coordinating Unit 75
- 5.2 Application Procedures 76
- 5.3 Notification to the Commissioner 79

6.0 Exemplary Programs and Projects. 81
- 6.1 Application Procedures 81
- 6.2 Program or Project Requirements. 83

7.0 Residential Vocational Education Schools 85
- 7.1 Procedures for Establishing Residential Facilities . . . 85
- 7.2 Requirements 88
- 7.3 Notification to Commissioner 89

8.0 Consumer and Homemaking Education. 91
- 8.1 Establishing and Operating Programs. 91
- 8.2 Required Content of Program. 93
- 8.3 Ancillary Services and Activities. 94

9.0 Cooperative Vocational Education Programs. 97
- 9.1 Procedures for Approval of Cooperative Vocational Education Programs 97
- 9.2 Requirements of Cooperative Vocational Education Programs 98
- 9.3 Ancillary Services and Activities. 103

10.0 Work-Study Programs for Vocational Education Students. 105
- 10.1 Procedures for Approval of Work-Study Programs 105
- 10.2 Requirements of Work-Study Programs. 106
- 10.3 Funds for State Plan Development and Administration. . . 108

APPENDICES

Legal Appendix — Page

Authority of State. 113

Certification of State Plan 113

Certificate of Attorney General: State Plan. 115

Certificate of Governor's Advisory Council for Vocational Education. 116

Authority of State Board and State Officials. 117

State Laws and Regulations Regarding Expenditures 117

Agreement of Cooperative Arrangement Between Oregon Board of Education and State Department of Employment 119

Certificate of Public Hearings and Public Notification. 123

Memorandum of Understanding 125

Cooperative Agreement Between Oregon Board of Education and Department of Vocational Rehabilitation 127

Executive Order No. 01-070-04: Governor's Manpower Coordinating Committee. 129

Executive Order No. 01-070-05: Governor's Advisory Council for Vocational Education. 133

Appendix, Other

Oregon Rules for Certification of Public School Teachers, Education Specialists and Administrators. 137

Occupational Clusters and Oregon Employment 155

Local Program, Long-Range Plan - for Vocational Education 157

Application for Regular Vocational Education Programs 169

Application for Special Purpose Programs. 175

Sample Research Coordinating Unit Structure 187

An Administrative Flow-Chart for Processing Research and Development Proposals 188

STATE OF OREGON

OREGON BOARD OF EDUCATION

OREGON STATE PLAN FOR VOCATIONAL EDUCATION

The State of Oregon, through the Oregon Board of Education, hereby submits the administrative provisions of its State Plan as required in the Vocational Education Act of 1963, as amended under P.L. 90-576, the Vocational Education Amendments of 1968, and the revised regulations with respect thereto. (See Legal Appendix, page 113.)

1.0 General Provisions

1.1 State Board

1.11 Name and Designation of State Board

The Oregon Board of Education is the sole State agency responsible for the administration of vocational education, or for the supervision of the administration thereof by local educational agencies, in the State. Oregon outlines the following Board functions:

"ORS 326.051 Board Functions.

(1) In addition to such other duties as are prescribed by law, the State Board of Education shall:

(a) Establish State standards for public schools--------.

(b) Report to the Legislative Assembly biennially--------.

(c) Adopt rules for the general government of public schools--------.

(2) The State Board of Education may:

(a) Consistent with the laws of this state accept money-----.

(b) Apply for federal funds and accept and enter into any contracts or agreements in behalf of the State for the receipt of such funds from the Federal Government or its agencies for educational purposes, including but not limited to any funds available for the school lunch program, for vocational education purposes, for adult education and any grants available to the State or its political subdivisions for general federal aid for public elementary and secondary schools and their

auxiliary services, improvement of teacher preparation, teacher salaries, construction of school buildings, administration of the Department of Education and any other educational activities under the jurisdiction of the State Board of Education."

Throughout this plan the Oregon Board of Education is a term used to refer to this official board and is used interchangeably with the term "State Board." It is the State Board in this State within the meaning of Section 123(a) (2) of the Vocational Education Amendments of 1968 Act as certified by the Attorney General of Oregon. (See Legal Appendix, page 115)

1.12 Executive Officer Designation

The executive officer of the State Board is designated as the Superintendent of Public Instruction and is elected by the people of the State. The Superintendent is responsible for putting these policies into effect.

1.13 Authority of State Board

The authority of the State Board to submit a State plan for vocational education and administer the program contained therein is provided for under ORS 344.070 to ORS 344.140 inclusive which provides for acceptance of provisions of the Federal Vocational Act, designates the State treasurer as custodian of federal appropriation with the authority to disburse federal and State appropriations and otherwise provides the legal authority to administer vocational-technical education programs in the State.

1.14 State Board Organization

1.14-1 The State Board consists of seven members appointed by the Governor and subject to confirmation by the Senate of the State of Oregon.

1.14-2 State Administration and Leadership

The State Board is required to provide for a State staff sufficiently qualified by education and experience and in sufficient numbers to enable the State Board to plan, develop, administer, supervise, and evaluate vocational education programs, services, and activities under the State Plan to the extent necessary to assure quality in all educational programs. The programs must be realistic in terms of actual or anticipated employment opportunities and suited to the needs, interests, and abilities of those being trained. Consideration must be given to professional staff qualifications for leadership of program services and activities for the disadvantaged and handicapped, depressed areas, research training, exemplary programs, projects, residential vocational schools, consumer and homemaking, cooperative vocational education, curriculum development, and work-study.

1.14-3 The Executive Officer of the State Board

The executive officer of the State Board is designated as the Superintendent of Public Instruction and is elected by a nonpartisan vote of the people. The Superintendent puts into effect such rules and regulations as the State Board requires in matters affecting vocational education.

1.14-4 The Assistant Executive Officer

The Associate Superintendent for the Division of Community College, Career Education, is directly responsible to the Executive Officer. He acts for the Executive Officer in a coordinating capacity and devotes as much time to the vocational education program as is necessary to fulfill his administrative responsibilities.

1.14-5 Director Career Education

The State Board employs a full-time Director of Career Education immediately responsible to the Assistant Executive Officer for the general direction, integration, and administration of all vocational education programs for which federal and State funds are used.

1.14-6 Coordinator - Career Program Operations

The Coordinator of Career Programs is directly responsible to the Director of Career Education. He supervises a broad range of secondary and post-secondary vocational programs in business education, distributive education, home economics, service occupations, agriculture, T & I, health. and industrial arts. Each program specialist is responsible for research in his area of specialty and for curriculum development. (See staffing chart, pages 6 and 7 and appendix pages 144-153)

1.14-7 Coordinator - Program Development and Evaluation

The Coordinator of Program Development and Evaluation is directly responsible to the Director of Career Education. He initiates and coordinates exploratory programs and compiles statistical information relating to manpower needs. He is responsible for both vertical and horizontal vocational program articulation. (See staffing chart, pages 6 and 7 and appendix pages 144-153)

1.14-8 Coordinator - Special Programs

The Coordinator of Special Programs is directly responsible to the Director of Career Education. He supervises special programs such as MDT, apprenticeship, cooperative education, work-study, and programs

for the disadvantaged and handicapped. (See staffing chart, pages 6 and 7 and appendix, pages 144-153)

1.14-9 Vocational Guidance and Counseling Personnel

Vocational guidance and counseling is specifically provided for through staff specialists working in the division of Student Services and Community Colleges Support (see organization chart, page 6).

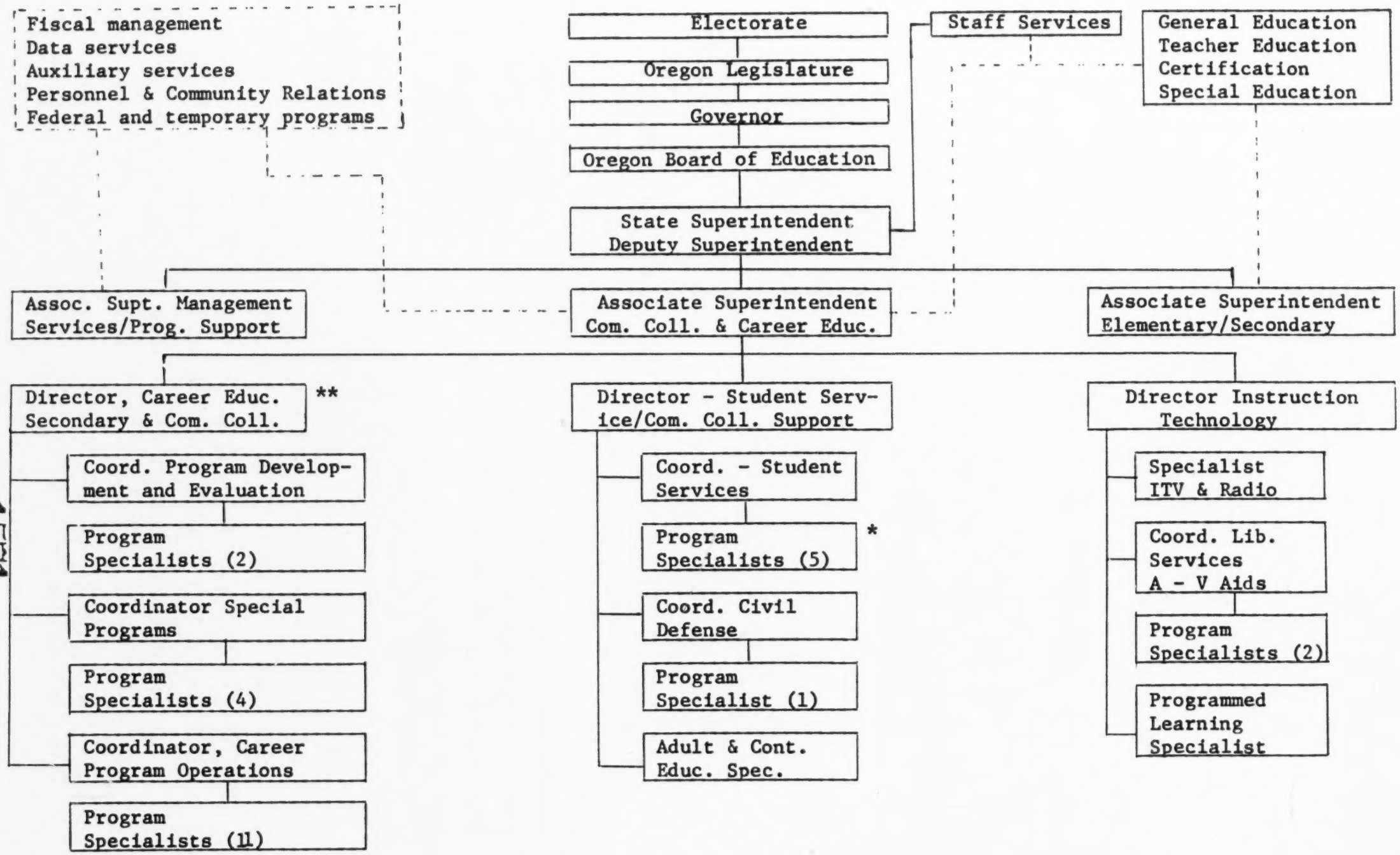
1.14-10 Expenditure of Federal Funds

The Executive Officer of the State Board, the Assistant Executive Officer of the State Board, the Director of Career Education, or representatives designated by them, will have authority to authorize expenditures of federal funds under the State Plan. The Director of Career Education will recommend approval of all expenditures from vocational education funds.

1.2 Public Hearings and Information

The State Board will provide for the publication and dissemination of the approved State Plan and amendments thereto, together with all statements of general policies, rules, regulations, and procedures established by the State Board concerning the administration of the Plan, in sufficient quantity to assure the information being reasonably available to the public. An original printing of 200 copies will be published.

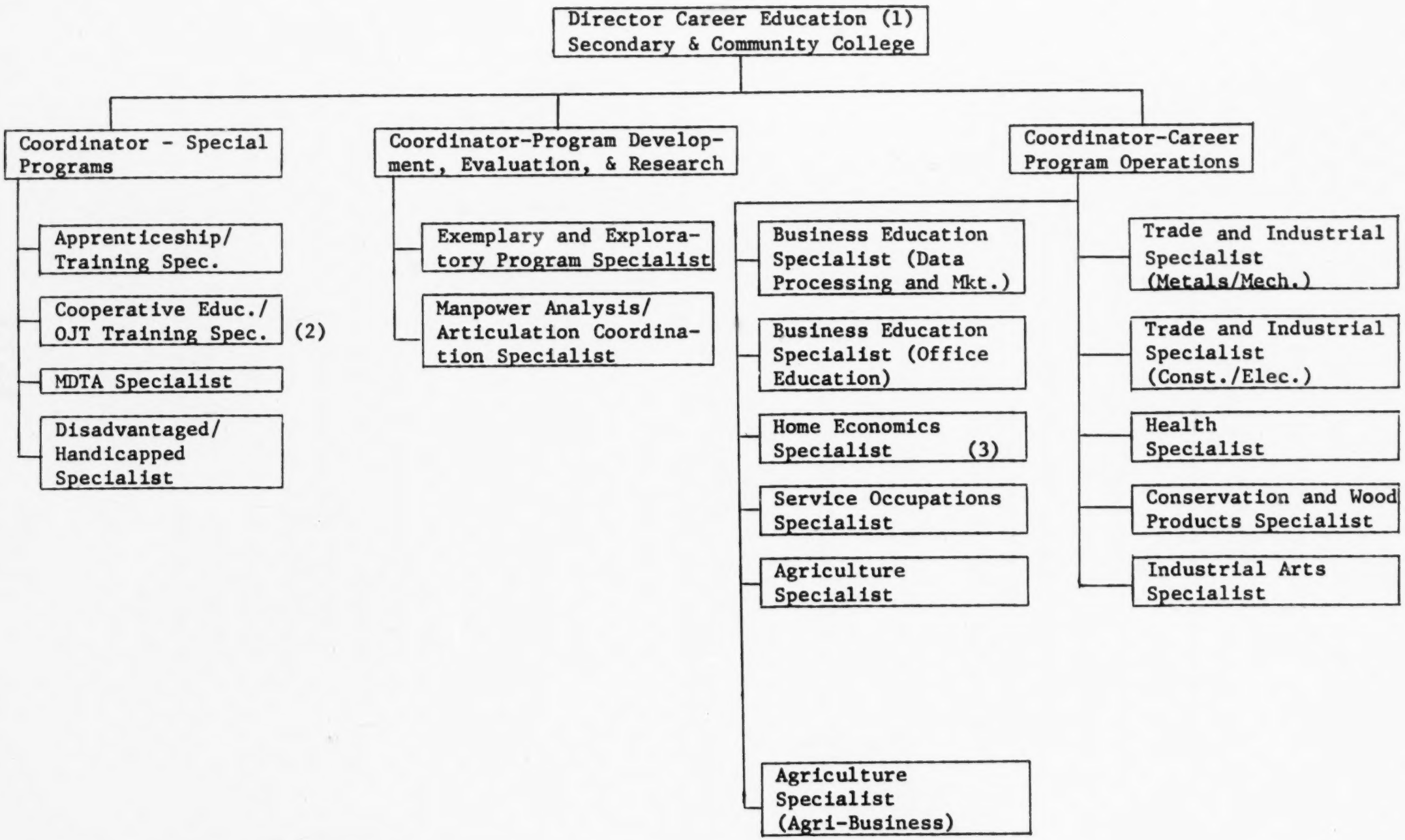
1.21 Copies of the State Plan, together with all statements of general policies, rules, regulations, and procedures established by the State Board concerning the administration of such plan, will be provided to State and local agencies and institutions responsible for conducting vocational and technical education. This information will also be made available to other interested organizations, institutions, and agencies as identified in section 1.7 of the State Plan. Sufficient copies will be provided to the State Library to assure that this information is readily available to the interested public.



Dotted lines indicate State Board of Education staff who are available and utilized in implementing the functions of the Career Division under the Oregon Board but are not supported from funds under the State Plan for Vocational Education.

* Guidance personnel included among program specialists.

** Director of the State's Vocational Education Programs.



(1) Each box represents one person.
(2) Will also be responsible for Work-study.
(3) Will also be responsible for Consumer Homemaking.

4572

1.21

Amendments to the State Plan shall be reviewed by the State Advisory Council prior to adoption by the State Board.

1.22 The State Plan for each fiscal year and major amendments thereto, will be developed in consultation with persons knowledgeable in the occupational needs of the State and shall be reviewed by the State Advisory Council and examined in a public hearing, which shall be called by the State Board following due public notification as provided for in sections 104 (b) (3) and 123 (a) (3) of the Act in compliance with ORS 193.000 - 193.360 inclusive.

1.3 Minimum Qualifications of Personnel

1.31 State Administrative and Supervisory Personnel

1.31-1 Education Program Director 2

Knowledge, skills, and abilities

Extensive knowledge of administration as it can be applied to the field of education; an extensive knowledge of the basic principals and theories of education; an extensive knowledge of important schools of thought and developments in the field of specialty; an extensive knowledge of state and federal laws relating to education and to the specialty fields; a thorough knowledge of methods of supervision; a thorough knowledge of planning, budgeting, and programming; ability to speak and write effectively; ability to analyze and evaluate programs; ability to coordinate diverse publics and groups to achieve an objective; ability to plan and conduct institutes and conferences; ability to organize the work and supervise the professional and technical work of others.

Experience and training

A Master's degree in the area of specialty plus eight (8) years of progressively responsible experience in a field appropriate to the requirements of the position including a minimum of two (2) years of teaching experience and four (4) years of administrative experience providing planning, budgeting, personnel, and programming experience. For those positions for which teaching experience is not required, the two years of teaching experience may be substituted for by two (2) years of responsible experience in the specialty field or two years of responsible administrative experience. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount, quality, and kind of experience that will qualify in lieu of the advanced degree. A doctoral degree will substitute for one year of the required specialty experience.

1.31-2 Education Program Director 1

Knowledge, skills and abilities

Thorough knowledge of administration as it can be applied to the field of education; a thorough knowledge of the basic principles and theories of education; thorough knowledge of current principles and practices of education; a thorough knowledge of important schools of thought and developments in the field of specialty; a thorough knowledge of state and federal laws relating to education and to the specialty fields; a thorough knowledge of methods of supervision; a working knowledge of planning, budgeting, and programming; ability to speak and write effectively; ability to analyze and evaluate programs; ability to coordinate diverse publics and groups to achieve an objective.

Experience and Training

A Master's degree in the area of specialty plus six (6) years of progressively responsible experience in a field appropriate to the requirements of the position including a minimum of two (2) years of teaching experience and two (2) years of administrative experience providing planning, budgeting, personnel, and programming experience. For those positions for which teaching experience is not required, the two years of teaching experience may be substituted for by two (2) years of responsible experience in the specialty field or two years of responsible administrative experience. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount, quality, and kind of experience that will qualify in lieu of the advanced degree. A doctoral degree will substitute for one year of the required specialty experience.

1.31-3 Education Program Coordinator

Knowledge, skills and abilities

Thorough knowledge of the basic principles and theories of education; thorough knowledge of the current principles and practices of education; a thorough knowledge of important schools of thought and developments in the specialty field; a thorough knowledge of state and federal laws relating to education and to the specialty field; considerable knowledge of methods of supervision; considerable knowledge of report writing and research methods; a working knowledge of management principles and techniques; ability to analyze and evaluate instructional programs and to develop instructional materials; ability to speak and write effectively; ability to work with various professional and technical personnel and with diverse publics.

Experience and training

A Master's degree in the area of specialty plus five (5) years of progressively responsible experience in a field appropriate to the requirements of the position including a minimum of two (2) years of teaching experience and one (1) year of supervisory experience. For those positions for which teaching experience is not required, the two years of teaching experience may be substituted for by one (1) year of responsible experience in the specialty field or one (1) year of supervisory experience. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount, quality and kind of experience that will qualify in lieu of the advanced degree. A doctoral degree will substitute for one year of the required specialty experience.

1.31-4 Education Program Specialist 2

Knowledge, skills and abilities

Thorough knowledge of the basic principles and theories of education; thorough knowledge of current principles and practices of education; thorough knowledge of important schools of thought and developments in the field of specialty and generally in the field of education; a thorough knowledge of state and federal laws relating to education and to the special field; ability to analyze and evaluate instructional programs and to develop instructional materials; ability to speak and write effectively; ability to coordinate diverse publics and groups to achieve an objective; ability to develop a report analyzing a program or institution and making recommendations.

Experience and training

A Master's degree in the area of specialty plus five (5) years of responsible experience in a field

appropriate to the requirements of the position including a minimum of two (2) years of teaching experience. For those positions for which teaching experience is not required, the two years of teaching experience may be substituted for by two years of responsible experience in the specialty field. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount, quality, and kind of experience that will qualify in lieu of the advanced degree.

1.31-5 Education Program Specialist 1

Knowledge, skill and ability

Thorough knowledge of current principles and practices of education; thorough knowledge of important schools of thought and developments in the field of specialty and to a lesser degree in the general field of education. A knowledge of Oregon and federal laws, and current problems both instructional and administrative facing educators in Oregon; ability to communicate and work effectively with teachers, administrators, and the special publics who relate to the education field; ability to speak before groups and write effectively; ability to develop a report analyzing a program or institution and making recommendations.

Experience and Training

A Master's degree in the area of specialty plus four (4) years of responsible experience in a field appropriate to the requirements of the position; including a minimum of two (2) years of teaching experience. For those positions for which teaching experience is not required, the two years of teaching may be waived, and four (4) years of relevant experience would be the total experience required. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount and quality

of experience which will qualify in lieu of the advanced degree.

1.32 Local school district directors, supervisors, and coordinators are required to hold vocational certificates as provided for in Oregon certification requirements (see Appendix, Other, page 137). Community college personnel must meet these same requirements to be vocationally approved.

1.32-1 Director

Duties:

Responsible for the overall planning, supervision, and coordination of the total vocational education program of the educational agency. He must be familiar with the various fields of vocational education and assist each to render maximum service to the community. He recommends the appointment of all professional members of the local staff and directs program development.

Qualifications:

(See Appendix, Other, pages 144-153.)

1.32-2 Supervisors

Duties:

Responsible for the ogranization, promotion, and development of training in one or more designated occupational areas.

Qualifications:

(See Appendix, Other, pages 144-153.)

1.32-3 Coordinators

Duties:

Responsible for the identification of vocational education needs in their occupational areas. They arrange for the educational staff to develop and evaluate

education programs to meet the needs that have been identified.

Qualifications:
(See Appendix, Other, page

1.33 Public School Instructional Personnel

Public school instructional personnel are required to meet Oregon certification requirements (see Appendix, Other, pages 144-153).

1.33-1 Instructor-Coordinators

Duties:
Responsible for both instruction in and coordinator of a program of vocational education.

Qualifications:
(See Appendix, Other, pages 144-153.)

1.33-2 Instructors

Duties:
Responsible for the instructional processes in an educational agency.

Qualifications:
(See Appendix, Other, pages 144-153.)

1.33-3 Instructor Assistants

Duties:
Responsible to teachers for carrying out routine functions not involving direct instruction in the classroom, laboratory, or shop.

Qualifications:
Recommendation of the employing educational agency.

1.33-4 Teacher Interns

Duties:
Provide instruction under the guidance and direction

of a supervising teacher.

Qualifications:

(See Appendix, Other, pages 144-153.)

1.34 Other Ancillary Personnel

1.34-1 Teacher Educator Personnel

Teacher education staff and specialists shall meet qualifications equal to Oregon State Civil Service Regulations (see Appendix, Other, pages 144-153). or the qualifications of the contracting institution providing vocational teacher education, whichever pertains.

(a) Teacher educators shall provide preservice, in-service, and graduate training programs for vocational personnel, develop instructional materials and aids, and conduct studies and research dealing with vocational education.

1.34-2 Education Specialists

Education Specialists, including research personnel, may be employed by educational agencies to provide instruction, guidance and counseling, course and instructional materials development; research, and other functions. Qualifications shall include competence in the area of research as evidenced by educational qualifications, previous experience in research projects similar to the one to which they are assigned, or specialized training in research procedures and techniques. Qualifications must be approved by the Director of Career Education (see section 5.0 of this part of the State Plan for policies and procedures governing research, demonstration, and experimental programs).

1.34-3 Vocational Guidance and Counseling Personnel

Vocational guidance and counseling personnel shall

be responsible for assisting students with career guidance, program planning, placement, and for establishing and coordinating the collection and reporting of student follow-up information.

1.35 Exchange Personnel from Business and Industry
(To be developed when need occurs.)

1.4 Professional Improvement
The State Board will provide for the establishment of standards, policies and procedures for the conduct of the education program adequate in scope to provide qualified teachers, supervisors and other vocational personnel and will, in cooperation with established vocational teacher education institutions, assure the education program meets the prescribed standards.

1.41 Career Occupation Specialists will be responsible for evaluating teacher education programs relating to their area, and will provide consultation and supervision necessary to assure that such programs meet the standards and requirements set forth in the State Plan.

The standards and policies for teacher education provided by the State Board or provided under its supervision by agencies or institutions designated by and under contract for the State Board shall include the following:

(a) Provisions for professional courses and other subject matter courses essential for developing the understanding and competence needed in the professional capacity in which the prospective or employed professional person will serve;
(b) Provisions for adequately preparing teachers, supervisors, directors, administrators, counselors, and other supporting professional personnel;
(c) Teacher education faculty adequate in number, quality, and diversity to assure prospective teachers the preparation

necessary for them to teach effectively in the area assigned to them;

(d) Arrangements for adequate facilities and equipment to meet the standards established by the State Board.

1.41-1 Preservice Training

The Oregon Board of Education shall provide for preservice vocational teacher education through the regular long established secondary, post-secondary, and adult vocational teacher education programs as well as providing for new and emerging needs such as special preparation for teachers of disadvantaged groups, physically handicapped persons and some of the identifiable new and emerging occupations. Emphasis will be given to providing this education through the cooperative effort of the schools, universities and colleges, the Oregon Board of Education, other professional organizations, and business and industry.

1.41-2 In-service Teacher Training

Program Specialist will provide for in-service teacher training in their respective areas. Such training will involve, as appropriate, the various staff resources of: the State Board, including counseling and guidance, remedial staff, and special education personnel; resource persons from business and industry, and structured assistance from the State System of Higher Education, through their Department of Continuing Education and teacher training colleges.

1.41-3 Other Agencies and Institutions Providing Teacher Education

Teacher education will be provided in approved teacher education agencies and institutions meeting the standards established by the State Board.

(a) Specific arrangements have been made for a continuing vocational teacher intern program with the

State System of Higher Education, designed to select and develop potential leaders for vocational programs in the State.

(b) As provisions of the Education Professions Development Act are implemented, the State Board proposes to utilize these resources in combination with its own financial and personnel resources to enter into cooperative arrangements with private business or industry, commercial enterprises, or with other educational institutions (including those for handicapped and delinquent) for the training or retraining of experienced vocational education personnel such as teachers, teacher educators, administrators, supervisors, coordinators and other personnel in order to strengthen vocational education programs. Activities will include such things as:

(1) exchange of vocational education teachers and other staff members with skilled technicians or supervisors in industry (including mutual arrangements for preserving employment and retirement status, and other employment benefits during the period of exchange), and the development and operation of cooperative programs involving periods of teaching in schools providing vocational education and of experience in commercial, industrial, or other public or private employment related to the subject matter taught in such school;

(2) in-service training programs for vocational education teachers and other staff members to improve the quality of instruction, supervision, and administration of vocational education programs; and

(3) short-term or regular-session institutes, or other preservice and in-service training programs or projects designed to improve the

qualifications of persons entering and re-entering the field of vocational education, except that funds may not be used for seminars, symposia, workshops or conferences unless these are a part of a continuing program of in-service or preservice training.

Contracts and/or agreements for vocational teacher preparation shall be entered into with approved teacher education institutions. Such contracts and/or agreements of this type will be in keeping with contractual arrangements described on page 117 of the legal Appendix. The revision and/or renewal of contracts and agreements will follow the same procedures as initial contracts.

1.42 Review and Modification of Personnel Qualification Standards

The State Board approves teacher approval and Certification Standards for teaching personnel in Oregon. Under this Board's authority, the Director of Career Education in cooperation with the Director of Teacher Education and Certification will provide for a continuous review of teacher education needs necessary to staff quality vocational education for Oregon. Inherent in the State's rules and regulations for instructor approval is the flexibility necessary to assure that qualification standards continue to reflect a direct relationship with the need for personnel in vocational education programs carried out under the State Plan. (See Appendix, Other, page 137) One of the options available to both secondary schools and community colleges is to make application for approval of vocational instructors based upon evaluations and recommendations made by local instructor appraisal committees whose membership is recruited from local advisory groups.

1.5 Program Evaluation

Major emphasis in program evaluation will continue to be on assisting

local educational agencies in conducting self-evaluations of their programs. Districts will be encouraged to use the self-evaluation procedures and instruments developed by the State Board, field tested during the 1968 fiscal year and revised in 1970. Occupational specialists on the State staff will assist secondary and post-secondary institutions in this task. Funding will be provided for the establishment of regional and/or statewide in-service meetings to orient local personnel to the evaluation procedures. In addition, special study grants within the limitations of funds will be made available to meet priority needs. The following criteria will be used as the basis for evaluating local vocational programs:

1. The administration develops and plans programs to meet the needs, interests, and abilities of students who want, need, and can benefit from vocational education.
2. The administration cooperates with and encourages teaching staff to improve instruction.
3. The effectiveness of the vocational education program in meeting student needs is evaluated on a continuing basis.
4. Students are admitted to the vocational education program on the basis of occupational objectives and potential for achieving occupational competency.
5. Vocational guidance is available to all students who want, need, and can benefit from vocational education.
6. Vocational programs are offered for all students who can benefit from vocational education instruction.
7. Instruction creates learning experiences which meet the educational needs of individual students.
8. Students are provided with adequate instruction to help them achieve the occupational objectives of the curriculum pattern.
9. Students are provided with adequate instruction to encourage sound safety practices and promote healthy work attitudes.
10. Facilities, including equipment, instructional aids and supplies, enable students to meet the objectives of the program with efficiency.

11. The administration insures that the vocational education program is responsive to changing job requirements and labor market needs.
12. The administration plans and organizes a statement of future needs including costs for administration, guidance services, instruction, and facilities.
13. Accurate and current information about employment opportunities in regional and local labor markets is maintained.
14. Program is designed to enable students to develop competencies necessary for further education or entry employment in the recognized occupations.
15. There are substantial and identified opportunities for employment in the occupations taught.
16. The vocational education program is designed to prepare individuals in an occupation or a group of closely related occupations.
17. The program is developed and conducted with the advice of an occupational advisory committee.
18. Facilities and equipment are comparable to conditions and equipment used in actual working situations.
19. Instruction is based on skills and knowledge required in the occupation or cluster of closely related occupations.
20. Adult supplementary vocational education courses are available to meet the occupational training needs of employed and temporarily unemployed adults.

State Board guidance and vocational staff will cooperate in the development of a State assisted vocational graduate follow-up system. It is planned that the follow-up will be carried out through the local districts, but the processing and accumulation of data will be carried out at a central location, thus orienting the data collection to a statewide analytical process.

Evaluation of all aspects of local vocational programs will be an integral part of the State Board's emphasis and activities for overall educational program evaluation and audits.

1.6

1.6 State Reports

The Director of Career Education and his staff will participate in periodic consultations with the Commissioner and his staff, and will make such reports to the Commissioner as he may consider reasonably necessary to carry out his responsibilities under the Acts, as well as keep such records, afford such access thereto, and comply with such other provisions as the Commissioner may find necessary to assure himself that such reports are correct and verifiable.

1.7 Cooperative Arrangements

1.71 State Employment Service

The State Board has entered into a cooperative agreement with the Oregon State Department of Employment, (see copy of agreement in Appendix, Legal, page 119) in order that these offices may make available to the State Board and local educational agencies occupational information regarding reasonable prospects of employment in the community and elsewhere, provide vocational guidance and counseling to students and prospective students and otherwise provide for meeting requirements as set forth in Section 123 (a) (8) of the Act.

1.72 Handicapped Persons

By executive order of the Governor (see Appendix. Legal, page 129) a manpower coordinating committee has been created and charged with the responsibility of developing and implementing a manpower plan utilizing the resources of federal, State, and local agencies. Serving on the Cooperative Area Manpower Planning Systems (CAMPS) committee are representatives of apprenticeship and training, education, employment, rehabilitation, public welfare, community action, public health, and others. It is within this structure that a comprehensive plan for the vocational education of handicapped persons will be made and allocations of funds determined.

In addition to the above, a specific cooperative agreement has been made between the Division of Elementary and Secondary Education and the Division of Community Colleges and

Career Education to render more effective vocational education programs. (See Appendix, Legal, page 125 for details of agreement.)

A cooperative agreement has been developed with the Department of Vocational Rehabilitation to provide for coordination of vocational programs, services and other activities. (See Appendix, Legal, page 127.)

1.73 Other Agencies, Organizations and Institutions

The State Board may make cooperative arrangements with other agencies, organizations, and institutions concerned with the disadvantaged and handicapped persons, such as State and local vocational rehabilitation and special educational agencies, public health agencies, and private organizations concerned with such persons as necessary to develop and implement vocational education programs.

1.74 Other States

The State Board may enter into a cooperative agreement with one or more states for the operation and administration of vocational education programs. All such cooperative agreements will be approved by the State Boards of the states participating and will not be in conflict with local or state laws. All such agreements will be forwarded to the U. S. Office of Education by each participating state to be filed with its respective State Plan.

1.8 Vocational Education Under Contract

The State Board and local educational agencies may make provisions with other public or nonpublic agencies or institutions (other than the State Board or local educational agency) through written contract to provide any portion of a vocational instruction program to an individual or group to the extent that needs are identified and funds are available.

1.8

Such contracts shall be entered into only upon a determination by the State Board or local educational agency that the following conditions are met:

(a) the contract is in accordance with State and local law.

(b) the instruction to be provided under contract will be conducted as a part of the State vocational education program priorities.

(c) that the contract will provide for effective use of funds provided for under State Plan provisions.

(d) that the contract assures that federal, State and local funds paid to the contracting agency or institution will be used only to lower the rate of or eliminate tuition, fees, and other charges which otherwise would be collected from persons benefiting from such portions of the instructional program.

(e) that such contracts will be reviewed annually by parties concerned.

1.81 Private Post-Secondary Vocational Training Institutions

The State Board or local educational agencies may through written contract pursuant to the conditions of section 1.8 provide post-secondary vocational instruction through private post-secondary vocational training institutions to the extent that needs are identified and funds are available when the following conditions are met:

(a) State Board or local educational agency determines that such contracts will make a significant contribution to meeting the State's vocational education program priorities; and

(b) that the contract will provide for equivalent training at lesser cost; or

(c) that the private institution can provide equipment or services not available in public agencies or institutions.

1.82 Other Agencies and Institutions

Not applicable at this time.

1.9 Construction Requirements

The State Board or its authorized representative will require the following assurances.

1.91 Labor Standards

All laborers and mechanics employed by contractors and subcontractors on all construction projects assisted under the Act will be paid wages at rates not less than those prevailing as determined by the Secretary of Labor in accordance with the Davis-Bacon Act (40 U.S.C. 276a-276a-5) and 29 CFR Part 1 (29 F.R. 95), and shall receive overtime compensation in accordance with and subject to the provisions of the Contract Work Hours Standards Act (40 U.S.C. 327-332), that such contractors and subcontractors shall comply with the provisions of 29 CFR Part 3 (29 F.R. 97), and that all construction contracts and subcontracts shall incorporate the contract clauses required by 29 CFR 5.5(a) and (29 F.R. 100, 101, 13463).

1.92 Equal Employment Opportunity

All construction contracts exceeding $10,000 shall include the employment nondiscrimination clause prescribed by section 203 of Executive Order No. 11246 of September 24, 1965 (30 F.R. 12319), and the State Board or local educational agency shall otherwise comply with the requirements of section 301 of said Executive Order.

1.93 Avoidance of Flood Hazards

In the planning of the construction of school facilities under the Act, the State Board or local educational agency shall, in accordance with the provisions of Executive Order No. 11296 of August 10, 1966 (31 F.R. 10653) and such rules and regulations as may be issued by the Department of Health, Education, and Welfare to carry out those provisions, evaluate flood hazards in connection with such school facilities, and as far as practicable, avoid the uneconomic, hazardous, or unnecessary use of flood plains in connection with such construction.

1.94 Accessibility to Handicapped Persons

In the planning of construction of school facilities under the Act, the State Board or local educational agency shall, to the extent appropriate in view of the uses to be made of the facilities to, and the usability of them by, handicapped persons, and of their compliance with the minimum standards contained in "American Standard Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped," approved by the American Standard Association, Inc., with appropriate usable segments of "Building Standards of the University of Illinois Rehabilitation Center" and "Occupancy Guide--Department of Veterans Benefits, Regional Offices, Veterans Administration," and with other standards in that regard as the Secretary of Health, Education, and Welfare may prescribe or approve.

1.95 Competitive Bidding

All construction contracts and contracts for services of architects and engineers shall be awarded to the lowest qualified bidder on the basis of open competitive bidding consistent with the following: one or more items of construction covered by ORS 279.036, mandatory preference of State products in purchase of materials and supplies, ORS 279.038, use of Oregon construction products mandatory; limitation on extra price, ORS 279.040, specifications to require alternate bids, ORS 279.044, discretionary preference to Oregon persons, concerns, materials, and supplies, and ORS 279.046, advertisements for bids for specific brands or patented appliances regulated, which are approved by the Oregon Board of Education as designed to assure construction in an economical manner consistent with sound business practices.

1.10A Effective Use of Results of Programs and Experience

The State Board shall provide for the effective use of the results and experience gained from programs and projects

assisted under sections 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, and related research, training, and curriculum development. Education program specialists will be responsible for the collection and analysis of data relating to their area of specialty and, in consultation with local vocational personnel, utilizing their findings for program improvement or in planning and developing new programs.

The Director of Career Education will plan and initiate in-service training for State vocational education staffs responsible for the gathering, analysis and dissemination of data necessary to assure program quality and improvement.

1.10B Opportunity for Hearing on Local Application

If any educational agency is dissatisfied with the final action of the State Board with respect to approval of an application by such local agency for a grant pursuant to this title, such local agency may, within sixty days after such final action or notice thereof, whichever is later, file with the United States court of appeals for the circuit in which the State is located a petition for review of that action. A copy of the petition shall be forthwith transmitted by the clerk of the court to the State Board. The State Board thereupon shall file in the court the record of the proceedings on which the State Board based its action as provided in section 2112 of title 28, United States Code.

The findings of fact by the State Board, if supported by substantial evidence shall be conclusive; but the court, for good cause shown, may remand the case to the State Board to take further evidence, and the State Board may thereupon make new or modified findings of fact and may modify its previous action, and shall certify to the court the record of the further proceedings.

The court shall have jurisdiction to affirm the action of the State Board or to set it aside, in whole or in part. The judgment of the court shall be subject to review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of title 28, United States Code.

A written record of State Board hearing procedures shall be kept and made available to the appealing agency. All State Board decisions shall also be in writing to the appellant.

1.10C Economically Depressed Areas or High Unemployment Areas

For purposes of this part of the State Plan the State Board elects to assign priorities to areas of high unemployment and identifies these areas as follows:

A labor area, or a county may be classified as an area of "persistent unemployment" when unemployment during the most recent calendar year has averaged 6 percent or more of the work force, and the rate of unemployment has:

(1) Averaged 6 percent or more and has been at least 50 percent above the national average for three of the preceding four calendar years, or

(2) Averaged 6 percent or more and has been at least 75 percent above the national average for two of the three preceding calendar years, or

(3) Averaged 6 percent or more and has been at least 100 percent above the national average for one of the two preceding calendar years.

As a source of information for identifying areas of high unemployment, data in "The Oregon Manpower Plan," is compiled and published annually by the Governor's Manpower Coordinating Committee.

1.10D Areas of High Youth Unemployment and Dropouts

The State Board will designate as high dropout areas those counties in which the school dropout rate for grades 9-12,

taken as a percentage of average daily membership and reported annually by local school districts on forms provided by the Oregon Board of Education, exceeds the State average. Counties in which the dropout rate has exceeded the State average for three consecutive years will be designated as persistent high dropout areas, and special consideration may be given to such areas for new and/or expanded program development.

A dropout refers to a student who leaves an elementary or secondary school before graduation from secondary school or completion of a program of studies and without transferring to another school. (For listing of dropouts by county see Table 4 Part II, page 238 of the State Plan.

In designating areas of high youth unemployment, the State Board will use the annual rate of unemployment as given by the Oregon Department of Employment for each of the State's metropolitan areas or counties. Areas will be so designated if the rate of unemployment of persons aged 16 through 19 in the area is at least 12 percent, and the annual rate of such unemployment is at least:

(a) Fifty percent above the national average for three of the preceding four calendar years, or
(b) Seventy-five percent above the national average for two of the three preceding calendar years, or
(c) One hundred percent above the national average for one of the two preceding calendar years.

In addition to geographic regions identified above (county and CAMPS areas) sub-areas such as the Portland Standard Metropolitan Statistics Area (see 2.12, Part II of the State Plan) identified as having particular needs will be given priority for purposes of this part of the State Plan.

2.0 Fiscal Control and Fund Accounting Procedures

2.1 Custody of Federal Funds

The State Treasurer, State of Oregon, Salem, Oregon, is designated as the custodian of all such funds received from the federal government and is responsible for the proper custody of such funds received, as provided for in ORS 344.110:

"344.110 State Treasurer designated custodian of federal appropriation; authority to disburse federal and state appropriations. The State Treasurer is designated and appointed custodian of all moneys received by the state from the appropriation made by the Act of Congress accepted by ORS 344.100. He is authorized to receive and provide for the proper custody of the moneys and to make disbursements thereof in the manner provided in that Act and for the purposes therein specified. He shall also pay out of any moneys appropriated for vocational education purposes by the State of Oregon upon the order of the State Board of Education."

2.2 Expenditure of Federal Funds

The State Superintendent or his designated representatives will have authority to authorize expenditures of federal funds under the State Plan as provided for in ORS 344.110 above. The Director of Career Education will recommend approval of all expenditures from vocational education funds.

2.3 Allotment Availability

Funds may be paid to local educational agencies or other agencies and institutions concerned with vocational education as an advance for future expenditures, or as reimbursement of actual expenditures, or both. (Statutory authority presented on page 117 of the Legal Appendix.)

2.31 Programs and Services

Approved federal matching expenditures for personal services, utilities, travel, and the acquisition of equipment and supplies will be chargeable to the fiscal year commencing on July 1 and ending on June 30. Incurred expenses by the local educational agency, for which approved federal reimbursement is requested, may report on either a cash or modified cash accounting basis. Payment procedures for expenses incurred by the State educational agency and payments to local educational agencies will follow a modified cash accounting system.

The term, modified cash accounting system, shall mean that both cash disbursements and obligations incurred prior to June 30 of the fiscal year, but payable after the close of the fiscal year, will be chargeable to that fiscal year's allotment. Under the cash accounting system, only those payments made during the fiscal year for expenses incurred during that year, will be chargeable to that current allotment. State obligations during the fiscal year must be liquidated within a period of twelve months following the closing date of the year in which obligation is incurred. Obligations are defined as amounts which the local agency may be required legally to meet out of its resources. They include not only actual liabilities, but also unliquidated encumbrances.

2.32 Construction

The same procedures described in 2.31 of this part of the State Plan will be followed as the accounting basis for construction of area vocational school facilities or residential school facilities, acquisition of land and buildings, acquisition of equipment, and procurement of architectural, engineering, and other construction related services, except that the date of the construction contract will determine the fiscal year to which the allocation is chargeable. All related construction services are included

in the construction contract. The period of liquidation of construction, equipment, land and buildings, architectural and engineering, and other related services will be twelve months after final approval and acceptance of the facility, equipment, or services.

2.4 Fiscal Records

The official fiscal accounts and supporting documents of the Oregon Board of Education and participating local educational agencies relating to expenditures involving federal participation will be maintained by the Oregon Board of Education, Salem, Oregon. Accounts and supporting documents relating to any vocational education program involving federal financial participation will be sufficient to permit an accurate and expeditious audit of the program. Basic fiscal documents, if not kept by the State, will be kept by the local educational agencies. The Oregon Board of Education and local educational agencies shall keep accessible and intact, all records relating to accountability of federal grants and matching funds, for a period of five years or until program reviews and federal audits of such records have been completed.

2.5 Audits

2.51 State Audit of State Accounts

The accounts of the Oregon Board of Education are audited by the Secretary of State, Salem, Oregon. These audits will be made annually and copies of such audits will be available in the office of the Oregon Board of Education.

2.52 Audits of Local Accounts

Independent professional accountants approved by the Oregon State Board of Accountancy shall audit the fiscal records and documents of the local educational agencies pertaining to expenditures claimed for federal financial participation under an approved program. These audits shall be made annually and copies of such audits shall be available in the Office of the Secretary of State.

3.0 State Vocational Education Programs

The State Board shall prepare annual program plans in consultation with the State Advisory Council that shall allocate federal Grant B funds among each of the population groups for vocational education programs, services and activities in accordance with the following policies and procedures.

3.1 Allocation of Funds to Part B Purposes

In keeping with the federal requirements the State Board will allocate the funds for vocational education programs, services and activities for persons who are attending high school, have completed or left high school, need retraining, are disadvantaged, or are handicapped. The State Board, with the advice of the State Vocational Advisory Council, will take into consideration the following premises in making allocations:

(a) Continuing support shall be given to ongoing programs.

(b) Manpower needs, job opportunities, and student needs have essentially equal weight and urgency for secondary and post-secondary and adult populations in Oregon.

(c) Eligibility for basic support of ongoing vocational programs, so far as manpower needs, job opportunities, and student needs are concerned, will be determined on a statewide basis at the state level, with supplementary justification secured as needed from local educational agencies.

(d) Allocations for basic support for secondary, post-secondary, and adult programs will be on a per-student basis, except that a portion of the funds may be designated for carrying out special activities such as program development and program evaluation.

(e) Short and long-range plans and priorities will be established which will provide for disadvantaged and handicapped students in regular vocational programs supported by Grant B funds. This will include an open-door policy for such students at the high school and post-high school level, additional guidance and instructional services, and provisions for cooperative agreements and efforts with other agencies at the

state level. Special vocational programs for these groups may also be provided.

3.11 Percentage Requirements

The policies and procedures to be followed by the State Board in allocating federal funds appropriated under the Act shall be in accordance with the following percentage requirements:

(a) At least 15 percent of funds appropriated under Section 102 (a) of the Act, or 25 percent of Oregon's allotment which is in excess of its base allotment, whichever is greater, shall be used only for vocational education for disadvantaged.

(b) At least 15 percent of the total allotment for any fiscal year to a state, of funds appropriated under 102 (a) of the Act, or 25 percent of that portion of the State's allotment which is in excess of its base allotment shall be used only for post-secondary education.

(c) At least 10 percent of the total allotment for any fiscal year to a state, of funds appropriated under section 102 (a) of the Act shall be used only for vocational education for handicapped persons.

(d) If an expenditure for vocational education falls within more than one of the categories for which there is a percentage requirement, the State Board, as it deems reasonable and proper, may count the expenditure as one of the categories or may prorate it to each.

The above percentage requirements of paragraphs (a) and (b) may be amended for any fiscal year upon request by the State Board and subsequent approval by the Commissioner upon his findings that the requirements impose a hardship or are impractical in their application.

3.12 Identification of Disadvantaged Persons

3.12-1 Criteria for Identifying

Following are some of the criteria that will be used to identify persons who are academically, socio-economically, or culturally disadvantaged, which prevent them from succeeding in vocational education or consumer homemaking programs designed for persons without such handicaps, and who for that reason require specially designed educational programs or related services.

A. Vocational Students with Special Academic Needs

Students with low-level ability or who lack reading ability, have limited vocabulary, or severe spelling deficiencies, or lack essential basic math skills.

EXPLANATION:

Students in this group may require special alternative methods of instruction such as audio tapes, pre-prepared math tables, diagrams or supportive remedial work directly related to the vocational subject matter. Determination by a reliable testing instrument that the individual is reading below the seventh grade level may well be indicative of this problem.

B. Vocational Students with Special Economic Needs

Persons from low-income families who have nutritional and other health needs and lack adequate finances to obtain essentials for going to school. Individuals who persistently rely on public assistance. Those who are economically illiterate.

EXPLANATION:

Students in this category may well be deterred more by the lack of or loss of motivation than the actual financial deprivation, especially in the case of 2nd and 3rd generation welfare

recipients. They are often highly dubious of the necessity or desirability of preparing for a career. They may be highly resistive to any program because of despair arrived at by constant failure. Often reluctance to attend class is exhibited because of their awareness of their relative position or lack of it in the economic scheme of things. Supportive services could well include involvement of other agencies and organizations in dealing with these individuals. Many of them may not be aware of the demands and requirements of specific occupations or even work itself.

C. Vocational Students with Special Social Needs

Students may be unable to adequately comprehend written or spoken English due to bilingual home or community environment, improper or anti-social behavior resulting from environment. Social customs or dress causing undue ridicule or rejection. A high incidence of conflict with the law may be indicative of a lack of acceptance or resentful attitude. May belong to a sub-culture which feels conflict with the establishment or a need to bring about a confrontation.

EXPLANATION:

Students in this category may be acting out because of resentment brought about by real or imagined lack of opportunities provided them by the economic community. A part of the problem may well result from an absence of successful suitable models to identify with in their home or locale. Some suitable supportive programs would be built around the promotion of understanding individual and cultural differences. Certainly the understanding of the problem by

the culturally disadvantaged individual is equally as important as the acceptance of him for his individuality.

3.12-2 Methods for Identifying and Recruiting

Local education agencies will be reimbursed for identifying disadvantaged students enrolled in approved vocational programs based on excess costs identified.

An active program to identify and enroll persons, classified as disadvantaged in 3.12-1 preceding, into vocational education programs designed to fit their needs will be pursued by the State Board. Referrals will be encouraged from persons in school and community settings. State agencies, i.e., Oregon Mental Health, Rehabilitation, Employment, Society for Crippled Children, etc., as well as private organizations will be encouraged to cooperate in this effort.

A. Identification of handicapped persons will be based on the following criteria:

(1) Hard of Hearing

Those in whom the sense of hearing, although defective, is functional with or without a hearing aid.

(2) Deaf

Those in whom the sense of hearing is nonfunctional for ordinary purposes of life.

(3) Speech Impaired

Defective when it is conspicuous, unintelligible, or unpleasant when it interferes with communication and/or causes maladjustment in the person.

(4) Visually Handicapped

A person is considered to be visually handicapped if his best corrected visual

acuity is 20/70 or less in the better eye, or if he is unable to attain a level of academic achievement commensurate with his mental ability because of a visual defect.

(5) Blind

A person is considered to be legally blind if his best corrected visual acuity is 20/200 or less in the better eye or if there is a field defect in which the peripheral field has contracted to such an extent that the widest diameter of visual field subtends an angular distance no greater than 20 degrees.

(6) Seriously Emotionally Disturbed

Persons who require special education in order to obtain the education of which they are capable, because they are socially or emotionally maladjusted to the extent that they cannot make satisfactory progress in the regular school program.

(7) Mentally Retarded

Persons who (a) because of well-established retarded intellectual development are incapable of receiving a common school education through regular classroom instruction but whose intellectual ability would indicate a possible scholastic attainment of third grade level with the benefit of special instructional methods; and (b) are competent in all aspects of the school environment except the academic.*

(8) Physically Handicapped

Physically handicapped persons are those who are crippled or chronically ill.

*Those persons with IQs ranging from 55-75 may be considered to be mentally retarded.

a. Crippled Persons
Those who have orthopedic conditions or motor impairment, congenital or acquired and which prevent successful functioning in an educational program temporarily or continuously.

b. Chronically Ill Persons
Those who have physical conditions which result from disease or impairment of any body systems and which prevent successful functioning in an educational program temporarily or continuously.

Persons certified by the special education section of the State Board will be presumed to meet the requirements.

B. School districts will be encouraged to identify handicapped persons enrolled in vocational programs in a like manner as prescribed for disadvantaged students in 3.12-2.

C. Handicapped persons may also be identified in work, and community settings. Individuals may be referred from organizations or agencies concerned with such persons or by an individual seeking a special vocational education program or service upon his own initiative. Testing and other diagnostic techniques used will be consistent with those used by other agencies to the degree possible.

D. Data from other government agencies such as the Office of Economic Opportunity and the Social and Rehabilitation Service will be used to help identify and assist districts in establishing their degree of need.

3.14 Manpower Needs and Job Opportunities

The State Board will give due consideration to manpower needs and job opportunities in establishing training programs and in allocating funds to local educational agencies as described in section 3.26-1 of the Continuing Plan for Vocational Education, utilizing the manpower and job opportunity data shown in Table 1, page 190 of the long-range plan.

The allocation of funds will be predicated upon analysis of manpower and job opportunity information maintained under constant revision and available through the Oregon Employment Service.

In allocating funds to the various purposes, manpower needs and job opportunities will carry equal weight for the following reasons:

1. All vocational education programs, to be eligible to receive federal funds, must be established and operated on the basis that manpower needs exist in the occupational area in which the training is being given.
2. Available manpower data and vocational education enrollment statistics indicate that the present resources, both public and private, being devoted to training is only partially meeting manpower needs in all areas identified.
3. The objectives, depth and breadth of vocational education programs for each group are different as they reflect various levels of entry employment, thus making it impractical to establish priorities.

3.15 Vocational Education Needs of Groups to be Served

(a) The program of instruction in vocational education for the State will be designed to train or retrain youth and adults for gainful employment in recognized occupations or to prepare persons for enrollment in advanced vocational-technical programs as provided for

in 3.1 of this part of the State Plan. This training shall be available to the following groups of persons:

(1) Those persons attending high school (secondary).

(2) Those persons who have completed or left high school and who are available for full-time study in preparation for entering the labor market.

(3) Those persons who have already entered the labor market and who need training or re-training to achieve stability or advancement in employment.

(4) Disadvantaged persons who have academic, socio-economic, cultural, or other handicaps that prevent them from succeeding in regular vocational education programs designed for persons without such handicaps and who for that reason require specially designed educational programs or related services or both in order for them to benefit from a vocational education or consumer and homemaking education program.

(5) Handicapped persons, as identified in section 3.13 of this part of the State Plan.

(b) The State Board will base the annual allocations of Grant B funds for regular secondary, post-secondary and adult programs on the projected total number of full-time equivalent students for the year. The projected number of students will be considered in relation to the Board's long-range goal for each group, determined as outlined in 3.26-2 of this part of the State Plan.

A part of the allocation for each of these purposes will be designated by the Board for use in providing

such ancillary services as teacher education, curriculum development and developmental projects, deemed essential to the development and operation of the educational programs.

(c) Consideration will be given to the special needs of disadvantaged and handicapped persons enrolled in regular vocational programs through special payments to local districts as outlined in 3.27-1 of this part of the State Plan.

3.2 Allocation of Funds to Local Educational Agencies for Programs, Services, and Activities

3.21 Local Applications

(a) Applications for regular vocational education programs will contain the following information:

(1) Type of program, content and area of instruction.

(2) Personnel and their qualifications.

(3) Justification for amount of federal and State funds requested.

(4) Amount and source of funds other than federal and State.

(5) An identification of education and training resources available for consultation.

(6) An identification of career preparation potential.

(7) The local schools' long-range vocational education plan (5-year).

(8) Explanation of how proposed program will help achieve goals of long-range plan.

(9) Population groups which are to be served if any (handicapped, disadvantaged, etc.).

(10) Availability of vocational counseling and guidance.

(11) Assurance of maintenance of local effort.

(12) Provision for local program evaluation.

(b) Special grant vocational education projects for disadvantaged and handicapped:

The local education agency makes application for special grant projects by submitting to the State Board or its authorized representatives an application requesting funds. In addition to information requested in section 3.21(a), the applications will include the following:

(1) Unemployment in the area.

(2) Student dropout statistics.

(3) Information on low income groups.

(4) Provisions made for participation of students from nonprofit private schools.

(5) Pertinent ancillary services to be provided such as special facilities, equipment and staff capabilities to meet the program's needs.

(6) Student eligibility for enrollment.

3.22 Procedures for Processing Local Applications for Vocational Programs

3.22-1 Programs, Services, and Activities Undertaken by The State Board

The State Board may enter into contracts with public and private agencies to provide services that have statewide implications for vocational education from the ancillary portion of the budget. Priorities for these services will be established by the State Board staff based on identified program needs and in keeping with the long-range and annual plan.

3.22-2 Programs, Services, and Activities Undertaken by Local Education Agencies

(a) Applications for regular vocational programs will be reviewed by State Board staff to insure that they meet requirements for

approval. Programs that qualify will be reimbursed in accordance with the formula outlined in section 3.27 of this part of the State Plan.

(b) For set aside funds provided for under Part B of the Act the following procedures will be followed by the State Board or its authorized representatives in determining the approval, disapproval, or deferral, notification of applicant and provisions of letter of award or contract:

(1) Project proposals will be reviewed by a panel of experts who have knowledge of the needs of youth who have dropped out, become unemployed or underemployed, or who have socio-economic problems. Representatives may include persons of the State Advisory Council, chosen from the State at large, and personnel of the State Board who have program responsibility for residential vocational programs.

(2) Panel reviewers will be particularly concerned with program development, but, will rate all aspects of the program, using criteria in section 3.27-2 in a weighted scale. (See page 47)

(3) Board of Education personnel will make final evaluation of proposals using the review panel's findings and other pertinent criteria as a basis for recommendations to the State Board.

(4) Board of Education staff will compile all information and will make their recommendations to the State Board or its authorized representative within four weeks of the date of submission.

EVALUATION CRITERIA FOR DETERMINING PRIORITY FOR REIMBURSING SPECIAL VOCATIONAL EDUCATION PROJECTS FOR HANDICAPPED OR DISADVANTAGED

CRITERIA	Weight Applied by Panel Column 1	High 5	4	3	2	Low 1
1. Impact on unemployment of youth 18-24.	_____					
2. Impact on school dropouts.	_____					
3. Impact on needs of handicapped*.	_____					
4. Impact on needs of disadvantaged*.	_____					
5. Impact on local and State manpower needs.	_____					
6. Impact on adult unemployment.	_____					
7. Impact on economically depressed areas.	_____					
	==========					
TOTAL	_____					
Average score of total evaluation	_____					

Assurance that program cost will be reasonable	Yes_____ No_____
Assurance of interagency cooperation	Yes_____ No_____
Programs will be represented by advisory committees	Yes_____ No_____

* If program is for handicapped, disregard item 3; if for disadvantaged, disregard item 4.

(5) The State Board or its authorized representative will make final approval.

(6) Announcements of such disposition will be made approximately on or before the day which is six weeks after the announced final submission date.

(7) Projects will be placed in two categories: approved and not approved.

(8) Approved proposals will be subject to budget and grant negotiations between the submitters of the proposal and the Oregon Board of Education.

(9) Unapproved proposals will be declared unapprovable for stated reasons. These proposals may be resubmitted at the next funding period after changes have been made that the submitters feel make the proposal approvable.

(10) Submitters of proposals will be notified by letter from the Superintendent of the approval or nonapproval of their proposal.

3.22-3 Coordination With Other State Agencies

All State agencies developing manpower training programs designed to improve the quality and employability of the Oregon work force, are directed to present their proposals to the committee for inclusion in a total manpower State Plan for Oregon. Members of the Governor's Manpower Coordinating Committee serve as liaison persons with the Governor's Advisory Council for Vocational Education by joint membership.

3.23 Procedures for Processing Local Applications for Construction

3.23-1 Projects Undertaken by the State Board

Construction projects for area vocational school

facilities, including acquisition, expansion, and alteration, to be initiated and administered by the State Board will receive approval through legislation submitted by the Oregon Board of Education to the legislative assembly.

3.23-2 Projects Undertaken by Local Education Agencies

Educational agencies shall submit applications for proposed area vocational education construction projects to the State Board of Education or its authorized representative. The application will include as a minimum the following items:

(a) General description of the project, with due consideration shown for manpower needs and job opportunities, including recognition of new and emerging occupations.

(b) Evidence that a suitable site is available and geographically convenient to the needs of all population groups.

(c) Evidence of ability to finance local share.

(d) Educational specifications of the project including assurance that the facility will be for exclusive or principal use in approved vocational programs.

(e) Estimated costs.

Review of Application

The State Board, or its authorized representative, will review the application for the proposed project and evaluate the educational advisability of the project in terms of the following criteria:

(a) impact on needs of disadvantaged youth;

(b) impact on reducing youth unemployment;

(c) extent of cooperation between the local education agency and local manpower agencies;

(d) evidence of future planning to insure that programs will meet immediate as well as long-range needs;

(e) evidence that the facility will be functional and meet the needs of the individuals and community to be served;

(f) evidence that costs estimates will be reasonable and that the project will not be elaborate and extravagant in design;

(g) evidence that adequate provision will be made for the selection with respect to sex, race, color, religion, national origin, and place of residence within Oregon of students needing education and training; and that such facilities will not be used in a manner resulting in racial segregation;

(h) evidence that vocational course offerings include fields selected on the basis of market analyses that indicate need for trained manpower;

(i) evidence that vocational courses will be designed appropriately to prepare enrollees for entry into employment or advancement in such fields.

Action on Application

The State Board of Education or its authorized representative, after determining approval, disapproval, or deferral, will notify by letter of action taken on applications.

3.23-3 Coordination With Other State Agencies

Construction projects undertaken by the State Board and/or local education agencies must be reviewed and approved by the School Facilities Section of the Oregon Board of Education. All plans are reviewed in cooperation with the Bureau of Health, Bureau of Labor, Safety Commission, and State Fire Marshal.

3.24 Maintenance of Effort

Federal funds authorized under part B of the Act will not be used to supplant State or local funds, but will be used to supplement and, to the extent practical, increase the amount of State and local funds that, in the absence of such federal funds, would be made available for the purposes set forth in section 3.15 of this part of the State Plan. The purpose is to assure that all persons in all communities of the State will have ready access as soon as possible to vocational education suited to their needs, interests, and ability to benefit therefrom.

No payments of Federal funds under the Act will be made in any fiscal year to any local educational agency unless the State Board finds that the combined fiscal effort of that agency and the State with respect to the provision of vocational education by that agency for the preceding fiscal year was not less than such combined fiscal effort for that purpose for the second preceding fiscal year. For the purpose of this paragraph, "combined fiscal effort" means total expenditures of State and local funds with respect to the provision of vocational education by the local educational agency. A combined fiscal effort in the preceding fiscal year shall not be deemed to be a reduction from that in a second preceding fiscal year unless the per student expenditure for vocational education and ancillary services and activities from State and local funds in the preceding fiscal year is less than that in the second preceding fiscal year by more than 5 percent. Any such reduction in combined fiscal effort for any fiscal year by more than 5 percent will disqualify a local educational agency unless the local educational agency is able to demonstrate to the satisfaction of the State Board that such a reduction was occasioned by unusual circumstances that could not have been fully anticipated or reasonably compensated for by the local educational agency and that the fiscal effort of the local educational agency

does not otherwise indicate a diminished fiscal effort. Such unusual circumstances may include in the first preceding fiscal year unforeseen decreases in revenues due to the removal of a large segment of property from the tax rolls or other causes, or transfers to, or combinations with, other local educational agencies of responsibility for the conduct of some or all vocational education activities or services; or, in the second preceding fiscal year, contributions for large sums of money from outside sources on a short-term basis, or unusually large amounts of funds expended for such long-term purposes as the construction and acquisition of school facilities or the acquisition of equipment.

3.25 Matching

3.25-1 Overall State Matching

Federal funds will be allocated to local education agencies in a manner which will result in at least one dollar of State and local funds being expended for each dollar of federal funds expended for vocational education programs, services, and activities, but not in a manner which requires local educational agencies to match federal funds at a percentage ratio which is uniform throughout the State.

3.25-2 Reasonable Tax Effort

No local educational agency with taxing authority which is making a reasonable tax effort will be denied funds for the establishment of new vocational education programs solely because it is unable to pay the nonfederal share of the cost of such programs. For purposes of this paragraph, an "Effort Ability Rating" index will be used to identify those schools which are making a reasonable tax effort. This index is arrived at by comparing the school's true cash

value per average daily membership to the school's operating millage. Results are then listed in rank order for the State's 125 secondary school districts in one index and the twelve community colleges in another. Those school districts rated on or above the median in their respective indices are considered to be making a reasonable tax effort.

Information relative to the "Effort Ability Rating" index is provided for, and kept current by, the school finance division. Sources of information include quarterly school enrollment reports and annual county tax reports. Tax roll reports provide millage levies assessed for individual school districts in addition to the true cash value of property being assessed.

3.26 Criteria for Determining Relative Priority of Local Applications

The State Board must consider manpower needs and job opportunities, differences in vocational education needs, relative ability of educational agencies to pay, and relative costs of programs in the allocation of funds to local education agencies. The Board will utilize the premises as described under each of these factors in making such allocation.

3.26-1 Manpower needs and Job Opportunities

Occupational data pertinent to the statewide manpower needs is provided by the Department of Employment. The data is obtained by survey of all wage and salary segments, including technical and professional occupations in the State of Oregon. Concentration is centered upon the three metropolitan areas, (Multnomah, Marion, and Lane counties), plus a residual of other counties representing the non-metropolitan areas.

Evaluation and updating of the skill survey data will be performed on an annual basis. Future data collection and updating may be compiled by using the fourteen CAMPS districts as a grouping basis for coordinated planning. The long-range plan for vocational education will be based on data derived from the statewide skill survey to identify present and projected manpower needs that will provide a sound basis for continued program expansion. Table 1, page 190 of the Long-Range Plan provides a summary of the data that will be utilized.

All local education agencies must submit evidence through their applications that the vocational programs they plan to operate will meet current and projected manpower needs and job opportunities to be eligible to receive federal funds. The statewide skill survey will serve as the primary source of information to show this evidence; however, other local and national manpower data may also be utilized. All vocational programs will be approved on the basis of meeting identified manpower needs which may be established in the following ways:

(1) Secondary vocational programs based on statewide developed cluster curriculums will be given first priority for approval.

The occupational cluster concept combines logically related occupations into groups on the basis of having identical or similar teachable skill and knowledge requirements.

The curriculum is, therefore, centered upon the knowledge and skills common to the occupations comprising a "cluster" which will prepare students for entry into an "area" or "family" of occupations rather than any specific one.

The determination of the occupational clusters is derived from the statewide skill survey and the Dictionary of Occupational Titles.

To best meet the manpower needs of the State, and to serve a maximum number of individual students, the occupational clusters were required to contain a minimum of 10,000 full-time employees and exhibit a projected five-year need of 2,000 additional employees. (See Appendix, page 155 for the list of clusters and number of jobs involved.)

Additional clusters will be identified by periodic evaluation of local, state, and national manpower studies. Long-range planning for vocational education will utilize a comparison of student input in public and private training institutions and their related manpower output. This will provide basis for additional cluster development, revision, and reorientation of the existing cluster program.

(2) Secondary vocational programs based on other clusters using a similar rationale to the above will be approvable providing the data analysis is not overlapping.

(3) Local educational agencies, including post-secondary and adult, with vocational programs will be required to provide manpower data that shows evidence of meeting manpower needs in that occupation or occupational area.

(4) Analysis of follow-up studies and other evaluation data as described in Section 1.5 of this part of the State Plan will be made annually to determine how adequately the training output is actually meeting identified manpower needs so that long-range program plans may be adjusted as needed.

3.26-2 Vocational Education Needs

(a) Secondary

The State Board has established long-range goals of the number of high school students who should have access to vocational education and the number who should be enrolled in such programs. These goals have been developed in cooperation with the State Advisory Council, representative secondary school personnel, labor and management representatives, and representatives of interested agencies and organizations. They are based on analysis of statewide manpower and employment data, student interest surveys, follow-ups of students, and other pertinent information. The goals are reassessed periodically in light of educational and employment developments.

Annual allocations of funds and other resources are based on anticipated progress toward the established goals. The number of students enrolling in vocational programs is taken as the primary indication of the current need for financial support.

(b) Post-Secondary and Adult

The need for post-secondary and adult programs is primarily determined by the individual community colleges through such procedures as analysis of local and regional data, consultation with local advisory committees and groups, and regional studies of need. These needs are reflected in a long-range projection of programs and enrollment developed by each college as a

part of its required long-range plan. The enrollment projections are revised annually and are approved by the State Advisory Council, the State Board and the State Educational Coordinating Council after review by the State staff and consultants selected from appropriate agencies.

The projected annual enrollment in vocational programs is used as the primary indication of the current need for financial support.

Financial support on the per student basis with both State and federal funds includes provision for comprehensive vocational counseling and guidance and basic compensatory instruction as an integral part of the program.

(c) Disadvantaged and handicapped students in regular vocational education programs will be identified as outlined in 3.12 and 3.13 of this part of the State Plan. Additional funds will be required to serve the needs of this group to cover the added costs of vocational guidance and counseling, special teaching assistance and instructional materials. (These costs are not normally accounted for, but are readily identifiable.)

Information on the disadvantaged and handicapped persons not being served in vocational programs will be obtained from such sources as the State and local agencies for welfare and rehabilitation, community service organizations, and local education agencies. The information will be used in reviewing the adequacy of ongoing programs and in planning with the local education agencies for the amount and kinds of additional educational services needed.

(d) The results of the periodic evaluations described in 1.2 of this part of the State Plan will be used to modify long-range plans, to phase programs in or out of areas as changing needs may dictate, and to help identify student needs.

3.26-3 Relative Ability to Provide Resources

(a) All secondary school districts will be ranked according to their relative ability to support a vocational program. The relative ability will be based on the tax effort a district would have to make if no federal supplemental grants were available. Districts with low ability will receive varying amounts of supplemental Grant B funds in order that all such districts may make a uniform effort. The tax effort is the locally incurred costs in relation to assigned wealth.

(b) Post-secondary and adult programs are provided by the State's system of locally controlled community colleges. The high level of State support for program operation and for construction permits the operation of programs with a relatively low level of local tax support. On a statewide basis, local funds provide for approximately 20% of total operating costs, with district taxable wealth per student generally higher in those districts with a higher percentage of local funding. In light of these conditions, it is deemed that all community colleges have an ability to pay that minimizes the need for a factor in fund allocations to compensate for any variance in ability to support an adequate program.

The State Board will review annually the application of a funding differential as the stages of development of all colleges become more uniform.

The relative true cash value of taxable property in the districts will be the basis of the funding differential.

(c) In addition to (a) and (b) above, the relative ability to provide resources will be one of the factors considered in approval of special projects from set-aside funds.

3.26-4 Relative Costs of Programs and Activities

The federal funds allocated as basic support for regular programs are designed to offset part of the demonstrated excess costs of vocational programs over comparable general education programs. The excess per pupil cost will be utilized as a factor in computing reimbursement at the secondary and post-secondary levels.

(a) Secondary Vocational Excess Costs

Excess costs for secondary vocational programs will be determined by using each district's average costs per ADM and using a ratio of their average class size of approved vocational programs versus all education programs. This is based on the assumption that per pupil costs may be directly related to class size since approximately 70% of the program's operating costs is attributed to instructor salaries and a significant part of the other costs are the same regardless of the number of students involved.

Current accounting practices do not provide a breakdown of actual program costs for individual courses.

(b) Post-Secondary and Adult Program Excess Costs

The primary basis of the federal fund payments to community college post-secondary and adult programs is the added cost of providing and operating these programs as compared to their other educational programs. State fund support is at the same level for both vocational and non-vocational programs. Comparative operative costs data for the total vocational program and the total nonvocational program are reported annually by each of the community colleges. Limited comparative data are also available for capital expenditures. Total costs of construction are reported at the time of construction.

Because the excess costs of providing the vocational program at any one institution vary widely from year to year because of the times at which capital expenditures are made, the allocation of federal funds to institutions is made by applying excess costs of the vocational education programs on a statewide basis.

A second excess cost factor taken into account is the higher cost of providing programs in the smaller colleges. This factor is taken into account by providing a higher per-student payment for a minimum number of vocational students. This principle has been applied to the allocation of State operating cost funds for community colleges by State legislative action.

3.26-5 No other criteria

3.27 Application of Criteria in Determining the Relative Priority of Local Applications

3.27-1 Regular Vocational Programs

All program applications received from local education agencies will be reviewed in light of the four factors outlined in Section 3.26 of this part of the State Plan. Programs or parts of programs which do not meet the manpower criteria outlined below will not be considered for federal fund support. All approved programs will be eligible for federal fund support, with the amount of federal funds for each district to be determined on the basis of the three remaining factors of vocational education needs, relative program costs, and relative ability to provide resources as outlined in the following.

Manpower needs and job opportunities

All local education agencies must submit evidence through their applications that the secondary and post-secondary and adult vocational programs they plan to operate will meet current and projected manpower needs and job opportunities to be eligible to receive federal funds. The statewide skill survey will serve as the primary source of information to show this evidence; however, other local and national manpower data may also be utilized. All vocational programs will be approved on the basis of meeting identified manpower needs as outlined in 3.26-1.

Determination of amount of federal fund support

Secondary and community college reimbursement will be computed separately, with each district's reimbursement being computed from enrollment forms indicating number of vocational students in approved

vocational programs. Preliminary estimates for budget purposes will be obtained from district applications which include their vocational education plans for the ensuing year.

(a) Secondary Reimbursement

The formula has been developed to distribute the Grant B funds for regular secondary programs, taking into account the excess costs incurred by each district in conducting its vocational education program, its relative ability to support such a program and an additional cost factor for disadvantaged and handicapped students in regular vocational programs. The funds will be distributed on a per pupil basis three ways:

(1) A student needs grant based on the number of disadvantaged and/or handicapped students enrolled, and the amounts to be used for grants for disadvantaged and handicapped students will be based on the estimated number of students in these categories and identified cost factors that are applicable to accommodating these students in a regular program.

(2) A basic vocational education excess cost grant. The amount of the secondary program allocation to be devoted to the basic grant will be determined annually by the State Board, taking into account the federal funds available, the projected enrollments and the estimated amount of the excess costs. An approved excess cost per vocational pupil will be determined for each district on the bases of

the actual cost per secondary pupil, the comparative student-teacher ratios for vocational programs and other programs, and the special facilities and services required. Available funds will be prorated among districts on the basis of their total approved excess costs for their vocational programs.

(3) A supplementary vocational education grant varying with the district's relative ability to pay. The balance of the funds, but not less than 15%, will be applied to the supplemental grant particularly related to ability to pay. The amount of each district's payment will be based on its relative ability to support a basic level of expenditures for vocational programs as indicated by the district's true cash value per secondary average daily membership and on its relative expenditure per vocational student. The method to be used in distributing this grant is in accord with the practices used in the State's equalization program for Basic School Support.

The formula for reimbursing secondary programs follows:

(1) The student needs grant for disadvantaged and handicapped students enrolled in vocational education programs is determined for each district as follows:

$$\text{Student Needs Grant} = \frac{\text{Total Student Needs Grant}}{\text{Statewide No. Enrolled}} \times \text{Dist. No. Enrolled}$$

(2) The basic excess costs vocational education grant is determined as follows:

(a) Determine each district's total approved vocational education excess cost.

$$\text{Approved Excess Cost*} = \left[\frac{\text{Av. Sec. Cost/ADM**} \times \text{Sec. Pupil Teacher Ratio}}{\text{Pupil Teacher Ratio for Voc.Ed.}} - \text{Av. Sec. Cost/ADM}\right] \times \text{Voc.Equiv.ADM***}$$

* The approved excess cost will be the actual excess cost as determined by formula, except that it shall not exceed maximum nor be less than minimum per vocational ADM, to be determined by an analysis of annual cost data. A minimum approved excess cost is justified on the basis of additional capital and operational expenditures due to the special facilities required for vocational programs.

** Vocational equivalent ADM is determined by dividing the number of weighted vocational pupils by three.

*** ADM is - Average Daily Membership.

(b) Determine each district's basic grant by the following formula:

$$\text{Basic Grant} = \frac{\text{Total Basic Grant}}{\text{Statewide Excess Cost}} \times \text{District Excess Cost}$$

(3) The supplementary grant is determined as follows:

(a) Determine relative ability rate. The relative ability rate, determined annually, represents the tax rate which, when applied to the assigned true cash value of taxable property of the eligible districts, will distribute the supplement grant funds to those districts receiving them at a uniform rate. Districts

receiving a basic vocational education grant only will be able to support their vocational programs at a lower rate than that required of the supplemental grant districts.

To determine the rate, participating districts will be ranked according to their ability to support their vocational education programs, independent of the supplementary grant. Starting with the least able district, the components of the formula are cumulated and a rate established at each point of cumulation by the following:

$$\text{Ability Rate} = \frac{\text{Cum.Statewide Excess Cost} - \text{Cum.Basic Grant} - \text{Total Supp.Grant}}{\text{Cumulative TCV of Participating Districts*}}$$

* This is a cumulative total of assigned districts true cash value (TCV) from the following formula:

$$\text{Assigned District TCV} = \frac{\text{1/3 Total True Cash Value}}{\text{ADM} - 12} \times \text{Voc. ADM}$$

The rate derived by this formula will increase to a maximum as the components of the formula increase; beyond this point the rate will decrease. The rate chosen is that at the maximum point.

(b) District's supplementary grants are determined by the following formula:

$$\text{Supp. Grant} = \text{Approved Excess Cost} - \text{Basic Grant} - (\text{Ability Rate} \times \text{Assigned Dist. TCV})$$

1628

(b) Post-secondary and Adult Reimbursement

The formula has been developed to distribute the Grant B funds for regular vocational education programs to each community college on a full-time equivalent student (FTE) basis with consideration of three factors:

(1) A student needs grant.

The amounts to be used for grants for disadvantaged and handicapped students will be based on the estimated number of students in these categories and identified cost factors that are applicable to accommodating these students in a regular program.

(2) A basic vocational education excess cost grant.

The amount of the post-secondary and adult allocation to be devoted to the basic grant will be determined annually by the State Board, taking into account the federal funds available, the projected enrollments and the estimated statewide excess costs.

(3) A supplementary grant related to the district's ability to pay.

The amount to be used for the supplementary grant related to ability to pay will be determined annually by the State Board on the basis of current differences in the ability of operating districts to support adequate vocational programs as indicated in

Section 3.26-3 (b) of this part of the State Plan. As indicated in 3.26-3 (b), the funding pattern of the statewide community college program minimizes the need for consideration of the relative ability to provide resources. Not less than ten percent of the post-secondary and adult allocation will be used for this grant.

The allocations to individual institutions will be made as follows:

(1) The student needs grant will be distributed by the method used for secondary school districts as outlined in 3.27-1 (a) of this part of the State Plan.

(2) Under the basic grant all community colleges will receive an established amount for each FTE of actual enrollment up to a designated maximum. The rate and the maximum enrollment to which it applies will be determined annually, taking into consideration total enrollments, funds available, the number of institutions and the excess cost factor.

All institutions with enrollments above the designated maximum will receive a prorated amount of the remaining funds for each student FTE of actual enrollment in excess of the maximum.

The following is an example of the application of the basic grant under assumed conditions of $130 per FTE for the first 200 FTE and a prorated amount of $80 per FTE for additional enrollment:

a) College X with an actual enrollment of 350 FTE in post-secondary and adult programs:

200 FTE @	$130 =	$26,000
150 FTE @	80 =	12,000
Total		$38,000

Ave. FTE Reimbursement $108.58

b) College Y with an actual enrollment of 1,800 FTE in post-secondary and adult programs:

200 FTE @	$130 =	26,000
1,600 FTE @	80 =	128,000
Total		$154,000

Ave. FTE Reimbursement $ 96.25

(3) The formula for distribution of supplementary grants will be based on the relative true cash value of the local districts.

3.27-2 Criteria for approval of allocation for special grant projects as applicable:

(a) Impact on unemployment of youth age 18 to 24.
(b) Impact on school dropouts.
(c) Impact on needs of handicapped.
(d) Impact on needs of disadvantaged.
(e) Impact on local and State manpower needs.
(f) Impact on adult unemployment.
(g) Impact on economically depressed areas.
(h) Assurance that program cost will be reasonable.
(i) Assurance of interagency cooperation.
(j) Assurance that programs will be represented by advisory committee.

3.28

Provisions may be made for vocational education youth organizations and their activities which complement vocational instruction. They will be supervised by State program specialists and may be assisted by other persons who are qualified as vocational education teachers and/or supervisors within the State.

4.0 Vocational Education Programs for the Disadvantaged

In addition to the provisions in 1.0, 2.0 and 3.0 of this part of the State Plan, the following special provisions apply to programs for the disadvantaged supported with federal funds under section 102 (b) of the Act:

4.1 Required Allocation of Funds to Certain Areas

The State Board will allocate funds for programs for the disadvantaged located in areas of the State with a high concentration of youth unemployment and school dropouts which meet the criteria as defined in sections 1.10d, 3.1, and 3.27 of this part of the State Plan.

4.2 Participation of Students in Nonprofit Private Schools

To be eligible for federal funds provided for in part 102 (b) of the Act, local education agencies shall give assurance that there will be genuine and meaningful participation in all cooperative vocational education programs of students enrolled in nonprofit private schools. Each program and project carried out under Part B supported by funds allotted under 102 (b) and Parts D and G of the Act shall be designed to include, to the extent consistent with the number of students enrolled in private nonprofit schools in the geographic area served by the program or project, vocational education services which will meet the vocational education needs of such students. Such services may be provided through such arrangements as dual enrollment, educational radio and television, or mobile equipment, and may include professional subprofessional services.

The vocational education needs of students enrolled in private nonprofit schools located within the geographic areas served by the program or project, the number of such students who will participate in the program or project, and the types of vocational education services which will be provided for them shall be determined, after consultation with persons knowledgeable of the needs of those students, on a basis comparable to that used in providing such vocational education services to students enrolled in public

schools. Each application submitted by the local educational agency to the State Board shall indicate the number of students enrolled in private nonprofit schools who are expected to participate in each program and project proposed by such agency and the degree and manner of their expected participation. Public school personnel may be made available in other than public school facilities only to the extent necessary to provide vocational education services required by the students for whose needs such services were designed, and only when such services are not normally provided at the private school. The State Board or local educational agency providing such vocational services to students in private nonprofit schools shall maintain administrative control and direction over such services; and each application from a local educational agency providing such services shall so provide. Vocational education services provided with federal funds shall not include the payment of salaries of teachers or other employees of private schools, except for services performed outside their regular hours of duty and under public supervision and control, nor shall they include the use of equipment, other than mobile or portable equipment, on private school premises or the construction of private facilities. Mobile or portable equipment may be used on private school premises for such period of time, within the life of the current program or project for which the equipment is intended to be used, as is necessary for the successful participation in that program or project by students enrolled in private schools.

Any program or project to be carried out in public facilities, and involving joint participation by students enrolled in private nonprofit schools and students enrolled in public schools, shall include such provisions as are necessary to avoid forming classes that are separated by the school enrollment or religious affiliation of such children.

4.3 Noncommingling of Funds

Oregon State law provides in ORS 294.460 that:

> "(2) It shall be lawful to commingle cash balances of funds so long as all fund monies are segregated in the budget and accounting records."

Local educational agencies that accommodate students of nonprofit private schools for vocational education instruction shall be required by accounting and audit regulations to provide separate fund accounting that will identify federal funds used for such purposes.

5.0 Vocational Education Research and Personnel Training

In addition to the provisions in 1.0 and 2.0 of this part of the State Plan, the following special provisions apply to research and training supported with federal funds under part C of the Act.

5.1 State Research Coordinating Unit

A Research Coordinating Unit for vocational education will be established and operated for the following purposes related to promotion and coordination of innovative approaches to teaching and learning among the various educational agencies: local, state and federal.

The Research Coordinating Unit will focus attention on particular areas of priority established by the State Board with advice and counsel of the State Advisory Council for Vocational Education as it serves the State by coordinating research and development activities. Major emphasis will be placed on the priorities reflected in the annual and long-range plans as they relate to:

(a) Research and training programs--dealing with the mission-oriented development of materials, techniques and processes, or a combination of these;

(b) Experimental, developmental or pilot programs--dealing with outcomes that are known and describable, and those created to determine whether materials, techniques or processes can accommodate to a new or different setting;

(c) Dissemination of information from research and demonstration programs--which are specific to the ordinary ways in which professionals seek, obtain, and utilize information.

The Research Coordinating Unit may be established under the auspices of the State Board, as an arm of the State Board or under a contractual arrangement with other agencies. The Unit will consist of two branches: Advisory and Administrative (see Sample Organization Chart, Appendix, Other, page 187). The Unit will be physically and administratively located in an environment where operational constraints can be minimized as nearly as possible within usual administrative constraints imposed by parent organizations.

5.1

The Unit staff will expand to full complement and be reorganized as the nature, purposes, and objectives of the Unit are assessed and reoriented to the demands, and as fiscal support is appropriated.

5.2 Application Procedures

Priorities for research and development activities provided by the various sections of the Act will be established by the State Board with advice and counsel of the State Advisory Council for Vocational Education. The degree of congruency between the research and development proposals and application for grants or contracts and the established priorities shall provide the primary criterion for application approval and funding of the proposed project.

Appropriate guidelines, instructions for making application for grants and contracts, and contract award documents provided for under the Act will be provided for by the State Board (see Administrative Flow Chart for research and development proposals, Appendix, Other, page 188).

5.21 Submittal of Application

Applications will describe the nature, duration, purpose and plan of the project; the use to be made of the results in regular programs of vocational education; the qualifications of the personnel who will be responsible for the program or project; a justification of the amount of grant or contract funds requested; the proportion of the cost to be borne by the applicant; and the means of disseminating the results of the project.

Prior to submitting an application and/or a proposal for funding, it is recommended that:

(a) An abstract of the proposal be prepared and sent to the funding agency. The proposal abstract shall be reviewed by the staffs of the State Board and the Research Coordinating Unit for relevance nad congruency with state-level priorities.

Upon recommendation of the staffs reviewing the proposal abstract and at the discretion of the Director of Career Education, a planning grant may be made to the applicant to assist in development of the proposal.

All proposals will be required to include the performance objectives of the project or program and to provide for evaluation from outside the applicant agency or organization.

Applications for programs wholly or partly funded under this part of the Act shall stipulate that no person shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program before it shall be approved by the State Board.

An organization or agency or a group of organizations or agencies acting in concert shall submit to the State Board in writing the name of the individual who will have the legal authority to act in their behalf.

5.22 Review of Applications

When proposals are received by the State agency, they will be reviewed by selected State staff, the Research Coordinating Unit staff, and members of an ad hoc proposal review team, composed of persons knowledgeable in the subject matter field of the proposal.

In reviewing the proposals, due consideration will be given to such factors as:

(1) Relevance to the priorities established by the State Board, to priority areas in vocational education specified in the long-range program plan, to vocational education programs, services, and activities described in the annual plan;

(2) Adequacy and competence of personnel designated to carry out the program or project;

(3) Adequacy of facilities;

(4) Reasonableness of cost estimates;

(5) Expected potential of the proposed program or project being made a part of the regular vocational education program; and

(6) The expected potential for utilizing the results of the proposed programs or projects in exemplary or regular vocational education programs.

Board of Education personnel will make final evaluation or proposals using the review panel's findings and other pertinent criteria as a basis for recommendations to the State Board.

5.23 Action on Applications

Procedures in taking action on applications include the following:

(1) Board of Education staff will compile all information and will make their recommendations to the State Board or its authorized representative.

(2) The State Board or its authorized representative will take final approval action to either:

(a) Approve the application in whole or in part,

(b) Disapprove the application, or

(c) Defer action for a stated reason.

(3) The State Board will notify the applicant in writing of the disposition of the application.

In addition to the procedures outlined above, the State Board in acting on applications shall:

(1) Provide that any deferral or disapproval of an application will not preclude its reconsideration or resubmission.

(2) Include in the award letter for any State Board grant or contract award, the approved budget and grant or contract award conditions which the applicant will accept in accordance with State law.

5.3 Notification to the Commissioner

Within 15 days after notification of project or program approval, the State Board staff will notify the Commissioner of Education of the approval of grants or contracts, and will forward a copy of the proposal for the program or project for which the grant or contract was made.

6.0 Exemplary Programs and Projects

Grants for exemplary programs or projects may be made to local educational agencies or other public or nonprofit private agencies, organizations, or institutions; and contracts for such programs and projects may be entered into with public or private agencies, organizations, or institutions, including business and industrial concerns. In addition to the provisions in 1.0 and 2.0 of this part of the State Plan, the following special provisions apply to exemplary programs and projects supported with federal funds under Part D of the Act:

6.1 Application Procedures

6.11 Submittal of Application

Applications for programs to be funded under part D of the Act shall:

(1) Describe the nature, duration, plan and purpose of the project, the use to be made of the result in regular programs of vocational education, the qualifications of the personnel staff who will be responsible for the program or project, a justification of the amount of grant or contract funds requested, the portion of the cost (if any) to be borne by the applicant, and such other pertinent information as the State Board may require.

(2) Identify the individual authorized to represent the applicant and submit the project proposal to the State Board.

(3) Provide for the participation of students in nonprofit private schools, according to provisions as set forth in 4.2 of this part of the State Plan.

Prior to submitting an application and/or a proposal for funding, it is recommended that:

(1) An abstract of the proposal be prepared and sent to the funding agency. The proposal abstract shall

be reviewed by the staff of the State Board for relevance and congruency with state-level priorities.

(2) If the proposed project is deemed to deserve more attention, it will be returned to the local educational agency with instructions for the development of a formal proposal and application.

Upon recommendation of the staff's reviewing the proposal abstract and at the discretion of the Director of Career Education, a planning grant may be made to the applicant to assist in development of the proposal.

All proposals will be required to include the performance objectives of the project or program and to provide for evaluation from outside the applicant agency or organization.

6.12 Review of Applications

Applications submitted will be reviewed by selected State staff and by an ad hoc proposal review committee composed of persons competent to evaluate the programs and projects. In reviewing the applications, consideration will be given to:

(1) Impact of program on meeting vocational education needs of disadvantaged youth.

(2) Impact of program on reducing youth unemployment.

(3) The extent to which the project promotes cooperation between public education and manpower agencies.

(4) Relevance to priority areas in vocational education specified in the long-range program plan and to vocational education programs, services, and activities described in the annual plan.

(5) Adequacy and competency of personnel designated to carry out the program or project.

(6) Adequacy of facilities.

(7) Reasonableness of cost estimates.

(8) Expected potential of the program or project being made a part of the regular vocational education program.

(9) Extent to which the project is of sufficient scope and duration to make a significant contribution to vocational education and,

(10) Adequacy of project evaluation plans.

Board of Education personnel will make final evaluation of applications using the review committee's findings and other pertinent criteria as a basis for recommendations to the State Board.

6.13 Action on Application

Action taken by State Board will follow procedures as set forth in 5.23 of this part of the State Plan.

6.2 Program or Project Requirements

6.21 Coordination With Other Programs

Applications will be reviewed to determine that the proposed programs or projects have been effectively coordinated with projects having the same or similar purposes. It will be necessary that a cooperative effort to coordinate planning, development and operation with those similar programs will be continuously pursued.

6.22 Participation of Students in Nonprofit Private Schools

Grants or contracts will be made only if the State Board determines from the application that provision has been made for participation of nonprofit private school students as provided for in section 4.2 of the State Plan.

6.23 Noncommingling of Funds

Oregon State law provides in ORS 294.460 that:

> "(2) It shall be lawful to commingle cash balances of funds so long as all fund monies are segregated in the budget and accounting records."

6.23

Local educational agencies shall be required by accounting and audit regulations to provide separate fund accounting that will identify federal funds used for such purposes.

6.24 Notification of Commissioner

Within 15 days after the approval of a grant or contract the State Director of Career Education shall notify the Commissioner. The State Board shall forward to the Commissioner a copy of the approved proposal for which the grant or contract was made.

7.0 Residential Vocational Education Schools

In addition to the provisions in 1.0 to 2.0 and 10.0 of this part of the State Plan, the following special provisions apply to residential vocational education schools.

7.1 Procedures for Establishing Residential Facilities

Educational agencies shall submit applications for proposed residential vocational education school projects to the State Board or its authorized representative. The applications will include as a minimum the following items:

(a) general description of the project, with emphasis on serving needs of unemployed youth and dropouts;

(b) evidence that suitable site is available and geographically located to serve concentrated groups of unemployed and dropouts;

(c) evidence of ability to finance local share;

(d) educational specifications of the project including floor area, number of occupational areas, number of student stations;

(e) estimated costs.

7.11 State Operated

Residential vocational education projects initiated and directly administered by the Oregon Board of Education shall comply with the terms and conditions set forth in section 7.12-2, items (a) through (i) of this part of the State Plan, and shall be developed in consideration of and with regard to the criteria for determining relative priorities of projects as outlined in section 7.12-1, items (a) through (c) of the State Plan.

7.11-1 Planning

The determination of need for a State operated residential vocational education facility shall comply with the conditions set forth in 7.12-1 (a) through (b), 7.12-2(e), (h), and (i) of this part of the State Plan.

7.11-2 Construction

The State Board will prepare proposed legislation for the construction of residential vocational education facilities and submit it to the State legislative assembly for administrative authorization and approval of expenditure of federal and State funds.

In addition, section 1.9 of this part of the State Plan will be adhered to in providing assurances that all construction requirements will be met.

7.11-3 Operating

The operation of residential schools will be the responsibility of the State Board or, public educational agencies, organizations and institutions pursuant to applications approved by the State Board. Criteria for submitting proposals for residential schools will be developed by the State Board as the need arises.

7.12 Locally Operated

The local educational agency shall prepare and submit an application proposal for consideration pursuant to section 7.1 of this part of the State Plan.

7.12-1 Application by Local Educational Agency

Educational agencies shall submit applications for proposed residential vocational education projects to the State Board or its authorized representative. The applications will include, as a minimum, the items set forth in 7.1 of this part of the State Plan. After receiving a preliminary approval, the local educational agency shall submit information relevant to:

(a) availability of facility to serve areas of high concentration of unemployed youths and school dropouts;

(b) degree of availability of existing facilities (preference will be given to locations where minimal facilities are currently available);

(c) compliance with State and local building codes and standards of construction.

7.12-2 Review of Application

The State Board, or its authorized representative, will review the application for the proposed project and evaluate the educational advisability of the project in terms of the following criteria:

(a) impact on needs of disadvantaged youth;

(b) impact on reducing youth unemployment;

(c) extent of cooperation between the local education agency and local manpower agencies;

(d) evidence of future planning to insure that programs will meet immediate as well as long-range needs;

(e) evicence that the facility will be functional and meet the needs of the individuals and community to be served;

(f) evidence that the cost estimates will be reasonable and the project will not be elaborate and extravagant in design;

(g) evidence that adequate provision will be made for the selection with respect to sex, race, color, religion, national origin, and place of residence within Oregon of students needing education and training; and that such facilities will not be used in a manner resulting in racial segregation;

(h) evidence that vocational course offerings include fields selected on the basis of market analyses that indicate need for trained manpower;

(i) evidence that vocational courses will be designed appropriately to prepare enrollees for entry into employment or advancement in such fields.

7.12-3 Action on Application

For procedures followed by the State Board of Education or its authorized representative in determining approval, disapproval, or deferral, as well as notification of applicant and provision of letter of award or contract, see section 3.22 and 3.27 of this part of the State Plan.

7.13 Priority Allocation of Funds to Certain Areas

Priority in the allocation of funds for residential vocational schools will be given to areas of Oregon having high concentrations of unemployed youth and school dropouts, as identified in 1.10C and 1.10D of this part of the State Plan.

7.2 Requirements

The State Board or its authorized representative will require the following assurances:

7.21 Purpose of Program

That the residential school facilities will be operated and maintained for the purpose of conducting a residential vocational education school program for youth who are at least age fourteen but not yet twenty-one when admitted to the training program, who need fulltime study on a residential basis, and who can profit from vocational education instruction; but, in no case, may juveniles be assigned to such schools as the result of delinquent conduct.

7.22 Nondiscrimination

That adequate provision will be made for selection without regard to sex, race, color, religion, national origin, or place of residence within the State of students needing education and training at such school; and that facilities will not be used in a manner resulting in racial segregation.

7.23 Employment Opportunities

That vocational course offerings at such school will include fields for which available labor market analyses indicate a need for trained manpower, and that the courses offered will be designed appropriately to prepare enrollees for entry into employment or advancement in such fields.

7.24 No Fees or Charges

That no fees, tuition, or other charges will be required of students who occupy the residential vocational education facility.

7.3 Notification to Commissioner

Within 15 days after the State Board's approval of grants or contracts, the State Superintendent shall forward to the Commissioner copies of approved proposals for which grants or contracts are made.

8.0 Consumer and Homemaking Education

In addition to the provisions in sections 1.0 and 2.0 of this part of the State Plan, the following special provisions apply to Consumer and Homemaking Education supported with federal funds under part F of the Act.

8.1 Establishing and Operating Programs

8.11 State-Operated

No programs operated by the State.

8.12 Locally-Operated

Funds for reimbursement of new, extended, innovative, and/or demonstration programs may be requested by local agencies which have been or are eligible for recognition as vocationally qualified education programs.

To be considered for approval by the State Board, programs must include emphasis on consumer education, preparation for the dual role of homemaker-wage earner, preparation for the role of homemaker, and/or improvement of the quality of the environment, especially in depressed areas.

8.12-1 Submittal of Application

Applications will show how programs plan to meet the following criteria:

(a) Be taught by approved instructional personnel.

(b) Include plans for use of advisory committees.

(c) Include a financial plan that provides adequate facilities and resource materials.

(d) Provide for extended learnings beyond the classroom, including programs and activities such as FHA, home visitations, use of mass media, and/or other instructional techniques.

(e) Provide long-range evaluative information, i.e., a "record keeping" system to support evidences of success.

In addition to the above five requirements, each proposal will develop one or more of the following:

(f) Improvement of environment through greater consideration of social and cultural conditions and needs.

(g) Encouragement of preparation for professional leadership.

(h) Preparation of youth and/or adults for the role of homemaker or contribute to the employability of such youths and adults in the dual role of homemaker and wage-earner.

(i) Integrate consumer education into the homemaking program and/or, if appropriate, design comprehensive course or courses.

(j) Be designed for persons who have entered or are preparing to enter the work of the home.

8.12-2 Review of Applications

Applications shall be received by a deadline date to be established prior to beginning of the program. Applications will be reviewed by an ad hoc committee composed of: (1) vocational advisory committee personnel who are knowledgeable in consumer and homemaking education; (2) school administrators; (3) representatives from other public agencies working with the disadvantaged; and (4) home economics teacher education representatives. This committee will evaluate and recommend priority for applications to be funded, according to the extent to which the criteria in 8.12-1 has been met.

8.12-3 Action on Applications

The State Board upon recommendation of the review committee will notify local agencies within two months after the closing date for applications as to:

(a) Approval of the program for funding;

(b) Approval of the program, with contingencies requiring changes prior to being suitable for funding; or

(c) Disapproval of the program.

If a program is disapproved, the applicant must receive notification with reasons for the action taken.

8.13 Required Allocation of Funds to Certain Areas

At least one-third of federal funds shall be used for home-making education programs designed to assist consumers and help improve home environments and the quality of family life in economically depressed areas or areas with high rates of unemployment.

8.2 Required Content of Program

Consumer and Homemaking Education" means education designed to help individuals and families improve home environments and the quality of personal and family life. It includes instruction in food and nutrition, child development, clothing, housing, family relations, and management of resources, with emphasis on selection, use, and care of goods and services, and budgeting.

Local programs shall be encouraged to continue to provide opportunities for participation in tested and proven activities, as well as developing new and experimental programs. Provisions shall be made for extended learning beyond the classroom situation, as well as for follow-up and evaluation purposes.

Funds from federal allotments for consumer and homemaking programs will be expended for education programs which:

(a) encourage home economics to give greater consideration to social and cultural conditions and needs, especially in economically depressed areas;

(b) encourage preparation for professional leadership;

(c) are designed to prepare youth and adults for the role of homemaker, or contribute to the employability of such youth and adults in the dual role of homemaker and wage earner;

(d) include consumer education, and

(e) are designed for persons who have entered, or are preparing to enter the work of the home.

8.3 Ancillary Services and Activities

8.31 Personnel Responsible for Administration, Supervision and Evaluation

(a) Consumer and Home Economics Education Specialist (qualifications are detailed in section 1.3 of this part of the State Plan).

(b) Responsibilities:
Establish and maintain effective Consumer and Home Economics Education at appropriate educational levels.

8.32 Contracted Personnel

(a) The organization plan of the Oregon Board of Education makes provision for short-term and long-term employment of additional personnel to maintain supportive services as needed. Such services may include: planning and conducting inservice teacher conferences, either statewide or in local areas; curriculum development; development, supervision, and evaluation of special experimental demonstration projects; and State leadership for maintaining the State level youth organization (FHA).

(b) Qualifications of such supportive personnel shall meet the requirements outlined in section 1.3 of this part of the State Plan.

8.33 Teacher Education

The State staff shall be responsible for development of coordinated teacher education activities with the institutions approved to prepare vocational homemaking teachers in

Oregon. (See procedures for written agreements as stated in section 1.41 of this part of the State Plan.)

8.34 Curriculum Development

The State staff shall be responsible for the continued development and updating of all home economics curriculums, which shall reflect close articulation from elementary, secondary, through adult and post-secondary programs.

8.35 Research, Demonstration, and Experimental Programs

The development of research, demonstration, and experimental programs shall be in accordance with the requirements and criteria in sections 5.0 and 6.0 of this part of the State Plan.

8.36 Development of Instructional Materials and Provision of Equipment

(a) Consumer and homemaking instructional materials as an integral part of Oregon's plan for the "Structure and Articulation of Occupational Education" will be subject to continuous evaluation and revision. Emphasis is placed on an articulated approach extending from exploratory modules in the junior high school, through cluster curriculums in secondary, into specialized areas in the community colleges. Cooperative work experience is encouraged at both secondary and post-secondary levels.

(b) Standards for program approval will encourage the providing of adequate facilities and modern equipment. Innovative and exploratory programs which anticipate trends in emerging occupational areas will receive priority consideration.

9.0 Cooperative Vocational Education Programs

To receive State Board approval for utilization of federal funds under the provisions of part G of the Act, cooperative vocational education programs shall, in addition to meeting the provisions of 1.0 and 2.0 of this part of the State Plan, incorporate the following special provisions:

9.1 Procedures for Approval of Cooperative Vocational Education Programs

9.11 Submittal of Application

Local educational agencies requesting approval of programs to be reimbursed by funds provided for under part G of the Act shall submit an application which includes information on objectives, nature, duration, purpose, and plan of the project, value to vocational education, qualifications of staff, financial agreements, and participation of public and private employees. An application form provided for local agencies by the State staff will garner specific information relevant to:

(1) Written training agreements with employers;
(2) Conformity of employment practices with State and Federal labor laws;
(3) Identification of students' occupational needs,
(4) Manpower needs, both local and State;
(5) Instructor-Coordinator time allowed;
(6) Instructor-pupil ratio;
(7) School release time for working students;
(8) Credit allowed for work experience;
(9) Related class schedule;
(10) Composition of advisory committee;
(11) Occupational and educational experience of teacher;
(12) Occupational guidance provisions;
(13) Integration into total school curriculum;
(14) Community involvement;
(15) Cooperating agencies or organizations;
(16) Adequacy of school facilities;
(17) Extent of local financial support;
(18) Provisions for program evaluation;

(19) Consideration of students with special needs including handicapped and disadvantaged;

(20) Extent to which program goals can be provided for in existing programs;

(21) Relation of program to school's long-range vocational plan; and

(22) Provisions for participation of students from nonprofit private schools.

9.12 Review of Application

Deadline dates for submitting applications will be established. Applications will be reviewed periodically by an ad hoc committee composed of: (1) vocational advisory committee personnel who are knowledgeable in cooperative work-experience education; (2) school administrators; (3) representatives from business and industry; and (4) vocational teacher education representatives.

Using information provided through 9.11 above, the committee will assign program priorities derived from the rating scale on page 99.

9.13 Action on Applications

Action on applications for cooperative work-experience programs will follow the same procedures as set forth in 3.22-2 (b), (4) through (10) inclusive.

9.2 Requirements of Cooperative Vocational Education Programs

To receive State Board approval for use of federal funds provided under part G of the Act, cooperative education programs shall meet the requirements of sections 9.21 to 9.3 inclusive.

9.21 Purpose

It shall be the purpose of each cooperative vocational education program approved by the State Board to provide education for persons who, through a cooperative arrangement between the school and employers, receive their instruction,

CRITERIA	Weight Applied by Panel Column 1	High 5	4	3	2	Low 1
1. Impact on unemployment of youth 18-24.						
2. Impact on school dropouts.						
3. Impact on needs of handicapped.						
4. Impact on needs of disadvantaged.						
5. Extent to which program promotes cooperation between public education and public and private employers.						
6. Relevance to schools' short and long-range plans.						
7. Adequacy and competency of staff.						
8. Adequacy of facilities.						
9. Expected outcomes.						
TOTAL						
Average score of total evaluation						

Assurance that program cost will be reasonable Yes_____ No_____

Assurance that programs will be represented by advisory committees Yes_____ No_____

including required academic courses and related vocational instruction, through alternation of study in school with work on a job in any occupational field which complements the vocational class in which the student is enrolled. (The two experiences must be planned and supervised by the school and employers so that each contributes to the student's education and employability.)

9.21-1 Cooperative education programs shall be administered by the local educational agency and shall provide on-the-job training opportunities that may not otherwise be available to persons who can benefit from such programs.

9.22 On-The-Job Training Standards

Cooperative vocational education programs shall provide on-the-job training that (1) is related to existing career opportunities that offer promotion and advancement, (2) does not displace other workers who perform such work, and (3) employs student-learners in conformity with federal, State, and local laws and regulations, and in a manner not resulting in exploitation of the student-learner. Training will be conducted in accordance with written training agreements, copies of which will be filed with the State Board.

9.23 Identification of Jobs

To be eligible for federal funds as provided for under part G of the Act, local educational agencies shall provide information in their applications to show that suitable jobs for students to be enrolled in cooperative education programs have been arranged through cooperation with employment agencies, labor groups, employers, and other community agencies as provided for under section 1.7 of this part of the State Plan.

9.24 Additional Costs to Employers

Local educational agencies may, when necessary, be reimbursed from funds available under part G of the Act for certain added costs to employers for on-the-job training of students enrolled in cooperative education programs, provided such training is related to career opportunities that offer promotion and advancement, and does not displace other workers who perform such work.

9.24-1 Reimbursement of local schools under this part shall be limited to payments for excess program costs to employees which are based on evidence provided by local agencies that:

(a) there is a verified need for substantial expansion of on-the-job training, coupled with evidence that it is not economically feasible for the employer to provide such training under existing conditions, or,

(b) additional training stations could be procured for students whose limitations preclude the probability of their being economically productive in the time allowed, but who are otherwise identified as potentially capable of profiting from a work experience program, or,

(c) additional desirable training stations could be acquired which would not otherwise be available due to excess cost of training to the employer. Such excess is defined as cost substantially beyond benefits which might be expected to accrue to the employer as a result of the efforts of the student trainee.

(d) Added employer costs will include only that part of the compensation of students which represents the difference between the compensation to be paid and the fair dollar value

of services rendered by the student, as determined by negotiation between local educational agencies and the employer.

9.25 Costs to Students

It is not anticipated that Oregon will provide for added costs to students.

9.26 Participation of Students in Nonprofit Private Schools

To be eligible for federal funds provided for in part G of the Act, local education agencies shall, by meeting requirements of 4.2 of this part of the State Plan, give assurance that there will be genuine and meaningful participation in all cooperative vocational education programs of students enrolled in nonprofit private schools.

9.27 Noncommingling of Funds

Oregon State Statutes provide in ORS 294.460 that:

> "(2) It shall be lawful to commingle cash balances of funds so long as all fund monies are segregated in the budget and accounting records."

Local educational agencies that are reimbursed from State or federal funds under provisions of part G of the Act shall be required by accounting and audit regulations to provide separate fund accounting that will identify federal funds used for such purpose.

9.28 Evaluation and Follow-Up Procedures

Consistent with evaluation procedures as set forth in 1.5 of this part of the State Plan, the program specialist responsible for cooperative work-experience programs will assist local teacher-coordinators and guidance staff in maintaining a continuous supervision and evaluation of programs and in making follow-up studies of student placement.

Program proposals in cooperative education shall include specific plans by the local educational agency as to how program evaluation and student follow-up shall be carried out subsequent to allocation and utilization of federal funds toward the improvement or initiation of cooperative education in that school district.

9.3 Ancillary Services and Activities

9.31 Supervisory Personnel

9.31-1 Cooperative Education and On-The-Job Specialist

The State Board will provide for an education program specialist who will be responsible for supervising and coordinating programs provided for under part G of the Act.

9.31-2 Duties and Responsibilities

The Education Specialist will carry out the following work assignments:

(a) Provide assistance to community colleges and career educators in planning, evaluation, and improvement of cooperative education and on-the-job training programs.

(b) Perform reference research in cooperative education and on-the-job training techniques and trends.

(c) Evaluate program effectiveness by sampling findings of employers and trainers, and correlating these with the educational progress of trainees.

(d) Provide specialized assistance to program directors within the department.

(e) Perform staff specialty work in developing recommendations for criteria to be used in

approving courses and curriculums and for evaluating cooperative education and on-the-job training programs.

(f) Perform related work as required.

9.32 Teacher Training

As provided for in section 1.4 of this part of the State Plan, needed inservice and preservice teacher education will be provided to assure the availability of qualified teachers and coordinators to conduct cooperative education programs.

9.33 Other Supporting Services

Appropriate evaluation, counseling and guidance, research, and other supportive services provided in the State's vocational effort will be available to the cooperative education program. (Reference is made to sections 1.3, 1.4, and 1.5 of this part of the State Plan.)

10.0 Work-Study Programs for Vocational Education Students

To receive State Board approval for federal funding, as provided under part H of the Act, work-study programs shall, in addition to meeting the requirements of sections 1.0 and 2.0 of this part of the State Plan, meet the following special requirements.

10.1 Procedures for Approval of Work-Study Students

10.11 Submittal of Application

Local educational agencies requesting approval of programs to be reimbursed by funds provided for under part H of the Act shall submit an application which will provide specific information relevant to:

(1) Nature and duration of program.

(2) Dropout rate of applicant school.

(3) Youth unemployment information.

(4) Compliance with student eligibility as set forth in 10.22 following.

(5) Compliance with limitation on hours and compensation as set forth in 10.23 following.

(6) Compliance with employment regulations as set forth in 10.24 following.

(7) Maintenance of local effort as set forth in 10.25 following.

(8) Staff qualifications.

10.12 Review of Application

Deadline dates for submitting applications will be established. Applications will be reviewed periodically by State staff. Using information provided through 10.11 above, program priorities will be assigned with preference being given to districts showing larger proportions of unemployed youth ages 18-24 and greater numbers of school dropouts and applying other criteria including relevance to annual and long-range plans, adequacy and competence of staff, reasonableness of cost estimates and expected outcomes.

10.13 Action on Applications

Action on applications for work-study programs will follow the same procedures as set forth in 3.22-2(b) (4) through (10) inclusive.

10.2 Requirements of Work-Study Program

Except as provided for in section 10.3 below, funds allocated to the State under part H of the Act will be expended solely for the payment of compensation of students employed pursuant to work-study programs approved by the State Board which meet the following criteria:

10.21 Administration of Program

The work-study program shall be administered by the local educational agency and made reasonably available (to the extent of available funds) to all qualified youths in the area served by such agency who meet the requirements set forth in the Acts and section 10.0 of this part of the State Plan.

10.22 Eligible Students

Employment under the work-study program will be furnished only to a student who:

(a) has been accepted for enrollment, or is enrolled as a full-time student in good standing and in full-time attendance, in a program which meets the standards prescribed by the State Board for vocational programs under the 1963 Act; and

(b) is in need of the earnings from such employment to commence or continue his vocational education program; and

(c) is at least 15 years of age and less than 21 years of age at the date of commencement of employment, and is capable of maintaining good standing while so employed.

10.23 Limitation on Hours and Compensation

(a) No student shall be employed more than 15 hours in any week during which classes in which he is enrolled are in session, or receive compensation in excess of $45 per month or $350 per academic year, or equivalent time period, unless the student is attending a school which is not within reasonable commuting distance from his residence. In this case, his compensation may not exceed $60 per month or $500 per academic year, or equivalent time period. For the purposes of this paragraph, "academic year" means a period of nine months (exclusive of the summer term) interrupted by the equivalent of one month of vacation.

(b) A student attending on a full-time basis in the summer term shall be limited to 15 hours of employment per week and the monthly compensation of $45 or $60, as described in paragraph (a). If the student is not attending classes during the summer, there is no limitation upon his hours of employment or the amount of compensation which he may earn. The total of his summer earnings shall not be limited by, or have the effect of limiting, the compensation paid to him for the academic year pursuant to paragraph (a).

10.24 Employment for Public Agency or Institution

Employment under work-study programs will be for the local educational agency or for some other public agency or institution (federal, State, or local), pursuant to a written arrangement between the local educational agency and other agencies or institutions. Such work will be adequately supervised and coordinated, and will not supplant present employees of the agency or institution ordinarily performing the work. In those instances where employment under work-study programs is for a federal agency or institution, the

written arrangement between the local educational agency and the federal agency or institution will state that students so employed are not federal employees for any purpose.

10.25 Maintenance of Effort

In each fiscal year in which the work-study program remains in effect, the local educational agency shall expend for employment of its students an amount in State or local funds that is at least equal to the average annual expenditure for work-study programs of a similar nature during the three fiscal years preceding that in which the Plan provisions for its work-study program are approved.

10.3 Funds for State Plan Development and Administration

Federal funds provided under Part H of the Act to pay costs of developing and administering work-study programs in accordance with the provisions of the State Plan approved by the Commissioner will not exceed one percent of the State's allotment, or $10,000, whichever is greater.

A P P E N D I C E S

LEGAL APPENDIX

The State Board is governed by the following laws, executive regulations, and interpretations thereof by courts, the Attorney General, and other appropriate state officials.

Authority of State

ORS 344.100.

Certification of State Plan

Certificate of State Board

State of Oregon

I hereby certify that the attached State plan for fiscal year 1971 was adopted by the Oregon Board of Education on June 12, 1970. The State plan as submitted constitutes the basis for the operation and administration of the State's program established pursuant to the Vocational Education Amendments of 1968, Public Law 90-576. All information and representations contained in the plan as of this date are accurate to the best of my knowledge and belief.

OREGON BOARD OF EDUCATION

_____ By: _____

(Date)

Superintendent, Public Instruction

Certificate of Attorney General

State of Oregon

1. That Oregon Board of Education is the State Board in this State within the meaning of section 108(8) of Public Law 90-576;

2. That said Board has the authority under State law to submit a State Plan;

3. That said Board has authority to administer or supervise the administration of the foregoing State plan;

4. That all of the provisions of the foregoing plan can be carried out by the State;

5. That the Executive Officer has been duly authorized by the Oregon Board of Education to submit the foregoing State plan and to represent the Oregon Board of Education in all matters pertaining thereto.

(Signed) William T. Lilt

(Date)

Assistant Attorney General

GOVERNOR'S ADVISORY COUNCIL FOR VOCATIONAL EDUCATION

313 PUBLIC SERVICE BLDG. • SALEM, OREGON • 97310 • Ph. 364-2171 Ext. 1018

TOM McCALL
GOVERNOR

HOWARD BAKER
Chairman

IN REPLY
REFER TO:

Certificate of Governor's Advisory Council for Vocational Education

State of Oregon

I hereby certify that the attached State Plan for Fiscal Year 1971 was prepared in consultation with the Governor's Advisory Council for Vocational Education.

COMMENTS:

The proposed changes of the State Plan for Vocational Education for Fiscal Year 1971 were thoroughly reviewed in April and May, 1970, by the members of the Governor's Advisory Council for Vocational Education.

At the regular meeting of May 29, 1970, the Council conducted a review of the State Plan for Vocational Education for Fiscal Year 1971. Approval was granted the proposed plan for vocational education as presented, subject to an adjustment of budget figures, which have been made.

Governor's Advisory Council for
Vocational Education
(State Advisory Council)

Date: June 16, 1970

By: F. C. Bachman, Executive Secretary

Authority of State Board and State Officials

Authority of State Board

ORS 326.021, 344.100.

Authority of State Official receiving and holding custody to Federal Funds

ORS 7.615, 327.620, 344.100, 344.110.

State Laws and Regulations Regarding Expenditures

Types of Allowable Expenditures

Vocational Education Personnel

ORS Chapter 240 Civil Service for State Employees.

ORS Chapter 292 Salaries and Expenses of State Officers and Employees.

Oregon State Civil Service Rules, April 1968.

Oregon Rules and Regulations Governing the Certification of Teachers, 1967-69.

Oregon Regulations for Certification of Public School Teachers, Educational Specialists, and Administrators, 1962.

(a) Sabbatical and educational leave

Oregon State Civil Service Rules, April 1968, Division 9, Subdivision 4.

(b) Employee benefits

ORS Chapter 237 Public Employees Retirement Generally.

ORS Chapter 239 Retirement for School District Employees.

ORS Chapter 656 Workmen's Compensation.

Consultants, advisory committees, etc.

ORS 332.105 (4)

Oregon Administrative Manual 61-050 (6) (c).

Travel and transportation

(a) Travel

ORS 292.210 to 292.298.

Oregon Administrative Manual 23-005 to 23-060.

(b) Transportation

ORS 338.010 to 338.070, 341.890.

Instructional equipment, supplies, and teaching aids

ORS 332.155.

Other related expenses

Ibid.

Construction

ORS 332.155, 341.295, 341.925 to 341.950.

Work-study and cooperative education programs

ORS 344.120, 344.130, 332.075, 336.035, 655.405, 653.320.

Fiscal audit and accounting procedures

ORS 297.010 to 297.050, 297.210 to 297.240, 297.410 to 297.500, 297.610 to 297.740, 327.620.

Minimum Standards of Audit Reports, Certificates, and Procedures for Oregon Municipal Corporations.

Payment of funds to local educational agencies

ORS 341.625, 344.070, 344.080, 344.110.

Determination of fiscal year's allotment in which expenditure is made

ORS 291.232 to 291.260.

Oregon Administrative Manual 12-025.

Vocational instruction under contracts

Not applicable.

1673

AGREEMENT OF COOPERATIVE ARRANGEMENT

BETWEEN

OREGON BOARD OF EDUCATION

AND

STATE DEPARTMENT OF EMPLOYMENT

This AGREEMENT made this 6th day of June, 1969, by and between the Oregon Board of Education and the State Department of Employment, State of Oregon, witnesseth:

I. GENERAL PURPOSE

This agreement is entered into between the Oregon Board of Education and the Oregon State Department of Employment to render more effective, through cooperative action, selected functions of each agency as they relate to providing a public vocational education and placement program in the State. It is further the purpose of this agreement to establish a cooperative working arrangement between the departments for the purpose of complying with the provisions of Public Law 90-576 (Vocational Education Amendments of 1968 Act).

II. AGREEMENTS

A. Delineation of specific areas of cooperation

1. The Oregon Board of Education will:

a. Utilize occupational information furnished by the Department of Employment in providing for an effective vocational education program.

b. Cooperate with the Department of Employment in providing for labor market studies when supplemental occupational information is needed. When such studies are mutually agreed upon, the Oregon Board of Education shall reimburse the Department of Employment for certain costs of these studies from funds provided for in the Oregon State Plan for Vocational Education.

c. Encourage local educational agencies concerned with vocational education programs to cooperate with the employment service offices in their area in the exchange of appropriate information, and otherwise assist in the implementation of the intent of this agreement.

d. Provide the Department of Employment with information on training programs and courses available in educational agencies throughout the state. Local educational agencies will be urged to develop procedures to provide local employment service offices with information about persons trained and their qualifications.

2. The Department of Employment will:

a. Provide available occupational outlook information to vocational education officials for use in counseling students and in determining the occupations for which persons should be trained.

b. Conduct labor market studies mutually agreed upon between the Oregon Board of Education and the Department of Employment when supplemental occupational outlook information is unavailable and required.

c. Support existing vocational education facilities by referring to the proper officials those applicants in need of vocational educational information or training. At the time of referral, provide information germane to the counseling and guidance of applicants referred for training.

d. Accept work applications from persons who are referred by vocational education authorities upon completing or leaving vocational training, and will provide employment services in relation to need of the applicant.

B. <u>Liaison</u>

1. To insure maximum results as well as effectiveness between the agencies, the Executive Officer of the Oregon Board of Education and the Commissioner of the State Department of Employment shall each designate a staff member to act as liaison representative.

2. At the operating levels local educational agencies and employment service offices will be encouraged to develop and maintain, as time and conditions require, a working relationship which will reflect and serve to accomplish the specific purposes embodied in this agreement.

C. Exchange of Information

Exchange of information shall be treated confidential when information is of the type that makes it appropriate, but in no event will either department be required to discuss information which by law is made confidential.

D. Policies and Procedures

Present and future policies or procedures developed and issued under the terms of this agreement shall be a joint responsibility of the Oregon Board of Education acting through its Executive Officer and designated liaison representative, and the appropriate officials of the Department of Employment. Any deviations, changes, or extensions of this agreement shall be mutually agreed to, prior to implementation by either agency.

III. TERMINATION

The parties mutually understand that this agreement is made by the departments in their official capacities as State agencies and not by their representatives as individuals. It is further understood and agreed that in the event the Federal government or its agencies shall fail to grant funds for the purposes of the Oregon State Plan for Vocational Education, this agreement shall be subject to termination upon written notice of either party.

In witness whereof the parties have hereunto set their hands at Salem, Oregon, the day and year above written.

/s/ Dale Parnell
Executive Officer, Oregon Board of Education

/s/ Ross Morgan
Commissioner, Department of Employment

Certificate of Public Hearing(s) and Public Notification

State of Oregon

I hereby certify that:

1. Notification of dates for public hearings and materials were provided as follows:

Date(s) of Notification	Sent to	Materials Provided with Notice
April 28 and May 5, 1970	The Oregonian	Copy of notice - legal provisions for notice

2. Public hearings on the State Plan for Vocational and Technical Education were held as follows:

Date(s)	Time	Place	Attendance
May 15, 1970	9:00 a.m.	Room 6 & 7 Capitol Bldg.	41

3. The hearing(s) were conducted by:

Name	Title
Dr. Eleanor Beard	Chairman, Oregon Board of Education

4. Conclusions or Decisions Reached:

Testimony was heard concerning the changes in Part I and Part II of the Plan and the proposed annual plan for fiscal year 1971.

All the witnesses endorsed the proposed changes and the proposed annual plan.

May 15, 1970
(Date)

Oregon Board of Education

By: Dale Parnell

Superintendent, Public Instruction

Memorandum of Understanding

Between

Division of Elementary and Secondary Education

and

Division of Community Colleges and Career Education

I. General Purpose

This memorandum of understanding is entered into between the Division of Elementary and Secondary Education and the Division of Community Colleges and Career Education to render more effective, through cooperative planning and action, the development of vocational-technical education for the handicapped. It is further the purpose of this agreement to establish a cooperative working arrangement between the divisions for the purpose of complying with the provisions of Public Law 90-576 (Vocational Education Amendments of 1968 Act).

II. Agreements

1. Divisions shall work cooperatively in developing a comprehensive plan for the vocational education of handicapped persons in the public school system.
2. The Director of Career Education and the Director of Special Education shall each designate a staff member to act as liaison representatives.
3. Applications for funds for programs or projects that provide vocational education to the handicapped that are submitted through either division shall be reviewed by designated staff member(s) from each division.

/s/ Joy Hills Gubser
Associate Superintendent
Elementary and Secondary
Education

/s/ Carrol deBroekert
Associate Superintendent
Community Colleges and
Career Education

AGREEMENT OF COOPERATIVE ARRANGEMENT
BETWEEN
OREGON BOARD OF EDUCATION
AND
VOCATIONAL REHABILITATION DIVISION

This agreement made this 1st day of July 1970, by and between the Oregon Board of Education and the Vocational Rehabilitation Division, State of Oregon, witnesseth:

1. This agreement is designed in the interests of handicapped individuals, confidential information relative to individuals is to be insured. It is based upon the joint capabilities of these agencies to provide services.

2. We will operate on the changing notion of referral in that the referring agency will cooperate and continue to contribute towards the individual's attainment of an acceptable goal.

3. The agreement is to be operative at all levels from the administrative to field operations and will include such activities as joint planning and program operations that are determined to be mutually beneficial.

4. There will be joint planning, review, and evaluation of individual project applications that pertain to the handicapped or handicapped/disadvantaged for funding under the Vocational Education Amendments of 1968.

5. Each agency will appoint a liaison person for implementation of the Agreement.

6. Both parties agree that all service will be in compliance with Title 6 of the Civil Rights Act, 1964.

7. This agreement may be terminated by either party upon 90 days written notice.

8. This agreement expires June 30, 1971.

/s/ J. N. Peet	/s/ Dale Parnell
Administrator	Executive Officer
Vocational Rehabilitation Division	Oregon Board of Education

EXECUTIVE ORDER NO. 01-070-04

GOVERNOR'S MANPOWER COORDINATING COMMITTEE

(Supersedes Executive Orders dated 3-22-69 and 7-14-69)

IT IS HEREBY ORDERED AND DIRECTED that the Governor's Manpower Coordinating Committee is created for the purpose of developing a cooperative manpower plan, utilizing the resources of Federal, State, and local agencies having manpower program responsibilities. This Committee is to insure that programs developing and utilizing manpower in Oregon will be planned to provide the greatest benefit to the citizens of the State in the most efficient manner possible and to provide complete services without unnecessary overlap.

The Committee is assigned the responsibility of:

(1) developing the basic principles and guidelines for manpower planning in Oregon;

(2) determining that all manpower programs are formulated within these basic principles and operate within the guidelines;

(3) coordinating all agency manpower programs with one another; and

(4) totally integrating the advisory, evaluating and planning activities of the Governor's Advisory Council for Vocational Education as set forth in the 1968 Amendments to the Vocational Education Act of 1963 and the Governor's Executive Order No. 01-070-05 into the overall state manpower plan as developed by the Governor's Manpower Coordinating Committee.

It shall also be responsible for the formulation and publication of an Annual Comprehensive Manpower Training and Utilization Plan for Oregon.

The principle of cooperative manpower planning by area is to be the policy of the State of Oregon. The Cooperative Area Manpower Planning System shall be the system through which all State agencies, together with such local and Federal departments and agencies as may be appropriate, shall cooperatively plan and evaluate their related manpower programs.

All agencies engaged in the formation of programs to improve the quality and employability of the Oregon work force shall develop such programs and tentatively allocate available fiscal resources in line with the planning guidelines established by the Committee.

These programs, so refined, shall then be brought to the Committee for its endorsement and inclusion in the Annual State Plan, or as an amendment to the established State Plan. This process must precede program implementation.

In implementation of this policy, each participating State agency shall, to the maximum extent consistent with law, exercise its discretionary authority and use the full measure of its influence to further cooperative manpower planning and to persuade local governments and private organizations with which it maintains grant-in-aid or contractual relationships to participate in and support activities undertaken in furtherance of this principle.

All agencies originating manpower training plans that are scheduled for ultimate presentation to the federal government for funding and approval are to receive the endorsement of this Committee, prior to that agency requesting approval of the Governor and/or the Fiscal Management Division (formerly the Department of Finance) pursuant to Executive Order No. 67-19.

The Committee shall consist of twenty-two members appointed by the Governor and serving at his pleasure. Members will represent the organizations and interests hereafter listed:

Apprenticeship and Training Council, Director	By Position
Board of Education, Superintendent	By Position
Division of Employment, Administrator	By Position
Division of Vocational Rehabilitation, Administrator	By Position
Division of Welfare, Administrator	By Position
Governor's Advisory Council for Vocational Education, Chairman	By Position
Agriculture	15 Aug. 72
Community Action Programs	15 Aug. 70
Private Vocational Education or Placement Services	15 Aug. 71

Public Education; Community Colleges	15 Aug. 71
Public Health	15 Aug. 72
Employee Organizations	15 Aug. 71
	15 Aug. 72
	15 Aug. 70
Employer Organizations	15 Aug. 71
	15 Aug. 72
	15 Aug. 70
Public	15 Aug. 71
	15 Aug. 72
	15 Aug. 70
	15 Aug. 71
	15 Aug. 71

Following the initial term, the terms of office shall be three years. Such representatives as the Federal Government designates shall serve as ex officio, nonvoting, members of the Committee.

The Governor shall select the individual to serve as Chairman of the Committee. A Vice Chairman appointed by the Chairman shall carry out the duties of the Chairman in his absence. The Chairman may establish ad hoc committees to study specific areas, and designate their chairmen. The tenure of ad hoc committees will be determined by the nature of the study or project undertaken.

The Chairman shall also establish and appoint the members of local manpower coordinating committees in each of the fourteen State administrative districts. Members of these local committees shall be, where relevant, the area counterparts of State Committee members. The agency members should be those who can make policy decisions at the local level. The Chairman of each of the local committees shall be selected by a vote of its members.

The members of the State Committee shall receive no compensation for their services, but are entitled to reimbursement for actual or necessary travel expenses incurred in the performance of their duties. Such expenses shall be paid from the budget of the Committee or from member agency accounts, subject to applicable State Law.

The State Committee shall meet at the call of the Chairman, but at least four times a year. Staff and services shall be supplied by the Executive Department or such other state agency as may be appropriate. The expenses of the Committee and its staff support are to be paid from funds made available by the United States Government. These funds are to be in compliance with its funding requirements and through such agencies as are appropriate.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and caused to be affixed the great seal of the State of Oregon. Done at Salem, the Capital, this 18th day of February, A.D., 1970.

/s/ Tom McCall
Governor

By the Governor:

/s/ Clay Myers
Secretary of State

GOVERNOR'S EXECUTIVE ORDER NO. 01-070-05

GOVERNOR'S ADVISORY COUNCIL FOR VOCATIONAL EDUCATION

(Supersedes Executive Orders dated 3/22/69 and 7/14/69)

IT IS HEREBY ORDERED AND DIRECTED that the Governor's Advisory Council for Vocational Education is created to carry out the requirements of the Vocational Education Amendments of 1968. The Council shall be a part of the Governor's Cooperative Manpower Planning System. In order to carry out this responsibility the Council shall:

1. Advise the Governor's Manpower Coordinating Committee and the State Board of Education on the development of the State Plan for Vocational Education and policy matters arising in the administration of the State Plan submitted pursuant to Part B of Title 1, including both the preparation of a long-range and an annual program plan; and
2. Evaluate Vocational Education programs, services, and activities under the State Plan, and publish and distribute the results thereof; and
3. Prepare and submit through the State Board of Education to the Commissioner and the National Advisory Council an Annual Evaluation Report. Submit the same report to the Governor's Manpower Coordinating Committee, accompanied by such additional comments as the State Board deems appropriate, which
   (i) evaluates the effectiveness of vocational education programs, services, and activities carried out in the year under review in meeting the program objectives set forth in the long-range program plan and annual program plan, and
   (ii) recommend such changes as may be warranted by the evaluations.

IT IS FURTHER ORDERED AND DIRECTED that the Advisory Council be made up of no more than fifteen members appointed by the Governor, serving for 3 year terms and at his pleasure. Council members shall represent the organizations and interests hereafter listed:

1. Management and Labor
2. Economic Development Agencies

3. Community Colleges and Manpower and Vocational Education Agencies
4. Vocational Education Programs - State Apprenticeship and Training Division
5. Vocational Education Programs; Local Education Agencies· School Boards
6. School Systems with large numbers of disadvantaged students
7. Special educational needs of physically or mentally handicapped persons
8. The General Public

IT IS FURTHER ORDERED AND DIRECTED that the Chairman of the State Advisory Council shall be selected by its membership. The Chairman shall automatically serve as a member of the Governor's Manpower Coordinating Committee. The Council shall meet not less than four times per year. The Council shall also meet at other times at the pleasure of the Chairman.

IT IS FURTHER ORDERED AND DIRECTED that those evaluation and planning activities of the Advisory Council as described in items one and two of paragraph one of this directive shall be totally integrated with the overall Manpower Plan as developed by the Governor's Manpower Coordinating Committee. Staff and services shall be supplied by the Executive Department and financed by the funds made available by the Vocational Education Amendments of 1968, Part A, Section 104.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and caused to be affixed the great seal of the State of Oregon. Done at Salem, the Capital, this 18th day of February, A.D., 1970.

/s/ Tom McCall
Governor

By the Governor

/s/ Clay Myers
Secretary of State

APPENDIX, OTHER

OREGON RULES FOR CERTIFICATION OF PUBLIC SCHOOL TEACHERS, EDUCATION SPECIALISTS AND ADMINISTRATORS (Excerpts pertaining to certification of vocational instructors)

II. SUBJECT MATTER NORMS

A. AGRICULTURE (Vocational)

1. Basic norm

a. Graduation with a baccalaureate degree from a four-year college course in agriculture as given by a standard college or university approved by the State Board of Education for the preparation of vocational agriculture teachers.

b. 70 quarter hours of preparation in technical agriculture.

c. Verification of two years' work experience in the occupational area to be taught, or clearance by an instructor appraisal committee as provided in the Oregon State Plan for Vocational Education.

d. Special methods in teaching vocational agriculture and supervised teaching in vocational agriculture.

2. Standard norm

88 quarter hours in technical agriculture including the 70 quarter hours required for the basic norm plus all other requirements for the four-year norm.

C. BUSINESS EDUCATION

1. Basic norm

42 quarter hours in business education, to include:

a. A minimum of nine quarter hours from one or more of the following areas: economics, business law, and business fundamentals.

b. 33 quarter hours in business education courses taught in high school, to include any three of the following: typing, shorthand, bookkeeping, and office practice. (Teachers who hold the Basic or Standard certificate and who teach typing only may substitute evidence of proficiency in typing in lieu of college credit and will not be required to meet the business education norm.)

c. Teachers or coordinators of business education in vocational programs must verify two years of work experience in the occupational area to be taught, or, clearance by an instructor appraisal committee as provided in the Oregon State Plan for Vocational Education.

2. Standard norm

57 quarter hours in business education, including those areas required for the basic norm and an additional 15 quarter hours in economics, business law, and business fundamentals.

D. DISTRIBUTIVE EDUCATION (Vocational)

1. Basic norm

a. 42 quarter hours in business to include preparation distributed among four or more of the following: retailing, marketing, salesmanship, business law, accounting, economics and business fundamentals.

b. Verification of two years' work experience in the occupational area to be taught, or, clearance by an instructor appraisal committee as provided in the Oregon State Plan for Vocational Education.

2. Standard norm

a. 57 quarter hours in business, including areas required for the basic norm, 15 additional quarter hours in distribution and marketing and clearance of experience requirement.

b. Six quarter hours of special methods in distributive education.

H. HOME ECONOMICS (Vocational)

1. Basic norm

a. Graduation with a baccalaureate degree from a program of home economics as given by a standard college or university approved by the State Board of Education to prepare vocational home economics teachers.

b. 48 quarter hours in home economics distributed to strengthen a balanced program upon advice of the college or university among the areas of foods and nutrition, clothing, family relations, child development, home furnishings and equipment, and family economics and home management.

c. Special methods in vocational home economics.

d. Supervised teaching in vocational home economics. (Applicants who did not graduate from a vocational home economics program as given by a college or university approved by the State Board of Education for this purpose but who meet the requirements for the nonvocational home economics norm may clear requirements for the vocational home economics norm by verifying completion in residence of 15 quarter hours of approved preparation in an approved college or university.)

2. Standard norm

63 quarter hours in home economics including all requirements for the basic norm and with the additional preparation distributed to strengthen a balanced program upon the advice of the college or university among the following areas: foods and nutrition, clothing, family relations, child development, home furnishings and equipment, and family economics and home management.

N. OFFICE EDUCATION (Vocational)

1. Basic norm

42 quarter hours in business education, to include:

a. A minimum of nine quarter hours from one or more of the following areas: economics, business law, and business fundamentals.

b. 33 quarter hours in business education courses taught in high school, to include any three of the following: typing, shorthand, bookkeeping, and office practice. (Teachers who hold the Basic or Standard certificate and who teach typing only may substitute evidence of proficiency in typing in lieu of college credit and will not be required to meet the business education norm.)

c. Verification of two years' work experience in the occupational area to be taught, or, clearance by an instructor appraisal committee as provided in the Oregon State Plan for Vocational Education.

2. Standard norm

57 quarter hours in business education, including those areas required for the basic norm and an additional 15 quarter hours in economics, business law, and business fundamentals.

Q. TRADE AND INDUSTRIAL AND TECHNICAL EDUCATION (Vocational)

1. Basic norm

a. 48 quarter hours in trade and industrial or technical subjects related to the occupational area to be taught. All or part of this credit may be granted by the graduating institution on the basis of formal evaluation of practical occupational experience.

b. Verification of two years of work experience in the occupational area to be taught, or, clearance by an instructor appraisal committee as provided in the Oregon State Plan for Vocational Education.

2. Standard norm

60 quarter hours in the occupational area to be taught including the 48 quarter hours and experience requirement for the basic norm.

VOCATIONAL SUPERVISOR'S, DIRECTOR'S, AND COORDINATOR'S CERTIFICATES

I. VOCATIONAL SUPERVISORS (For supervisors of a broad service area such as Home Economics or Agriculture in the vocational instruction program.)

A Vocational Supervisor's Certificate, valid for a period of not more than five school years, shall be issued to an otherwise qualified applicant who:

1. Holds or is eligible for an Oregon Standard teaching certificate with a vocational teaching norm, a 5-year vocational certificate, or a 5-year Special Vocational Certificate.

2. Verifies three years of teaching or coordinating experience in a vocational area.
3. Verifies completion of 15 quarter hours of preparation in a standard teacher education institution from the following areas:
   a. Improvement and evaluation of instruction
   b. Philosophy and techniques of supervision
   c. Group processes and organization

II. VOCATIONAL DIRECTORS (For directors with administrative responsibility for all aspects of a vocational education program.)

A Vocational Director's Certificate, valid for a period of not more than five school years, shall be issued to an otherwise qualified applicant who:

1. Holds or is eligible for a Vocational Supervisor's Certificate.
2. Verifies five years of vocational teaching and/or supervision in one of the vocational subject areas.
3. Is recommended by the superintendent of the employing school district, or the president of a community college as having:
   a. Knowledge and understanding of vocational education.
   b. Proven ability to teach and/or supervise in vocational education.
   c. Understanding of and interest in the several subject areas to be coordinated and directed.

III. VOCATIONAL COORDINATORS OR INSTRUCTOR-COORDINATORS (For instructors responsible for coordinating a program of vocational education.)

Holds or is eligible for an Oregon Basic Teaching Certificate with a vocational teaching norm or a regular 5-year vocational certificate.

SPECIAL VOCATIONAL CERTIFICATES

I. SHOP AND LABORATORY INSTRUCTORS, AND WORK EXPERIENCE INSTRUCTOR-COORDINATORS (For full-time high school or post-high school.)

Upon request of the employing superintendent of a school district or the president of a community college a Special Vocational Certificate valid for one or five years may be issued to otherwise qualified applicants who comply with the following requirements in the area to be taught:

A. One-year Certificate

1. Verification of three calendar years of occupational experience as a qualified worker in the occupational area in which the instruction is to be given. Or,
2. Verification of a background of work experience and/or specialized training, or by completion of an examination appropriate to the occupational area involved. The candidate must also be recommended by an instructor appraisal committee as provided for in the Oregon State Plan for Vocational Education. Committee approval is required for renewal. Or,
3. Possession of a baccalaureate degree <u>and</u> a background of at least three years of verifiable work experience. <u>Both</u> the degree and the work experience must be in the instructional area involved.

B. Five-Year Certificate

1. Meets requirements for the one-year certificate for shop and laboratory instructors.
2. Verifies one year teaching experience in a vocational area.
3. Verifies completion of 12 quarter hours of approved vocational teacher preparation.

Renewal

The one year certificate may be renewed twice upon verification at each renewal of completion of four quarter hours of approved vocational teacher education.

II. VOCATIONAL ADULT AND POST-HIGH SCHOOL EDUCATION (part-time)*

Vocational instructors may be approved for one or five years upon request of the superintendent of a school district, or the president of a community college, when the applicant has been recommended by the employing agent as having:

(1) Adequate acedemic and occupational training and experience,

(2) Ability to organize materials for teaching and to teach in the area for which approval is requested.

Verified compliance with the following requirements in the area to be taught:

A. One-year Approval

1. Holds a basic or standard teaching certificate. Or,
2. Meets requirements of a Special Vocational Certificate.

B. Five-year Approval

1. Meets requirements for a one-year approval.
2. Verifies teaching two (20-30 clock hour) vocational courses.

III. OCCUPATIONAL WORK EXPERIENCE DETERMINATION

The following criteria will be used to determine work experience qualifications which are required for vocational subject norms and special vocational certificates.

A. Work experience must in one or more of the occupations included in the occupational objectives of the curriculum or course to be taught.

B. Work experience will be determined on a full-time basis. (Certain approved volunteer service occupations will be defined as meeting this requirement.)

C. Work experience is subsequent to age 16.

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*Note: Adult vocational instructors are not required to hold a certificate; however, if the educational agency is to receive vocational reimbursement, the instructor must be approved by the Division of Community Colleges and Vocational Education.

EDUCATION PROGRAM DIRECTOR 2

The Education Program Director 2 plans, organizes and directs programs for one of several large and significant areas of responsibility of the State Department of Education, being responsible to one of the three Associate Superintendents in charge of programs.

Distinguishing Features of Work:

This is professional administrative work directing a major section in the Agency having broad or multi-program responsibilities and having a major impact on the Agency's mission. This class of positions represents the top echelon of program decision and policy-makers below the unclassified positions of Associate Superintendent. Each position is held accountable for attaining the section's objectives in concert with the Agency's goals. The Education Program Director 2 will be held responsible for providing top management with technical expertise in his area of responsibility and final recommendations on policy and procedural matters as required. The work is reviewed and evaluated for results and progress toward goal attainment.

Examples of Work:

1. Plans, organizes, interprets, and administers a major educational program effort through contacts with local school authorities, community colleges, and cooperating agencies.
2. Studies reports, makes recommendations regarding program budget, program policies, and program objectives to be adopted by management.
3. Reviews program materials prepared by the staff for publication for use by teachers and local school officials.
4. Represents the Agency and the Superintendent before education groups and other interested publics providing information and professional consultation on matters pertaining to programs.
5. Directs the activities of staff in the various disciplines of their program areas.
6. Evaluates performance of staff and makes recommendations for improved results.
7. Serves as an interdisciplinary resource person for Agency top management in the development of overall educational objectives.

Recruiting Requirements:

Knowledge, skills, and abilities

Extensive knowledge of administration as it can be applied to the field of education; an extensive knowledge of the basic principles and theories of education; and extensive knowledge of important schools of thought and developments in the field of specialty; and extensive knowledge of state and federal laws relating to education and to the specialty fields; a thorough knowledge of methods of supervision; a thorough knowledge of planning, budgeting, and programing; ability to speak and write effectively; ability to analyze and evaluate programs; ability to coordinate diverse publics and groups to achieve an objective; ability to plan and conduct institutes and conferences; ability to organize the work and supervise the professional and technical work of others.

Experience and training

A Master's degree in the area of specialty plus eight (8) years of progressively responsible experience in a field appropriate to the requirements of the position including a minimum of two (2) years of teaching experience and four (4) years of administrative experience providing planning, budgeting, personnel, and programing experience. For those positions for which teaching experience is not required, the two years of teaching experience may be substituted for by two (2) years of responsible experience in the specialty field or two years of responsible administrative experience. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount, quality, and kind of experience that will qualify in lieu of the advanced degree. A doctoral degree will substitute for one year of the required specialty experience.

EDUCATION PROGRAM DIRECTOR 1

An Education Program Director 1 plans and directs a broad functional area of the Agency's total program responsible directly to an Associate Superintendent or to a major division director.

Distinguishing Features of Work:

This is an administrative level responsible for planning and directing the implementation of a program for providing professional consultation and assistance to schools, school districts, and community colleges on all aspects of instructional techniques and media, or provides similar assistance to career educators on all areas included in the Agency's career program. Employees in these positions are required to perform all management functions relating to successful program execution including planning, budgeting, organizing, and personnel administration. Supervision is exercised of a number of education specialists. Work is reviewed for results and adherence to Agency policy.

Examples of Work:

1. Directs professional employees engaged in planning and developing educational programs in local school districts.
2. Directs the review and development of educational material pertaining to specialized programs for distribution to community colleges and local school districts.
3. Consults with state and local school officials, advisory committees, and other groups interested in promoting and developing educational programs within the state.
4. Makes broad assignments to staff specialists, reviews their plans and work, and evaluates their performance.
5. Establishes and maintains effective working relationships with local educational institutions, special-interest groups and other agencies.
6. Develops and executes a fiscal plan to meet established objectives.
7. Develops program policy, guidelines, procedures, and performance standards within the policy framework established by the Associate Superintendent.

Recruiting Requirements:

Knowledge, skill, and ability

Thorough knowledge of administration as it can be applied to the field of education; a thorough knowledge of the basic principles and theories of education; thorough knowledge of current principles and practices of education; a thorough knowledge of important schools of thought and

developments in the field of specialty; a thorough knowledge of state and federal laws relating to education and to the specialty fields; a thorough knowledge of methods of supervision; a working knowledge of planning, budgeting, and programing; ability to speak and write effectively; ability to analyze and evaluate programs; ability to coordinate diverse publics and groups to achieve an objective.

Experience and training

A Master's degree in the area of specialty plus six (6) years of progressively responsible experience in a field appropriate to the requirements of the position including a minimum of two (2) years of teaching experience and two (2) years of administrative experience providing planning, budgeting, personnel, and programing experience. For those positions for which teaching experience is not required, the two years of teaching experience may be substituted for by two (2) years of responsible experience in the specialty field or two years of responsible administrative experience. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount, quality, and kind of experience that will qualify in lieu of the advanced degree. A doctoral degree will substitute for one year of the required specialty experience.

EDUCATION PROGRAM COORDINATOR

The Education Program Coordinator supervises a program area with several professional and technical personnel reporting to him for policy and program direction. The Education Program Coordinator may report to an Education Program Director 1 or an Education Program Director 2, but whichever the case he reports to one of the top-level section directors who reports to the Associate Superintendent.

Distinguishing Features of Work:

This is an advanced level, responsible for supervising several professional or technical persons in the supervision of a moderately sized program area under the general direction of a higher-level Education Program Director. The work is performed independently with authority

to exercise judgment in matters concerning the assigned program. This is the first level in the series that has responsibility for administrative duties including planning, budgeting and programing; however, it is to a limited degree. Work is reviewed through conferences on the basis of adherence to policy and established procedures.

Examples of Work:

1. Assists the section director in the planning and development of program policies, guidelines, and performance standards.
2. Develops working procedures designed to effectively implement section plans on a timely basis.
3. Prepares assignments for staff specialists, reviews their work and evaluates results.
4. Establishes and maintains effective working relationships with individuals, local school districts, special interest groups and education-related associations relative to the successful execution of program plans.
5. Develops reports evaluating program progress and makes recommendations to correct deficiencies.
6. Coordinates special programs such as Manpower Development Training Act projects, on-the-job training and apprenticeship training.
7. Supervises educational audit teams and reviews and edits final report assuring compliance with Agency policy and presents the findings to local school boards.
8. Supervises a unit responsible for program development and evaluation.
9. Supervises a library services and audio-visual aid services unit providing professional and technical assistance to schools and community colleges.
10. Supervises a teacher-certification unit responsible for expanding and improving teacher-certification practices and procedures.
11. Supervises a student-services unit providing consultation to schools and community colleges in the areas of veterans' benefits, counseling and guidance, and remedial and adult education.
12. Supervises a unit responsible for administering Title I and III programs.

Recruiting Requirements:

Knowledge, skills and abilities

Thorough knowledge of the basic principles and theories of education; thorough knowledge of the current principles and practices of education; a thorough knowledge of important schools of thought and developments in the specialty field; a thorough knowledge of state and federal laws relating to education and to the specialty field; considerable knowledge of methods of supervision; considerable knowledge of report writing and research methods; a working knowledge of management principles and techniques; ability to analyze and evaluate instructional programs and to develop instructional materials; ability to speak and write effectively; ability to work with various professional and technical personnel and with diverse publics.

Experience and Training

A Master's degree in the area of specialty plus five (5) years of progressively responsible experience in a field appropriate to the requirements of the position including a minimum of two (2) years of teaching experience and one (1) year of supervisory experience. For those positions for which teaching experience is not required, the two years of teaching experience may be substituted for by one (1) year of responsible experience in the specialty field or one (1) year of supervisory experience. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount, quality and kind of experience that will qualify in lieu of the advanced degree. A doctoral degree will substitute for one year of the required specialty experience.

EDUCATION PROGRAM SPECIALIST 2

The Education Program Specialist 2 provides professional consultation and assistance in subject matter areas including those found in career programs as well as general elementary and secondary curricula. The Education Program Specialist 2 provides similar services in the programs included within the scope of special education, instructional technology, student counseling and guidance, adult continuing education, and the

Title I and III programs. Less frequently, employees in this class perform responsible professional-level work of a specialized nature related to education to a degree that it requires a background affording a knowledge of the teaching-learning process, but not related directly to the instructional process, such as the analysis of federal contracts, working with Manpower Development Training Act grants, apprenticeship and on-the-job training programs.

Distinguishing Features of Work:

Positions in this class are characterized by being responsible to a unit or section supervisor, or having responsibility for a complex program without technical supervision. Normally the incumbent is responsible for a cluster of instruction programs or an instructional area. Employees in this class have considerable administrative and technical decision-making authority in directing their phase of the Agency's total program, but their work is subject to general review and approval by an administrative superior.

Examples of Work:

1. Gathers, evaluates, and prepares instructional material for dissemination to schools, community colleges, and career educators.
2. Provides program assistance to schools, community colleges, career educators and program directors in the Agency relating to the planning and development of special programs.
3. Plans and conducts in-service training programs for teachers and career educators.
4. Analyzes manpower data with respect to existing or planned career education programs and articulates manpower needs and training resources to educators and program planners.
5. Assists the section director in the planning and development of program policies, guidelines, and performance standards, and translates section objectives into clear and specific program objectives.
6. Performs reference research in specialty area and gathers, evaluates, and prepares his information for dissemination to community colleges, career educators, and school districts.
7. Performs the coordinative work necessary to assure the smooth function and effective conduct of educational audits in the field.

8. Serve as a resource person and departmental specialist on school standards.
9. Reviews and analyzes federal contracts, grant and project proposals to determine whether they are in compliance with federal and state guidelines and regulations and the educational objectives of the State Department of Education.
10. Establishes and maintains effective working relationships with local districts, federal agencies, and special-interest groups.
11. Participates as a team member during educational audits providing evaluation expertise for his specialty area.
12. Provides program assistance to school districts and teachers for purposes of planning, evaluation, and improvement of educational programs and techniques.
13. Presents information to interested groups and the general public by writing articles and making speeches.

Recruiting Requirements:

Knowledge, skills, and abilities

Thorough knowledge of the basic principles and theories of education; thorough knowledge of current principles and practices of education; thorough knowledge of important schools of thought and developments in the field of specialty and generally in the field of education; a thorough knowledge of state and federal laws relating to education and to the special field; ability to analyze and evaluate instructional programs and to develop instructional materials; ability to speak and write effectively; abilities to coordinate diverse publics and groups to achieve an objective; ability to develop a report analyzing a program or institution and making recommendations.

Experience and training

A Master's degree in the area of specialty plus five (5) years of responsible experience in a field appropriate to the requirements of the position including a minimum of two (2) years of teaching experience. For those positions for which teaching experience is not required, the two years of teaching experience may be substituted for by two years of responsible experience in the specialty field. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount, quality, and kind of experience that will qualify in lieu of the advanced degree.

EDUCATION PROGRAM SPECIALIST I

The Education Program Specialist I provides expert professional consultation and direct assistance in one or more specialized areas of education to schools, school districts, county superintendents and Agency staff on methods of instruction, administration, service and subject matter content. These positions range from being directly involved in the instructional aspect of a school's operation to the more administrative functions found in schools and school districts, but in all cases the work is related and contributes to the educational objectives of the state's school system.

Distinguishing Features of Work:

The concern for and orientation to the teaching-learning process is what distinguishes this class of positions from other positions not included in this class series. This class is distinguished from other classes in this series by the intent that the positions in this class are characterized by being responsible to a unit or section supervisor or assisting a higher level position in a complex and moderately broad-scoped function. Incumbents of these positions normally do not exercise supervision over other professional level positions. Generally they exhibit expertise in relatively narrow technical areas.

Examples of Work:

1. Gathers, evaluates and prepares special program information for dissemination to school districts, school, and interested publics.
2. Performs reference research in area of specialization.
3. Provides specialized assistance to Education Program Directors in the Agency and assists as a member of an audit team in the evaluation of the school, providing that part of the evaluation that is concerned with his particular specialty area.
4. Participates in inservice teacher training programs providing instructions and materials in his area of expertise.
5. Provides program assistance to schools and school districts so that teachers and administrators can plan and evaluate their programs more effectively and generally improve the teaching program.

6. Reviews applications of educational institutions seeking approval of courses for veterans' training by analyzing course content, inspecting physical facilities, and investigating record of job placements.
7. Investigates student complaints of inadequate or incompetent instructors and follows up complaint with a discussion of complaint and his findings with school administrators advising them of what action would be appropriate for the administration.
8. Analyzes proposals, contracts, and grant applications recommending appropriate action based on his findings.

Recruiting Requirements:

Knowledge, skill and ability

Thorough knowledge of current principles and practices of education; thorough knowledge of important schools of thought and developments in the field of specialty and to a lesser degree in the general field of education. A knowledge of Oregon and federal laws, and current problems both instructional and administrative facing educators in Oregon; ability to communicate and work effectively with teachers, administrators, and the special publics who relate to the education field; ability to speak before groups and write effectively; ability to develop a report analyzing a program or institution and making recommendations.

Experience and training

A Master's degree in the area of specialty plus four (4) years of responsible experience in a field appropriate to the requirements of the position; including a minimum of two (2) years of teaching experience. For those positions for which teaching experience is not required, the two years of teaching may be waived, and four (4) years of relevant experience would be the total experience required. Substitution of experience for the Master's degree is at the discretion of the Superintendent who will define the amount and quality of experience which will qualify in lieu of the advanced degree.

OCCUPATIONAL CLUSTERS AND OREGON EMPLOYMENT

		1968* Oregon Employment in Key & Related Cluster Occupations	1975** Oregon Expansion-Replacement
1.	Agriculture Occupations	64,251	7,678
2.	Accounting Occupations	19,015	10,154
3.	Clerical Occupations	81,718	36,537
4.	Construction Occupations	18,984	6,442
5.	Electrical Occupations	13,849	4,080
6.	Food Service Occupations	50,813	26,994
7.	Health Occupations	22,279	9,731
8.	Marketing Occupations	48,612	18,285
9.	Industrial Mechanics	15,725	6,264
10.	Metals	20,890	8,011
11.	Secretarial	21,939	11,278

Important Note: All Jobs in Each Cluster Have Not Been Included. See Footnote #1.

*Minimum numerical requirements adopted by the committee for inclusion of a tentative cluster were present employment in Oregon of 10,000 workers and a forecast need for 2,000 additional workers in a five-year period.

**Statistical data, other than agriculture occupation, was developed from the State of Oregon Department of Employment "The 1967 Manpower resources of the State of Oregon and its metropolitan areas."

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[1]For purposes of defining the cluster, employment data is shown only for those occupations with 100 or more persons employed in the state.

OREGON BOARD OF EDUCATION
942 Lancaster Drive, NE
Salem, Oregon 97310

Form VE-97(71)
Community Colleges and
Career Education

Local Program
LONG RANGE PLAN - for Vocational Education

Educational Agency_____ Dist. No._____

Address_____ City_____ Zip_____

Superintendent_____ Phone_____

PURPOSE OF FORM:

The requested information is used for the preparation of the long range state plan as required of the State and local school districts by the regulations of the Vocational Education Amendment 81968

VOCATIONAL EDUCATION OBJECTIVES:

Describe in narrative form your vocational education objectives in measurable terms.

Example: Enroll 50 percent of the 11th and 12th graders in Vocational Education program by 1975.

Form VE-97(71)

Your total enrollment, grades:	7	8	9	10	11	12

OCCUPATIONAL ENROLLMENT (Do not include Industrial Arts and other general education

Program	Current Enrollment 9-10	Current Enrollment 11-12	1970-71 9-10	1970-71 11-12	1971-72 9-10	1971-72 11-12	1972-73 9-10	1972-73 11-12	1973-74 9-10	1973-74 11-12	1974-75 9-10	1974-75 11-12
Agriculture 01.0100-.0900												
Marketing 04.0800												
Health 07.7900												
Clothing Serv. 09.0202												
Food Serv. 09.0203												
Acct.& Bkkpg. 14.0100-.0200												
Clerical 14.0300-.0500												
Stenographic 14.0700												
Indust.Mech. 17.0300												
Metals 17.2300												
Construction 17.1000												
Electricity-Electronics 17.1500												
Diversified Occupations												
Consumer & Homemaking 09.0100												
Others (please Specify)												
TOTALS												
Total No.Students Enrolled in above occupational programs with coop work experience programs*												

*Includes supervised farming and farm placement programs for students enrolled.

Form VE-97 (71)

SPECIAL PROGRAM ENROLLMENTS:

Exploratory Occupational Programs

Program	Current Enrollment	1970-71		1971-72		1972-73		1973-74		1974-75	
		7-10	11-12	7-10	11-12	7-10	11-12	7-10	11-12	7-10	11-12
SUTOE											
Other (please specify)											

Work Study

	Current Enrollment		1970-71		1971-72		1972-73		1973-74		1974-75	
	7-10	11-12	7-10	11-12	7-10	11-12	7-10	11-12	7-10	11-12	7-10	11-12
Work Study												

Disadvantaged and Handicapped

	Number to be Served		1970-71		1970-72		1972-73		1973-74		1974-75	
	7	10 11-12	7-10	11-12	7-10	11-12	7-10	11-12	7-10	11-12	7-10	11-12
Regular Vocational Program												
Special Programs (please specify)												

CAREER GUIDANCE:

Career counseling is available at the following grade levels:

Grades	1-6	7	8	9	10	11	12
Current Year							
1970-71							
1971-72							
1972-73							
1973-74							
1974-75							

Counselor-student ratio:

Current Year	70-71	71-22	72-73	73-74	74-75

CAREER GUIDANCE (continued)

Group guidance is available to grade levels:

Grade	7	8	9	10	11	12
Current Year						
1970-71						
1971-72						
1972-73						
1973-74						
1974-75						

Describe planned group guidance activities:

Placement services are provided for students: Describe objectives of placement program.

Current Year

1970-71

1970-72

1972-73

1973-74

1974-75

Student follow-up studies of voc.completion will be made in the following years: Describe planned follow-up activities:

Current Year

1970-71

1971-72

1972-73

1973-74

1974-75

Form VE-97 (71)

PLANNED CONSTRUCTION OF VOCATIONAL FACILITIES

	Program to be Served	Approximate Number of Students to be Served
Current Year		
1970-71		
1971-72		
1972-73		
1973-74		
1974-75		

ADMINISTRATIVE:

Planned Administrative Personnel

	Title of Position	Number Required
Current Year		
1970-71		
1971-72		
1972-73		
1973-74		
1974-75		

EVALUATION:

Describe plans for evaluating voc. program:

OREGON BOARD OF EDUCATION
942 Lancaster Drive NE
Salem, Oregon 97310

Form No. VE-66(71)
Division of Community Colleges
and Career Education

APPLICATION FOR APPROVAL OF SECONDARY VOCATIONAL PROGRAMS

Date _____

School _____ District No. _____

Address _____ City _____ County _____

VOCATIONAL PROGRAM

Please identify the vocational curriculums for which approved programs are continuing or approval is being requested by checking the appropriate boxes in either column.

Cluster Curriculum	Previously Approved and in Operation	New or Amended	Other Vocational Programs	Previously Approved and in Operation	New or Amended
Agriculture	☐	☐	Diversified Occupations	☐	☐
Clerical	☐	☐	Other _____	☐	☐
Stenographic	☐	☐	Other _____	☐	☐
Bookkeeping and Accounting	☐	☐	Other _____	☐	☐
Mechanical	☐	☐	Other _____	☐	☐
Metals	☐	☐	Other _____	☐	☐
Construction	☐	☐	Identify previously approved curriculums that have been discontinued for this school year.		
Electrical	☐	☐			
Marketing	☐	☐	_____		
Food Service	☐	☐	_____		
Health	☐	☐	_____		

Certification

I do hereby certify that the assurances as outlined in Provisions for Approval of Secondary Vocational Programs will be complied with and the vocational programs approved will be conducted in accordance with the Acts, Regulations, and State Plan for Vocational Education.

_____ _____
Date Superintendent of School District

Please sign and return two copies of this form Form VE-66(71)

OREGON BOARD OF EDUCATION
942 Lancaster Drive NE
Salem, Oregon 97310

(Applies to) Form VE-66(71)
Division of Community Colleges
and Career Education

PROVISIONS FOR APPROVAL OF SECONDARY VOCATIONAL PROGRAMS

SECTION I: STATEMENT OF ASSURANCES

This section provides a series of statements designed to indicate that the district's program of vocational education meets the provisions of the rules and regulations governing the use of P.L. 88-210 funds.

Objectives of Instruction

- The program of instruction will be available for all persons of secondary school age or older, including those who have academic, socio-economic, cultural, physical, or other handicaps, who need or can profit from occupational education.

- Vocational education will be designed to prepare individuals for gainful employment or advancement in any recognized occupation except those which are generally considered to be professional or as requiring a baccalaureate or higher degree.

Content of Instruction

- The program of vocational instruction will be based on a consideration of the most up-to-date skills, knowledges, and understandings required in the cluster of occupations for which it is being provided. Programs will include planned, logical sequences of those essentials of education and experiences deemed necessary for individual students to meet their occupational objectives.

- The vocational curriculums are based on the advice and counsel of representatives from the occupational areas being served.

- There is reasonable expectation of employment opportunities in the occupational cluster as verified by advisory committees, the Oregon State Employment Service, or other sources.

- All students receiving vocational instruction in occupational preparation programs will have a career goal. This goal may be either a specific occupation or a cluster of closely related occupations in an occupational field.

- The program of instruction will be sufficiently extensive in duration and intensive within a scheduled unit of time to enable the individual to develop the competency necessary to fit him for entry level employment in the occupational cluster for which he is being trained or to prepare for advanced training.

- The program of instruction will combine and coordinate related instruction with field, shop, laboratory, cooperative work, and other occupational experience which is appropriate to the vocational objective of the individual, which is of sufficient duration to develop the competencies needed to fit him for employment in the occupation or occupational cluster for which he is being trained, and which is supervised, directed, or coordinated by a person qualified under the provisions of the State Plan for Vocational Education.

Use of Funds

- All vocational instruction will be under the supervision and control of a local educational agency responsible for expenditure of public school funds.

- Federal funds made available will be used to supplement the amount of local funds available, and in no case supplant local funds.

- Federal funds received will not be used for any programs of vocational education which cannot be demonstrated to (a) prepare students for employment, (b) be of significant assistance in making an informed and meaningful occupational choice to individuals enrolled, or (c) prepare students for advanced training.

Vocational Guidance and Counseling

- Vocational guidance, including effective selection, placement, and follow-up of all students who finish or drop a curriculum, is a continuing part of the program.

Teachers and Supervisors

- The program of instruction will be conducted and supervised by qualified teachers and supervisors meeting the qualifications stipulated in Sections 1.32, 1.33 and 1.34 of the State Plan for the Administration of Vocational Education.

Adequate Facilities and Materials

- Classrooms, libraries, shops, laboratories, and other facilities (including instructional equipment, supplies, teaching aids, and other material) will be adequate in supply and quality to enable those who are to be trained to meet the occupational objectives for which the education is intended. Class enrollment shall be limited to the number of students that insures effective instruction and safe working conditions.

Vocational Youth Organizations

- Provision will be made for vocational education youth organizations where appropriate. Vocational education youth group activities are an integral part of the instructional program and will be supervised by persons who are qualified as vocational education teachers or supervisors.

Evaluation

- A system for evaluating shall be developed to determine how the program meets its stated objectives. This system shall be ongoing and provide for modification resulting from appraisal from students, employers, and the advisory committee. Evaluation statements shall be specific and must include suggestions for improvement directly related to recommendations of local advisory committees.

SECTION II: VOCATIONAL CURRICULUM ASSURANCES

(Part A)

This part of Section II provides statements applicable to all vocational curriculums indicating that the district's vocational program meets the following minimum standards in addition to the assurances identified in Section I.

- Advisory committee meeting minutes and membership rosters are on file at the local educational agency for each vocational program.

- The educational agency will initiate and negotiate appropriate written contracts or agreements with all community resources used for student occupational experience.

- Adequate provisions will be made for the following activities and expenditures when appropriate:

  a. Supervision time and travel budget for personnel responsible for supervised occupational experience programs.

  b. Travel for instructor(s) engaged in official activities connected with vocational youth organizations.

  c. Travel expenses for instructor(s) to attend annual State-called conferences, in-service workshops, and other appropriate meetings.

  d. Adequate instructor time allotted for program development and evaluation.

- Provisions will be made for vocational curriculums to provide a minimum of ten instructional hours per week or for two credit units or its equivalent. Equivalent means: Five instructional hours per week or one credit unit, plus one hour or unit approved related vocational course, or supervised cooperative work experience or other occupational experience.

- Provisions shall be made for the articulation and coordination of occupational preparatory programs from secondary to post-secondary vocational-technical programs.

(Part B) Special Program Assurances

This part of Section II provides special statements for certain curriculums indicating that the district's vocational curriculum meets the minimum standards specified.

Agriculture Cluster

- Provisions will be made for a 9th and/or 10th grade instructional program in agriculture in addition to the 11th and 12th grade cluster.

- Provisions will be made for supervised occupational experience in agriculture.

- Provisions will be made for supervision of students in agriculture occupational experience programs on a 12-month basis by a qualified agriculture instructor.

- Provisions should be made for the FFA to be an integral part of the instructional program and for a qualified agriculture instructor to serve as chapter advisor.

Health Occupations Cluster

- The curriculum reflects consideration of State and national program standards, certification requirements, and licensure laws relating to a large number of occupations within the health field.

- Actual or "live lab" experiences in clinical and/or community facilities will be an integral part of a regular instructional program and will be planned, coordinated, and supervised by qualified health occupations education personnel.

Marketing Cluster - Distributive Education

- Provision should be made for DECA to be an integral part of the instructional program and for a qualified distributive education instructor to serve as chapter advisor.

- Provisions will be made for cooperative work experience to be an integral part of a one-year program and an integral part of the second year of a two-year program. The project method may be utilized in lieu of or in conjunction with cooperative work experience if cooperative work experience opportunities are limited by community resources, or if it is advisable to meet specialized student needs.

- Provision will be made for adequate supervision of students in cooperative work experience programs and/or working on special projects in lieu of or in conjunction with cooperative work experience programs.

Mechanical, Metals, Construction, and Electrical Clusters

- Provisions should be made for VICA to be an integral part of the instructional program.

Office Occupations Clusters: Bookkeeping and Accounting, Clerical, and Secretarial

- The program of instruction will enable students to be identified according to one of the following occupational cluster areas: bookkeeping and accounting; clerical; secretarial.

- The following are examples of courses that will be considered as vocational in intent in each of the clusters:

Bookkeeping and Accounting

Bookkeeping (second year)
Introduction to Data Processing
Office Machines
Business Communications
Business Mathematics
Cooperative Work Experience

General Clerical

Office Practice or Procedures
Office Machines
Introduction to Data Processing
Cooperative Work Experience
Typewriting (second year)

Steno-Secretarial

Shorthand I and II (two years)
Office Practice or Procedures
Typewriting (second year)
Cooperative Work Experience
Business Communications

Gainful Homemaking Programs

- The program of instruction will enable students to be identified in one of the following occupational areas:

  Child Care Services

  Clothing Management, Production and Services

  Institution and Home Management and Supporting Services

- Provisions should be made for FHA to be an integral part of the instructional program.

NOTE: All Consumer and Homemaking Programs (formerly Useful Homemaking) will be applied for under Part F - funding on Form VE-95(70).

OREGON BOARD OF EDUCATION
942 Lancaster Drive, NE
Salem, Oregon 97310

Form No. VE-67(71)
Division of Community Colleges
and Career Education

APPLICATION FOR APPROVAL OF VOCATIONAL CURRICULUM
(Submit two copies for each curriculum)

Please complete this section for each 11th and 12th grade curriculum.

School _____ District No. _____

Address _____

Vocational Curriculum _____ Date Submitted _____

Duration _____ to _____
(month) (day) (year) (month) (day) (year)

Will this be a continuing program? Yes__ No__

List below Occupational Course Titles within the Curriculum.
ATTACH ON A SEPARATE PAGE: CURRICULUM OBJECTIVES, COURSE OBJECTIVES & DESCRIPTIONS.

11th Grade	Instructional Time per week	12th Grade	Instructional Time per week
First Semester:		First Semester:	
Second Semester:		Second Semester:	

*Cooperative work experience is a part of the curriculum Yes__ No__
If Yes, Total minimum required hours _____

*Cooperative work experience is a part of the curriculum Yes__ No__
If Yes, Total minimum required hours _____

Identify Exploratory and/or Occupational Courses related to the Vocational Curriculum.

7th Grade	8th Grade	9th Grade	10 Grade

*Includes supervised farming projects, farm placement programs, and other supervised work experience.

For Local Educational Agency:

This curriculum meets the standards and requirements set forth in the Oregon State Plan for Vocational Education and meets the program assurances identified in PROVISIONS FOR APPROVAL OF SECONDARY VOCATIONAL PROGRAMS Form No. VE-66(70). The district will submit records as required by the State Board of Education.

Authorized Signature _____ Date _____

For State Office only:

This vocational curriculum has been entered into our records as approved. Approval will remain in effect until the curriculum is revised; eliminated from the school's offerings; or disqualified because it no longer meets approval criteria.

Recommended for Approval _____ Date _____ Occupational Specialist

Approval for State Board of Education _____ Date _____ State Director of Vocational Education

This vocational curriculum plan has not been approved for the following reasons:

_____ Occupational Specialist

_____ Date _____ State Director of Vocational Education

OREGON BOARD OF EDUCATION
942 Lancaster Drive, NE
Salem, Oregon 97310

Form No. VE-67-A(71)
Division of Community Colleges
and Career Education

APPLICATION FOR APPROVAL OF AMENDED SECONDARY PROGRAMS
(Submit two copies for each curriculum)

Please complete this section for each 11th and 12th grade curriculum.

School _____ District No. _____

Address _____

Vocational Curriculum _____ Date Submitted _____

Duration _____ to _____
(month) (day) (year) (month) (day) (year)

Will this be a continuing program? Yes No

List below Occupational Course Titles within the Curriculum.
ATTACH ON A SEPARATE PAGE: CURRICULUM OBJECTIVES, COURSE OBJECTIVES & DESCRIPTIONS.

11th Grade	Instructional Time per week	12th Grade	Instructional Time per week
First Semester:		First Semester:	
Second Semester:		Second Semester:	

*Cooperative work experience is a part of the curriculum Yes__ No__
If Yes, Total minimum required hours___

*Cooperative work experience is a part of the curriculum Yes__ No__
If Yes, Total minimum required hours___

Identify Exploratory and/or Occupational Courses related to the Vocational Curriculum.

7th Grade	8th Grade	9th Grade	10 Grade

*Includes supervised farming projects, farm placement programs, and other supervised work experience.

1718

For Local Educational Agency:

This curriculum meets the standards and requirements set forth in the Oregon State Plan for Vocational Education and meets the program assurances identified in PROVISIONS FOR APPROVAL OF SECONDARY VOCATIONAL PROGRAMS Form No. VE-66(70). The district will submit records as required by the State Board of Education.

Authorized Signature _____ Date _____

For State Office only:

This vocational curriculum has been entered into our records as approved. Approval will remain in effect until the curriculum is revised; eliminated from the school's offerings; or disqualified because it no longer meets approval criteria.

Recommended for Approval _____ Date _____ Occupational Specialist

Approval for State Board of Education _____ Date _____ State Director of Vocational Education

This vocational curriculum plan has not been approved for the following reasons:

_____ Occupational Specialist

_____ Date _____ State Director of Vocational Education

STATE BOARD OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

Form VE-61(67)

Application for Approval

VOCATIONAL-TECHNICAL CURRICULUM PLAN

INSTITUTION
OR SCHOOL_____ DATE:_____

CURRICULUM TITLE:_____

CLASSIFICATION:

____Occupational Preparatory

____Post-Secondary

____Adult

____Special Needs

____Adult Supplementary

INSTRUCTIONAL AREA:

____Agriculture Education

____Business Education

____Distribution & Marketing

____Office Education

____Health Occupations Education

____Home Economics Education (gainful)

____Technical Education

____Trade and Industrial Education

ADMISSION REQUIREMENTS (Grade level, prerequisites, test scores, etc.):_____

_____

CURRICULUM LENGTH (Terms or week normally included):_____

RECOGNITION FOR COMPLETION: ____Associate Degree ____Certificate ____Diploma

____Other (Specify)_____

IS THIS A CONTINUING PROGRAM? ____Yes ____No If no, enter

Beginning Date_____, Termination Date_____.

SUBSTANTIATION OF NEED FOR CURRICULUM (Cite studies or surveys if generally known, or attach special studies, reports, letters, etc., confirming need for proposed curriculum. Attach additional sheets if needed.):

(OVER)

ADVISORY GROUP MEMBERS (Attach additional sheet if needed):

Name	Organization	Position

This curriculum meets the standards and requirements set forth in the Oregon State Plan for Vocational Education and the Guide to Establishing Course Eligibility for State Financial Assistance. The institution will submit reports as required by the State Board of Education.

( ) Request that authority be granted to award _____.
Type (degree or certificate)

(Degree) (Certificate) indicating satisfactory completion of this curriculum.
(Strike out one)

( ) Do not request authority to award degrees or certificates in connection with this curriculum.

_____ _____
Date Local Administrator

This curriculum and the courses it includes have been entered into our records as approved. Approval will remain in effect until the curriculum is revised, eliminated from the institution's offerings, or disqualified because it no longer meets approval criteria.

Any financial aid associated with this approval is contingent upon individual courses and classes meeting other pertinent standards.

Approval of this curriculum does not by itself constitute authority for awarding associate degrees or certificates.

Recommended for Approval _____ _____
Date State Director

Approval for State Board of Education _____ _____
Date Designated Representative

This curriculum plan has not been approved for the following reasons:

_____ _____
Date State Director

Oregon Board of Education
942 Lancaster Drive N.E.
Salem, Oregon 97310

Community Colleges and
Career Education
VE-92(71)
Submit Three Copies

APPLICATION FOR SPECIAL VOCATIONAL EDUCATION PROJECTS FOR DISADVANTAGED AND HANDICAPPED

Educ. Agency_____ District Number_____
Address_____ City_____
PROJECT DIRECTOR_____ Phone_____

Identify the nature of the special project and the groups to be served by checking proper spaces.

____Community College ____Secondary
____Disadvantaged ____Handicapped ____Combination
____Special Educational Asst. ____Modified Voc. Prog. ____Special Voc. Prog.
Title or special area of project_____

Enter the estimated number of enrollees in each category.

DISADVANTAGED:	HANDICAPPED			
Academically ____	Hard of hearing	____	Emotionally disturbed	____
Culturally ____	Deaf	____	Mentally retarded	____
Economically ____	Speech impaired	____	Physically handicapped	
	Visually handicapped	____	Crippled	____
	Blind	____	Chronically ill	____

Length of program____ Starting date_____ Ending date_____
List occupational cluster(s) or specific vocational program(s) the project is a part of or related to

_____ _____

Describe the proposed program as briefly as possible, following outline on back, supplying adequate detail to consider the project in terms of the established criteria.

Disadvantaged Budget_____ Handicapped Budget_____
Total Budget_____ ATTACH DETAILED BUDGET SHEET

I certify that the programs, services or activities approved will be conducted in accordance with the Acts, regulations, and State Plan for Vocational Education, and those students, to be served, described as disadvantaged or handicapped will meet the criteria as outlined with the accompanying definitions.

_____ _____ _____
Authorized School Representative Title Date

Approved_____
Disapproved____ Disadvantaged $_____ Handicapped $_____ Total $_____

_____ _____
Oregon Board of Education Date
Designated Representative

1722

DISADVANTAGED AND HANDICAPPED PROGRAM OUTLINE

1. Define the problem.
2. Outline the measurable objectives in performance terms.
3. Identify specialized concepts, curriculum, unique procedures to be used.
4. List special instructional materials and any specialized equipment to be used. Equipment if included must relate directly and only to disadvantaged or handicapped students.
5. Specify provisions for outside agency or organization cooperation.
6. Stipulate follow-up procedures.
7. Outline specific plans for evaluation including plan for outside of local education agency evaluation.

The following criteria will be utilized to determine priority for reimbursing special vocational education projects:

Impact on unemployment of 18 to 24 years old youth, school dropouts, needs of handicapped and disadvantaged, local and state manpower needs, adult unemployment, economically depressed areas. Assurance that the program cost will be reasonable. Interagency cooperation, and that programs will be represented by advisory committees.

BUDGET OUTLINE	Disadvantaged	Handicapped	Total
1. Personnel (including fixed cost)	_____	_____	_____
2. Travel	_____	_____	_____
3. Supplies	_____	_____	_____
4. Other	_____	_____	_____
Total	_____	_____	_____

OREGON BOARD OF EDUCATION
942 Lancaster Drive, NE
Salem, Oregon 97310

Form No. VE-94(70)
Division of Community Colleges
and Career Education

APPLICATION FOR EXEMPLARY PROGRAMS OR PROJECTS
IN VOCATIONAL EDUCATION
(Submit in duplicate)

Applicant Agency _____
Address _____
Project Initiator _____ Phone No. _____

Title of Project _____
_____
Starting Date _____ Ending Date _____
Estimated Total Cost _____ Local Funds _____
Federal Funds Requested (exemplary) _____ Other Funds _____

Identify the nature of the exemplary project (check proper spaces)

Occupational Instruction _____
Occupational Orientation _____
Occupational Exploration _____
Occupational Guidance _____
Other (Specify) _____

Level:
Elementary _____
Secondary _____
Post-Secondary _____
Adult _____

Attach a description of the proposed project following the outline on the back of this page. The description should be sufficient to permit evaluation of the project against the indicated criteria.

I certify that the program, services, and activities under this project will be conducted in accordance with the provisions of the State Plan for the Administration of Vocational Education.

_____ _____
Authorized Agency Representative Date

_____
Title

For State Office Use Only)

Date Received _____
Approval Action: No. Assigned _____

Amount of Funds Allocated _____

_____ _____
Oregon Board of Education Date
Designated Representative

EXEMPLARY PROGRAM OR PROJECT OUTLINE

The proposal should be typewritten (double spaced) on 8½ x 11 white paper on one side only. No special binder or hard covers are to be used. Please supply an original and one copy. The body of the proposal should be concise but sufficently complete to provide for sound evaluation. It should cover the following:

1. Brief project description, including the major emphasis, to whom directed (e.g., age, grade level, sex, disadvantaged) and the estimated number of students affected.

2. Statement of the aims and objectives of the project in performance terms.

3. Methods or sequences of planned events or experiences to accomplish the project objectives.

4. Description of each type position planned in the project and qualifications for key staff members.

5. Specific provisions for the participation of students enrolled in nonprofit private schools.

6. Cooperative efforts planned under the proposal with other agencies, including manpower agencies and other agencies.

7. How the project will be coordinated with other public and private programs having the same or similar purposes.

8. Emphasis that will be given to youth who have academic, socioeconomic, or other handicaps.

9. Specific plans for evaluation of the program.

10. Description of the use to be made of the results in the regular vocational education program.

11. Assurance that all fund monies used for the project will be segregated in budget and accounting records to permit identification of federal and matching funds.

12. Separate budget sheet itemizing major categories of expenditures, such as personnel, supplies, equipment, travel, communications, and planned sources of funds.

The following criteria will be utilized to determine priority for reimbursing exemplary vocational education projects:

Impact on meeting vocational education needs of disadvantaged youth and on reducing youth unemployment. The extent to which the project promotes cooperation between education and manpower agencies. Relevance to current priority areas in vocational education. Potential of the program being made a part of the regular vocational education program. Potential contribution to vocational education in general. Qualification of staff. Adequacy of facilities. Project evaluation plans. Reasonableness of cost.

OREGON BOARD OF EDUCATION
Community Colleges and Career Education
942 Lancaster Drive NE
Salem, Oregon 97310

Form No. VE-95 (72)
Submit three copies

APPLICATION FOR APPROVAL OF CONSUMER AND HOMEMAKING EDUCATION
New, extended, innovative, and/or demonstration programs

Educational Agency _____ District Number _____

Address _____ City _____

PROJECTOR DIRECTOR _____

_____

Title of Project _____

_____

Estimated Number of Students to be Served _____

Type of Project:

_____ New, innovative demonstration
_____ New planning grant
_____ Extension, implementation of previous planning grant

Level:

_____ Jr. High _____ Secondary _____ Post-secondary _____ Adult

Length of Project:

_____ weeks, hours/week _____
Starting Date _____ Ending Date _____

Describe the proposed program as briefly as possible, following outline on back. Supply adequate detail to identify the project in terms of the established criteria. Attach additional pages as needed to complete the information requested.

Total Budget _____ Amount of local district Contribution _____ Reimbursement Requested _____

I certify that the programs, services, or activities approved will be conducted in accordance with the Acts, regulations, and State Plan for Vocational Education, and will meet the criteria as outlined on the back.

_____ Authorized School Representive _____ Title _____ Date

Approved _____
Disapproved _____

_____ Oregon Board of Education Designated Representative _____ Date

CONSUMER AND HOMEMAKING PROGRAM

1. State the problem. Give a brief description of the project.
2. Describe students to be served. (Educational background, age, or grade level, socioeconomic background, physical, social, or educational handicaps.)
3. Outline measurable objectives of the project in performance terms. (Only overall objectives - not specific course objectives.)
4. Give assurances that your project proposal meets the following criteria:
   (a) Be taught by approved instructional personnel.
   (b) Include plans for use of advisory committees.
   (c) Submit a budget using the format below. Omit items that do not apply. Show local cost for equipment, but do not request reimbursement. The total cost column should indicate only cost of this proposed project.
   (d) Provide for extended learnings beyond the classroom, including programs and activities such as FHA, home visitations, use of mass media, and/or other instructional techniques.
   (e) Outline specific plans for evaluation of the program including provisions for an evaluation by a source outside the local educational agency.
5. Indicate which of the following criteria applies to the project:
   (a) Improvement of environment through greater consideration of social and cultural conditions and needs.
   (b) Encouragement of preparation for professional leadership.
   (c) Preparation of youth and/or adults for the role of homemaker or contribute to the employability of such youths and adults in the dual role of homemaker and wage-earner.
   (d) Integrate consumer education into the homemaking program and/or, if appropriate, design comprehensive course or courses.
   (e) Be designed for persons who have entered or are preparing to enter the work of the home.

BUDGET FORMAT

Items - Detail	Total Cost this project request	Reimbursement requested	For State use only Am't approved
1. Salaries			
Identify personnel			
2. Employee benefits _____%			
3. Resource consultants or Auxiliary personnel			
4. Communications - (explain)			
Travel			
Field trips			
Student transportation			
5. Rental charges			
6. Equipment - (itemize)		XXXXX	XXXXX
7. Other - (explain)			
Totals			

Submit three copies with form VE-95 (72) attached; however, if you have additional copies of program details, it is very helpful to the Ad Hoc Committee to have five to seven extra copies.

9/70:2000

OREGON BOARD OF EDUCATION
942 Lancaster Drive NE
Salem, Oregon 97310

Form No. VE-93 (71)
Division of Community Colleges
and Career Education
Submit in Triplicate

APPLICATION FOR APPROVAL OF SPECIAL VOCATIONAL EDUCATION
COOPERATIVE WORK EXPERIENCE PROGRAMS (Part G Funds)

Date_____
Educ. Agency_____ District Number _____
Address_____ City_____
Telephone Number of Project Originator_____
Project Originator_____

Identify the nature of the special project and the groups to be served by checking the proper spaces.

_____Secondary _____Post Secondary_____Adult

_____Extension and improvement of existing programs _____New Programs

Length of Program: Weeks_____ Hours/week_____

Starting Date _____Ending Date_____

Will this be a continuing program: Yes_____ No_____

Estimated Enrollment: _____

Describe the proposed program as briefly as possible, following outline on back, supplying adequate detail to consider the project in terms of the established criteria. Attach additional pages as needed to complete the information requested.
Source of Funds:
Local_____Other_____Federal_____

Total Budget_____

I certify that the programs, services or activities approved will be conducted in accordance with the State Plan for Vocational Education, as set forth in Form VE-66 and 67(70), and will meet the characteristics of cooperative programs as outlined on the following pages.

Authorized Representative _____ Title _____ Date _____

Approved _____
Disapproved _____

Oregon Board of Education
Designated Representative _____ Date _____

COOPERATIVE WORK EXPERIENCE PROJECT OUTLINE

The project should be typewritten (double spaced) on 8½ x 11 white paper on one side only. No special binder or hard covers are to be used. Please supply an original and two copies. The body of the proposal should be concise but sufficiently complete to provide for sound evaluation. It should cover the following:

1. Brief project description, including the major emphasis, to whom directed, e.g., age, grade level, sex, disadvantaged, and the estimated number of students affected.

2. Describe students to be served. (Educational background, age or grade level, socioeconomic background, physical, social, or educational handicaps.)

3. Outline the measurable objectives in performance terms.

4. Description of personnel planned in the project and qualifications for key staff members.

5. Specific provisions for participation of students enrolled in nonprofit private schools.

6. Cooperative efforts planned with other agencies.

7. List advisory committee and qualifications.

8. Outline specific plans for evaluation of the program including provisions for an evaluation by a source outside the local educational agency.

9. Assurance that all fund monies used for the project will be segregated in budget and accounting records to permit identification of fund and matching funds.

10. School drop-out rate and unemployment of area, if above average for state. (Give statistics and source.)

11. Attached Budget. Please attach on a separate page a detailed breakdown of the budget, using the outline below as a guide.

BUDGET OUTLINE:

a. Personnel including fixed cost _____
b. Travel _____
c. Supplies _____
d. Other _____

TOTAL _____

The following criteria will be utilized to determine priority for reimbursing cooperative work experience projects.

Impact on unemployment of 18 to 24 year old youths, school drop-outs, needs of handicapped and disadvantaged, local and state manpower needs, adult unemployment, economically depressed areas. Assurance that the program cost will be reasonable. Interagency cooperation, and that programs will be represented by advisory committees. Local resources available.

1729

OREGON BOARD OF EDUCATION
942 Lancaster Drive NE
Salem, Oregon 97310

Form No. VE 96 (71)
Division of Community Colleges
and Career Education

LOCAL EDUCATIONAL AGENCY AGREEMENT TO PARTICIPATE

IN WORK-STUDY PROGRAM

We, _____
(Name of educational agency and address)

_____,
agree to participate in the work-study program under the supervision of the Oregon Board of Education, or authorized representative. We agree to participate pursuant to the following conditions:

I. Students Participating in the Program Are:

A. Enrolled or accepted for enrollment in an approved vocational program.
B. If enrolled, are in good standing.
C. In full-time attendance as a full-time student.
D. In need of the earnings from such employement to commence or continue his vocational education program.
E. At least 15 years of age and less than 21 years of age at the date of commencement of employment.
F. In the opinion of appropriate school authorities, are capable of maintaining good standing in their educational program while employed under the work-study program.

II. Hours and Compensation - Limitations

A. Maximum of 15 hours per week while classes in which student is enrolled are in session.
B. Maximum of $45 per month or $350 per academic year.
C. Special maximum for students not living within reasonable commuting distance from their residence, $60 per month or $500 per academic year.
D. A student working for the local educational agency during the regular school year is exempt from social security taxes and state retirement deductions.
E. During the summer months when school is not in session, the student will be governed by the same payroll conditions as a regular employee.
F. Must be covered by industrial accident insurance.

III. Place of Employment

Local educational agency making this application or an assigned educational agency made by the contracting educational agency.

IV. Coordination of Program

A. Work so performed will be adequately supervised and coordinated.
B. Work will not supplant present employees or participating agency or institution.

C. A work-study supervisor will be designated before students are assigned to jobs under this program. This supervisor will be responsible for assuring compliance with the "Minimum Program Requirements' in the Procedures Manual for Work-Study Programs issued by the State Department of Education, including provisions for the use of a Student Application form and a Work-Study Program Agreement, containing as a minimum the data outlined on these proposed instruments.

V. Local Financial Effort

Local funds for the employment of students will continue to be an amount at least equal to the average annual expenditures for work-study programs for the three fiscal years preceding that in which P.L. 88-210 funds are used.

A. Average amount expended in three previous years - $_____
B. Amount of local effort anticipated this year - $_____

VI. A Report of students, hours, and wages will be made to the State Director of Vocational Education on the recommended form.

VII. It is the intent of the _____school district to provide matching funds beginning in 1969-70. (i.e., every four dollars of Federal funds must be matched by one dollar of local funds.)

Date_____ Signed_____
(Authorized Educational Official)

_____ _____
State Director, Vocational Education Date

Prepare three copies of form; submit two copies to Oregon Board of Education.

RC:bjc

OREGON BOARD OF EDUCATION
942 Lancaster Drive NE
Salem, Oregon 97310

VE-8 (71)
Division of Community Colleges
and Career Education

APPLICATION FOR FINANCIAL ASSISTANCE TO PARTICIPATE

IN THE WORK-STUDY PROGRAM

Name and address of local educational agency_____

_____

The above educational agency desires to participate in the work-study program under the Vocational Education Act of 1963 in cooperation with the State Board of [illegible] Education.

Conditions in geographic area served by local school

1. Rate of unemployment_____%
2. Estimated dropout rate, grades 9-12 (public and private shcools)_____%
3. Number of unemployed youth at least 15 but under 21 years of age_____
4. Estimated number of vocational students who need program_____
5. Is the area listed as a depressed area?_____ Yes _____ No
6. Number of youth at least 15 but under 21 years of age_____

The following estimated budget is submitted for approval:

Budget Estimate

	Number per Month (Average)	Cost per Month (Average)	Number per Year	Cost per Year
Students, @ $45 per month				
Students, @ $60 per month				
		Total		

Funds are requested in the amount of $_____

Date_____ Signed_____
(Authorized Educational Official)

DO NOT COMPLETE -- (For State Office Use Only)

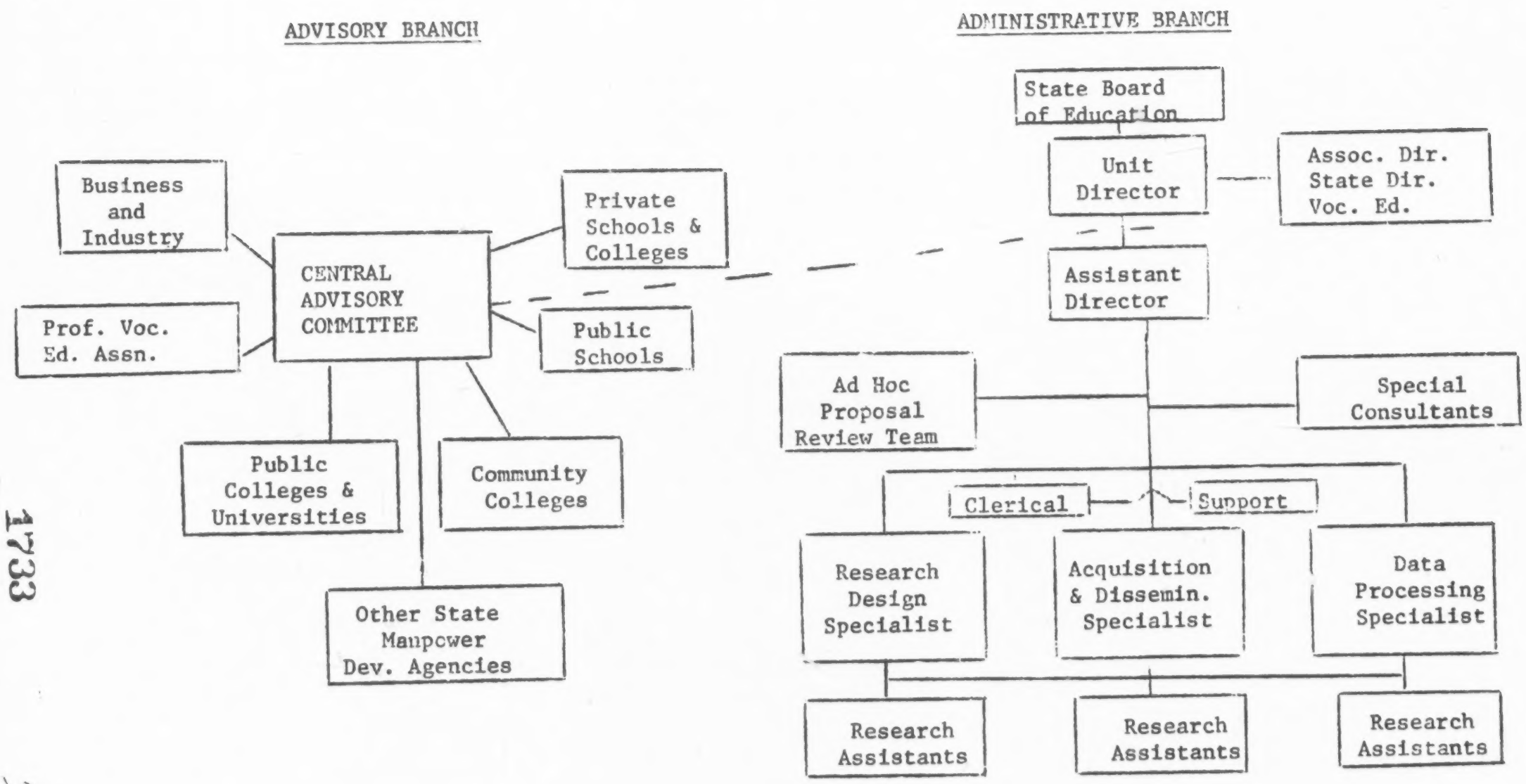
☐ Approved ☐ Approved as Amended ☐ Not Approved

Amount approved . . . $_____

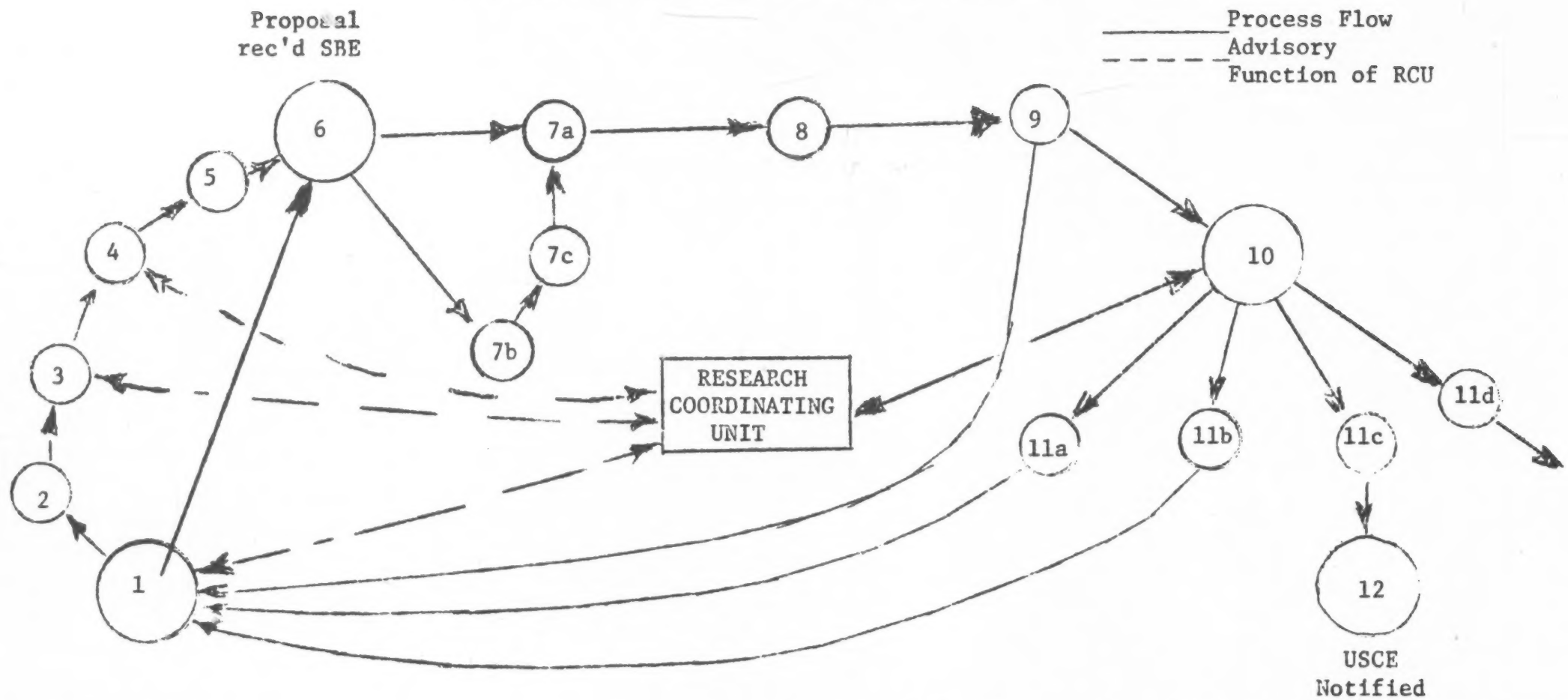
Signature_____
State Director, Vocational Education

1732

SAMPLE RESEARCH COORDINATING UNIT STRUCTURE



AN ADMINISTRATIVE FLOW-CHART
FOR
PROCESSING RESEARCH AND DEVELOPMENT PROPOSALS



1. Idea generated by local researcher or project director.
2. Completion of brief summary of the idea.
3. State Board staff and RCU staff review the idea summary.
4. State Board staff and RCU staff encourages and assists in development of proposal.
5. Proposal developed; approved by local board; signed by chief administrator and submitted to SBE.
6. Proposal received by SBE and processed.
7a. Proposal reviewed by selected State Board staff.
7b. Proposal reviewed by RCU staff.
7c. Proposal reviewed by Ad Hoc Proposal Review Team.
8. Proposal reviews synthesized.
9. Proposal signed by coord. & prepared for submission to State Dir., or returned to originator.
10. State Director acts on proposal; approves or takes other action.
11a. Disapproval & return to originator.
11b. Return to originator, request revision or adjustments.
11c. Approval & notification of originator, SBE staff & RCU.
11d. Submit proposal to other agency.
12. Commissioner of Education notified and proposal submitted.

PART II

LONG-RANGE PROGRAM PLAN PROVISIONS

FOR VOCATIONAL EDUCATION

Oregon Board of Education

TABLE OF CONTENTS

Section		Page
PART II		
1.0	Manpower Needs and Job Opportunities	189
	1.1 Summary of Labor Demand and Labor Supply	189
	1.2 Sources and Recency of Data in Table 1 page 190	189
2.0	Analysis of Availability of Vocational Education	191
	2.1 Location of Areas with Particular Needs	191
	2.2 Location of Vocational Education Programs	191
3.0	State's Population Relating to Vocational Education Needs	215
	3.1 Population Characteristic	215
4.0	Vocational Education Program Needs	221
	4.1 Vocational Education Needs Which Will Receive Priority in Terms of the Disadvantaged and Handicapped	221
	4.2 Depressed Areas--Areas with High Rates of Unemployment	222
	4.3 Program Emphasis--New Careers and Public Service Occupations	222
	4.4 Summary of Oregon's Vocational Education Needs	223
5.0	Career Education Objectives	227
	5.1 Secondary Objectives	230
	5.2 Post-Secondary Objectives	230
	5.3 Adult Objectives	231
	5.4 Disadvantaged Objectives	231
	5.5 Handicapped	232
	5.6 Special Programs	234
6.0	Analysis of Oregon's Vocational Education Programs	237

TABLES

Table		Page
PART II		
1	Employment Opportunities Related to Vocational Education Programs (Labor Demand and Supply Summary)	190
2	Analysis of State's Population Relating to Vocational Education Needs	216
2a	Population Characteristics and Vocational Education Needs	217
2b	Population of State	219
2c	Civilian Work Force, 1967	220
3	Vocational Education Enrollment	238
3a	Occupational Cluster Enrollment	239
4	Schools Offering Vocational Education	241
5	Construction Projects	241
6	Number of Teachers in Vocational Education Programs	242
7	Teacher Training Enrollment	243
8	Estimates of Funds Needed for Vocational Education	244

CHARTS

Chart		
1	Oregon Districts Designated as Areas For The Planning and Development of Vocational Training Programs	193
1a	State of Oregon Districts	195
1b	Oregon Employment, Selected Categories	197
1c	1966-69 Employment Trends for Economically Depressed Areas With High Rates of General Unemployment in Oregon	198
1d	Areas With High Youth Unemployment	201
1e	Reported Dropouts By County As A Percentage Of Average Daily Membership, Grades 9-12 For School Years 1968-69 And Previous 2 Years, Counties Designated As High Dropouts And Persistent High Dropouts in Most Recent Year Reported	203
1f	Areas With Greatest Population Density In Oregon	205
1g	Secondary Schools With 5 or More Occupational Fields Offered	207
1h	Community Colleges With 5 or More Occupational Fields Offered	210
1i	Number of Secondary and Community College School Districts Having Vocational Education Programs in Oregon	212
1j	Secondary School and Community College Districts With Five or More Occupational Fields Offered 1969-70	213

1.0 Manpower Needs and Job Opportunities

1.1 Summary of Labor Demands and Labor Supply

Table 1 page 190 shows the relationship between the current and projected labor demand and the current and projected labor supply. They were derived by using industry trend data for the period 1958 to 1967 and projected to 1975.

1.2 Sources and recency of data in Table 1 page 190

The 1967 Manpower Resource of the State of Oregon and its Metropolitan Areas - June 1969.

Oregon Manpower Plan FY 1971 Part A

TABLE 1

EMPLOYMENT OPPORTUNITIES RELATED TO VOCATIONAL EDUCATION PROGRAMS

LABOR DEMAND AND SUPPLY SUMMARY

190

1.2

State OREGON

Fiscal Year Ending June 30, 1971

OE Code	Instructional Program	Fiscal 1969-70 Employment[1]	Projected Labor Demand[1]		Projected Labor Supply[2]			
					Vocational Education Output[3]		Other[4]	
			1971	1975	1971	1975	1971	1975
			Expansion & Replacement	Expansion & Replacement				
0100	Agriculture-Prod.	50,082	1,215	1,013	251	398	20[5]	24[5]
0200-9900	Agriculture-Off Farm	11,092	1,130	683	378	642	10[5]	12[5]
04.0000	Distribution & Mktg	75,370	10,624	24,695	2506	3810	20[5]	25[5]
07.0000	Health	27,004	5,021	2,614	1418	2200	30[5]	35[5]
09.0000	Home Economics - Gainful	90,360	15,231	9,047	292	669	30[5]	35[5]
14.000	Office Occupations	151,634	21,601	12,194	4450	4902	370[5]	425[5]
16.0000	Technical	19,310	1,830	1,164	1104	1470		
17.000	Trade & Industrial	286,028	26,606	16,001	3756	7325	700[5]	770[5]
							1,180[6]	1,320[6]
							16,571[7]	17,589[7]
	TOTAL	710,800	83,258	67,411			34,323[8]	36,499[8]

1739

[1] Employment and projected labor demand supplied from "the 1967 Manpower Resource of the State of Oregon and its Metropolitan Areas.

[2] Output includes estimates projected from 1969 enrollments and completions.

[3] Number of completions from secondary and post-secondary and apprenticeship projected from 1969 enrollments and completions.

[4] Other than 3 above.

[5] MDTA.

[6] MDTA total.

[7] Completions from all other sources: N.Y.C., P.E.P., C.E.P., Job Corps, Work Experience & Tng., Adult basic, Voc. Rehab., C.A.P., W.I.N., J.O.B.S., New Careers, N.D.V.R., O.J.T., R.I.S.E., Project Breakthrough, Economic Development and Employment, "Outreach," Rehabilitation (Goodwill Industries), Bureau of Indian Affairs.

[8] Combined total of 6 and 7.

2.0 Analysis of Availability of Vocational Education

2.1 Location of Areas with Particular Needs

For purposes of interagency coordination of manpower problems, the state has been divided into 14 loca ized areas. These areas are referred to as the CAMPS Areas, see Chart 1 and Chart 1a, pages 193 and 195.

The following tables identify regions of the state which are experiencing employment and student dropout problems:

2.11 Chart 1b page 197 Oregon Employment Selected Categories, 1968

2.12 Chart 1c page 199 1966-69 Employment Trends for Economically Depressed Areas with High Rates of General Unemployment in Oregon

2.13 Chart 1d page 201 Areas with High Youth Unemployment

2.14 Chart 1e page 203 Reported Dropouts by County as a Percentage of Average Daily Membership, Grades 9-12 for School Years 1968-69 and Previous 2 Years, Counties Designated as High Dropouts and Persistent High Dropouts in Most Recent Year Reported

2.15 Chart 1f page 205 Areas with Greatest Population Density in Oregon (Counties and Cities)

2.2 Location of Vocational Education Programs

The following charts indicate the number and location of secondary and post-secondary districts in Oregon that provide occupational education:

2.0

2.21 Chart 1g page 207 Secondary Schools with Five or More Occupational Fields Offered 1969-70

2.22 Chart 1h page 210 Community Colleges with Five or More Occupational Fields Offered 1969-70

2.23 Chart 1i page 212 Number of Secondary and Community College School Districts having Vocational Education Programs in Oregon 1969-70

2.24 Chart 1j page 213 Secondary School and Community College Districts with Five or more Occupational Fields Offered 1969-70

CHART 1 OREGON DISTRICTS DESIGNATED AS AREAS FOR THE PLANNING AND DEVELOPMENT OF VOCATIONAL TRAINING PROGRAMS

District Number	Counties	County Seats
1	Clatsop	Astoria
	Tillamook	Tillamook
2	Clackamas	Oregon City
	Columbia	St. Helens
	Multnomah	Portland
	Washington	Hillsboro
3	Marion	Salem
	Polk	Dallas
	Yamhill	McMinnville
4	Benton	Corvallis
	Lincoln	Newport
	Linn	Albany
5	Lane	Eugene
6	Douglas	Roseburg
7	Coos	Coquille
	Curry	Gold Beach
8	Jackson	Medford
	Josephine	Grants Pass
9	Hood River	Hood River
	Sherman	Moro
	Wasco	The Dalles
10	Crook	Prineville
	Deschutes	Bend
	Jefferson	Madras
11	Klamath	Klamath Falls
	Lake	Lakeview
12	Gilliam	Condon
	Grant	Canyon City
	Morrow	Heppner
	Umatilla	Pendleton
	Wheeler	Fossil
13	Baker	Baker
	Union	La Grande
	Wallowa	Enterprise
14	Harney	Burns
	Malheur	Vale

STATE OF OREGON DISTRICTS

CHART 1a

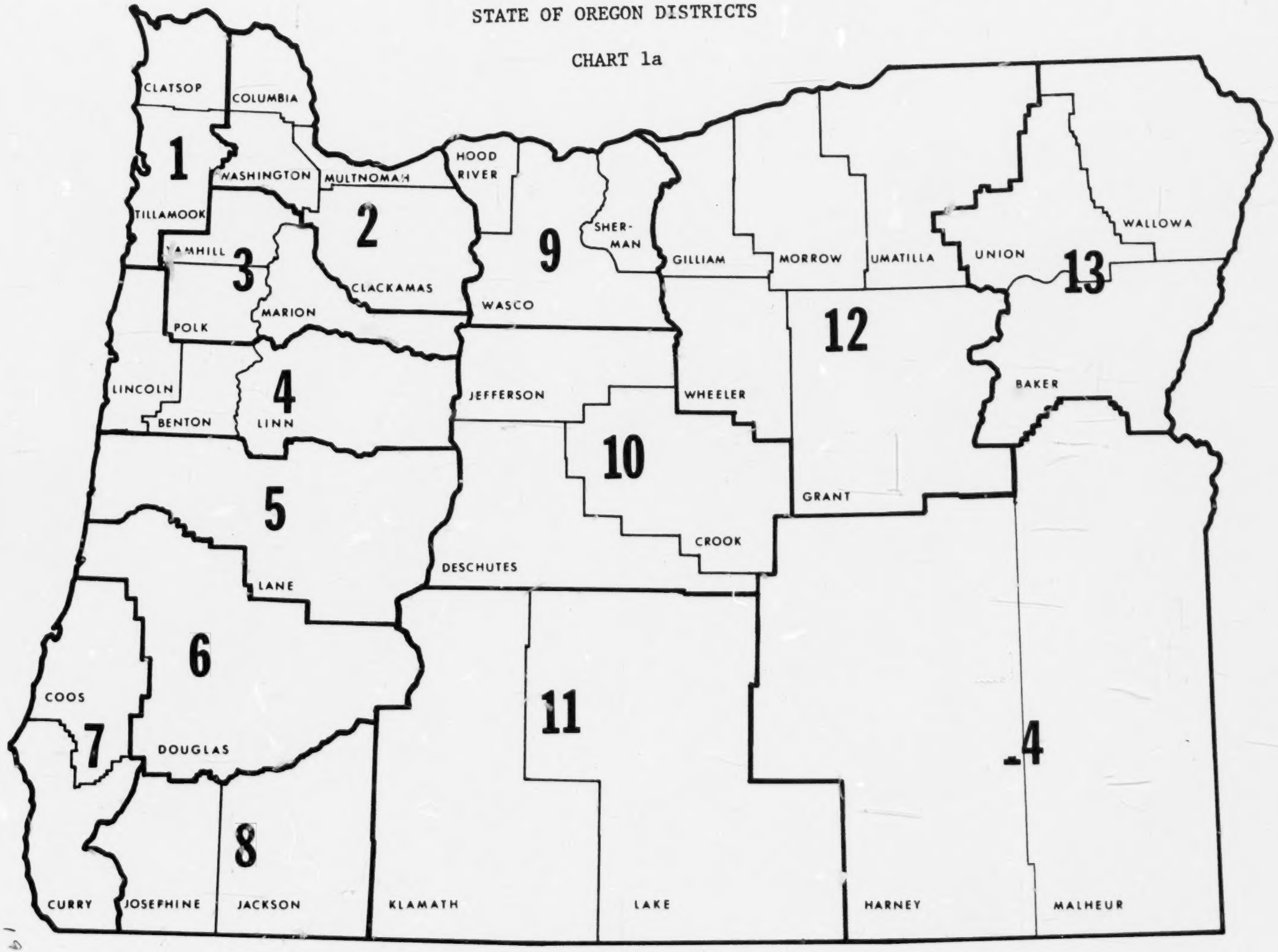


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CHART 1b OREGON EMPLOYMENT, SELECTED CATEGORIES, 1968

	TOTAL EMPLOYMENT	WAGE AND SALARY	MANUFACTURING	NON-MANUFACTURING	UNEMPLOYMENT RATE (%)
State of Oregon	840,400	674,800	172,100	502,700	4.4
District 1	17,290	13,730	4,830	8,900	5.3
District 2	388,100	335,560	77,280	258,280	3.3
District 3	80,040	59,940	13,070	46,870	5.8
District 4	55,680	44,320	12,850	31,470	4.7
District 5	79,400	65,100	18,900	46,200	5.1
District 6	26,370	21,270	9,060	12,210	6.1
District 7	25,480	20,990	8,660	12,330	6.6
District 8	46,940	35,710	9,060	26,660	6.9
District 9	14,270	10,220	2,110	8,110	7.3
District 10	18,960	14,320	4,160	10,160	5.4
District 11	21,810	16,680	4,310	12,370	5.0
District 12	24,280	17,190	4,160	13,030	4.9
District 13	15,130	10,580	2,190	8,390	5.0
District 14	20,190	11,650	3,010	8,640	4.9

Source: Department of Employment
State of Oregon
Executive Department
District FACTS
1970

2.12

CHART 1c

1966-69 EMPLOYMENT TRENDS FOR ECONOMICALLY DEPRESSED AREAS WITH HIGH RATES OF GENERAL UNEMPLOYMENT IN OREGON /1

CITY AND COUNTY	YEAR	PERCENTAGE OF UNEMPLOYMENT
Coos Bay (Coos County)*	1966	6.4
	1967	8.0
	1968	6.9
	1969	7.4
Medford (Jackson County)*	1966	6.2
	1967	7.4
	1968	6.3
	1969	6.9
Pendleton (Umatilla County)**	1966	4.1
	1967	5.0
	1968	4.7
	1969	6.5
Roseburg (Douglas County)*	1966	7.6
	1967	8.9
	1968	6.1
	1969	6.5
Condon (Gilliam County)	1966	5.3
	1967	6.7
	1968	5.8
	1969	5.5

* Persistent unemployment

** Substantial unemployment

/1 Zellner, Wesle E., Department of Employment, Research and Statistics Division, Salem, Oregon, March 1970.

CHART 1c 1966-69 EMPLOYMENT TRENDS FOR ECONOMICALLY DEPRESSED AREAS WITH HIGH RATES OF GENERAL UNEMPLOYMENT IN OREGON - continued

CITY AND COUNTY	YEAR	PERCENTAGE OF UNEMPLOYMENT
Enterprise (Wallowa County)	1966	4.2
	1967	5.6
	1968	6.4
	1969	6.8
Fossil (Wheeler County)*	1966	5.8
	1967	6.8
	1968	7.0
	1969	6.0
Gold Beach (Curry County)**	1966	5.5
	1967	6.0
	1968	5.5
	1969	7.4
Grants Pass (Josephine Co.)*	1966	8.7
	1967	10.3
	1968	8.3
	1969	10.6
Hood River (Hood River Co.)*	1966	6.6
	1967	7.1
	1968	7.3
	1969	7.0
Lakeview (Lake County)*	1966	8.2
	1967	8.3
	1968	7.0
	1969	6.3

* Persistent unemployment

** Substantial unemployment

CHART 1c 1966-69 EMPLOYMENT TRENDS FOR ECONOMICALLY DEPRESSED AREAS WITH HIGH RATES OF GENERAL UNEMPLOYMENT IN OREGON - continued

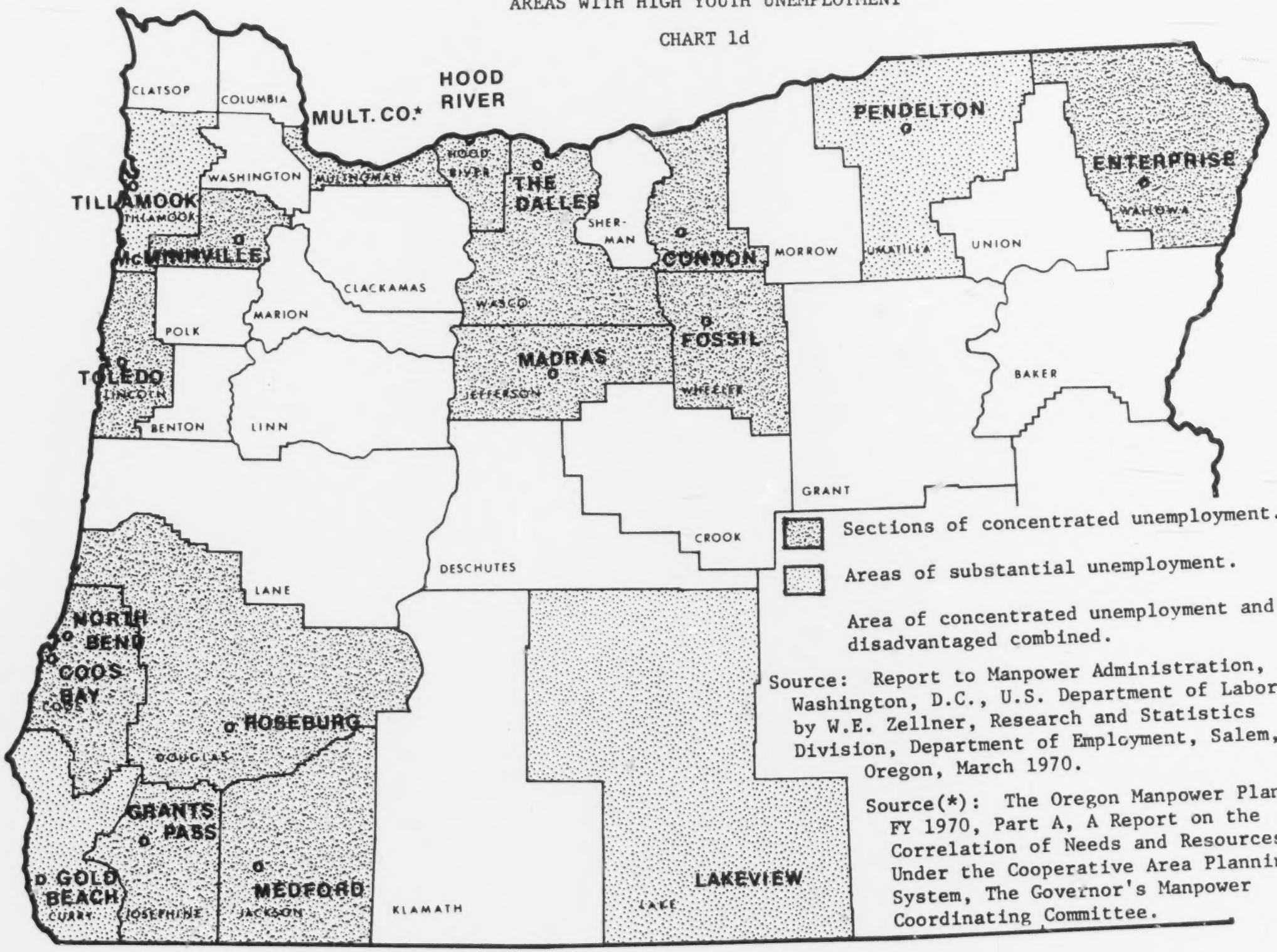
CITY AND COUNTY	YEAR	PERCENTAGE OF UNEMPLOYMENT
Madras (Jefferson County)	1966	6.3
	1967	7.2
	1968	6.4
	1969	5.2
McMinnville (Yamhill County)*	1966	6.9
	1967	7.5
	1968	6.5
	1969	6.6
The Dalles (Wasco County)*	1966	6.3
	1967	8.3
	1968	7.4
	1969	7.0
Tillamook (Tillamook Co.)**	1966	4.9
	1967	4.9
	1968	4.9
	1969	6.0
Toledo (Lincoln County)*	1966	6.5
	1967	7.0
	1968	5.7
	1969	6.2

* Persistent unemployment

** Substantial unemployment

AREAS WITH HIGH YOUTH UNEMPLOYMENT

CHART 1d



Sections of concentrated unemployment.

Areas of substantial unemployment.

Area of concentrated unemployment and disadvantaged combined.

Source: Report to Manpower Administration, Washington, D.C., U.S. Department of Labor, by W.E. Zellner, Research and Statistics Division, Department of Employment, Salem, Oregon, March 1970.

Source(*): The Oregon Manpower Plan, FY 1970, Part A, A Report on the Correlation of Needs and Resources Under the Cooperative Area Planning System, The Governor's Manpower Coordinating Committee.

CHART 1e REPORTED DROPOUTS BY COUNTY AS A PERCENTAGE OF AVERAGE DAILY MEMBERSHIP, GRADES 9-12, FOR SCHOOL YEARS 1968-69 AND PREVIOUS 2 YEARS, COUNTIES DESIGNATED AS HIGH DROPOUTS AND PERSISTENT HIGH DROPOUTS IN MOST RECENT YEAR REPORTED*

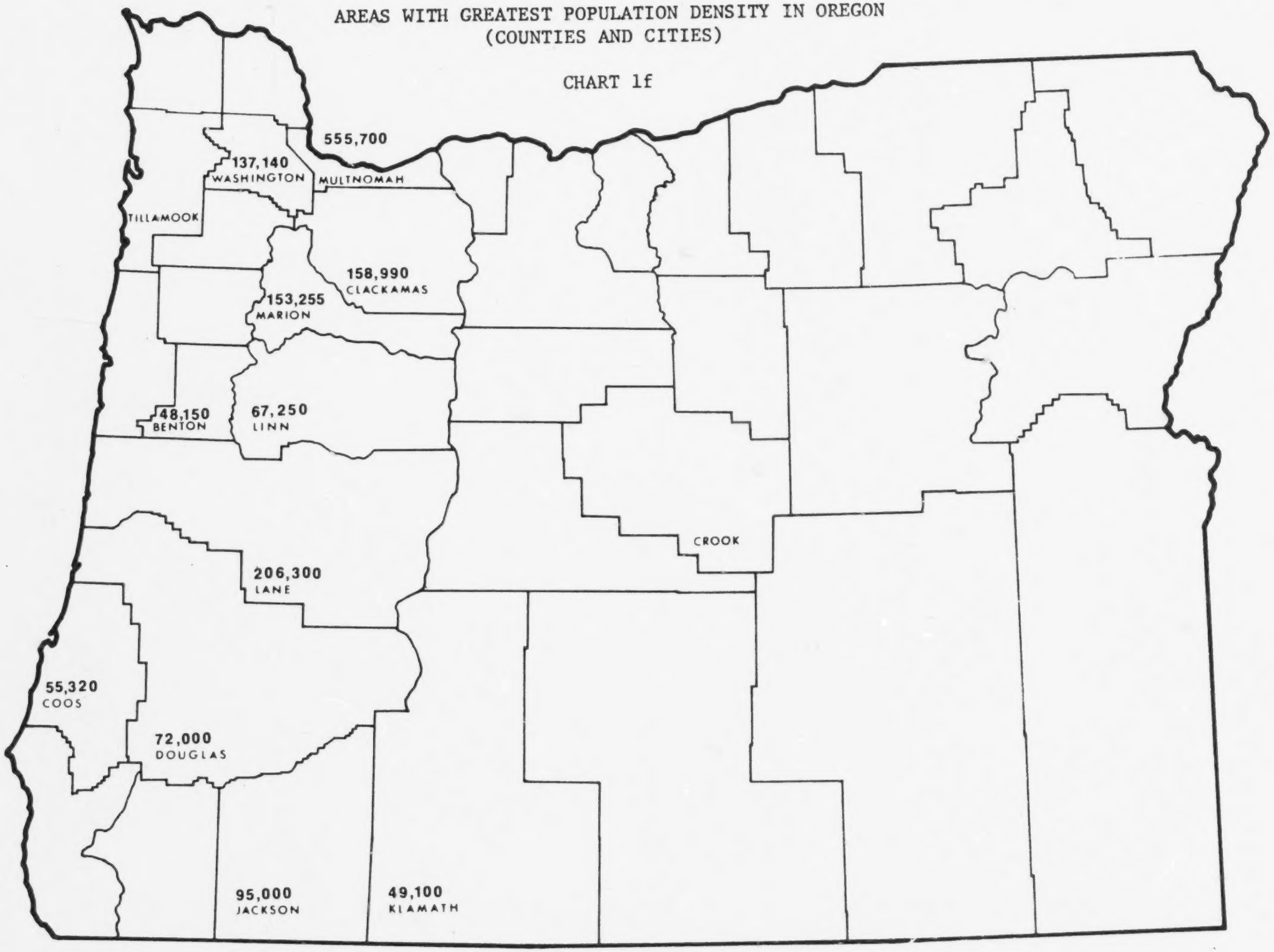
	1966-67			1967-68			1968-69				
Counties	Total Dropouts	ADM	Total Dropouts as % of ADM	Total Dropouts	ADM	Total Dropouts as % of ADM	Total Dropouts	ADM	Total Dropouts as % of ADM	Dropout(1)	Persistent High Dropout(2)
Baker	57	1,139.0	5.00	35	1,127.1	3.105	32	1,068.6	2.995	X	X
Benton	29	2,998.9	.97	14	3,062.6	.457	3	3,148.3	.095		
Clackamas	289	10,896.2	2.65	264	11,436.2	2.308	251	12,164.0	2.063		
Clatsop	39	1,651.4	2.36	20	1,720.8	1.162	59	1,723.1	3.424	X	
Columbia	55	2,529.8	2.17	49	2,538.9	1.930	35	2,612.3	1.340		
Coos	179	4,041.6	4.43	153	4,055.8	3.763	151	4,177.1	3.615	X	X
Crook	0	777.5	0	0	805.3	0	0	769.2	0		
Curry	32	1,009.4	3.17	14	1,004.6	1.394	34	1,022.3	3.326	X	
Deschutes	67	2,151.9	3.11	69	2,258.2	3.056	29	2,316.6	1.252		
Douglas	231	5,395.5	4.28	202	5,391.3	3.747	141	5,543.5	2.544		
Gilliam	2	209.9	.95	1	203.2	.492	8	205.8	3.887	X	
Grant	5	546.8	.91	3	567.4	.529	4	559.7	.715		
Harney	18	524.4	3.43	8	584.4	1.369	14	580.8	2.410		
Hood River	24	1,109.1	2.16	36	1,136.7	3.167	20	1,119.4	1.787		
Jackson	131	6,474.8	2.02	171	6,577.2	2.600	89	6,745.9	1.319		
Jefferson	94	690.7	13.61	95	690.7	13.754	0	738.6	0		
Josephine	113	2,624.1	4.31	98	2,612.5	3.751	134	2,648.0	5.060	X	X
Klamath	73	3,231.0	2.41	71	3,255.0	2.181	116	3,317.2	3.497	X	
Lake	0	522.9	0	1	563.4	.177	0	627.0	0		
Lane	284	14,288.9	1.99	212	14,697.0	1.442	160	15,119.0	1.058		
Lincoln	0	1,849.7	0	4	1,924.5	.208	63	1,873.4	3.363	X	
Linn	233	5,245.5	4.44	167	5,427.3	3.077	263	5,548.4	4.740	X	X
Malheur	2	1,793.2	.11	8	1,877.1	.426	4	1,881.0	.213		
Marion	300	9,390.4	3.19	305	9,813.2	3.108	274	10,166.1	2.695	X	
Morrow	4	329.1	1.22	0	349.1	0	0	360.8	0		
Multnomah	1,737	32,734.4	5.31	1,572	33,974.8	4.627	1,537	34,095.1	4.508	X	X
Polk	62	1,565.3	3.96	39	1,634.4	2.386	25	1,684.2	1.484		
Sherman	1	242.4	.41	10	220.3	4.539	7	209.3	3.344	X	
Tillamook	27	1,379.5	1.96	68	1,440.2	4.722	25	1,425.7	1.754		
Umatilla	123	3,377.4	3.64	137	3,465.9	3.953	82	3,561.4	2.302		
Union	49	1,360.0	3.60	44	1,333.7	3.299	38	1,382.2	2.749	X	X
Wallowa	6	500.1	1.20	4	515.8	.775	0	531.7	0		
Wasco	100	1,639.9	6.10	81	1,655.6	4.892	24	1,604.4	1.496		
Washington	205	9,263.1	2.21	261	9,9[illegible]6.4	2.621	171	10,578.1	1.617		
Wheeler	1	149.1	.67	0	141.6	0	3	150.4	1.995		
Yamhill	56	3,084.0	1.82	70	3,274.8	2.138	69	3,424.5	2.015		
TOTALS	4,633	136,716.9	3.39	4,286	140,698.3	3.046	3,865	144,683.1	2.671		

(1) above state average, 1968-69
(2) above state average for 3 consecutive years .

*Oregon Board of Education, Management Service(s)/Program Support, School Finance and Statistical Service(s), Salem

AREAS WITH GREATEST POPULATION DENSITY IN OREGON
(COUNTIES AND CITIES)

CHART 1f



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2 of 205

CHART 1g SECONDARY SCHOOLS WITH FIVE OR MORE OCCUPATIONAL FIELDS OFFERED 1969-70 - continued

SECONDARY SCHOOLS	OCCUPATIONAL FIELDS
Astoria	Agriculture Diversified Occupations Office Education (3) Trade and Industrial (2)
Beaverton	Distributive Education Office Occupations (2) Home Economics (2) Trade and Industrial (2)
Bend	Agriculture Distributive Education Office Education (3)
Bethel (Eugene)	Office Education (3) Home Economics Trade and Industrial (3)
Cascade (Turner)	Agriculture Diversified Occupations Office Education (3) Trade and Industrial (2)
Corvallis	Agriculture Distributive Education Diversified Occupations Office Education (3) Trade and Industrial (4)
Dallas	Agriculture Distributive Education Office Education (2) Trade and Industrial
Eugene School District	Distributive Education (4) Office Education (13) Trade and Industrial (8)
Grants Pass	Agriculture Distributive Education Health Office Education (3) Trade and Industrial (2)
Gresham	Agriculture (2) Diversified Occupations (2) Office Education Trade and Industrial (2)

Note: Numbers in parentheses denote number of programs in district.

CHART 1g SECONDARY SCHOOLS WITH FIVE OR MORE OCCUPATIONAL FIELDS OFFERED 1969-70 - continued

SECONDARY SCHOOLS	OCCUPATIONAL FIELDS
Hermiston	Agriculture Distributive Education Office Education Trade and Industrial (3)
Hood River School District	Agriculture Diversified Occupations Office Education (3) Trade and Industrial
Knappa	Agriculture Diversified Occupations Office Education (2) Trade and Industrial (2)
Lincoln County School District	Agriculture (2) Distributive Education (2) Office Education (2) Trade and Industrial (2)
La Grande	Agriculture Home Economics Office Education Trade and Industrial (2)
Lebanon	Agriculture Distributive Education Diversified Occupations Health Office Education (3) Trade and Industrial (5)
Medford	Distributive Education Diversified Occupations Office Education (2) Trade and Industrial
Milwaukie School District	Agriculture Distributive Education Home Economics Office Education (5) Trade and Industrial (5)
Portland School District	Agriculture Distributive Education (12) Home Economics (4) Office Education (19) Health (9) Trade and Industrial (16)

Note: Numbers in parentheses denote number of programs in district.

CHART 1g SECONDARY SCHOOLS WITH FIVE OR MORE OCCUPATIONAL FIELDS OFFERED 1969-70 - continued

SECONDARY SCHOOLS	OCCUPATIONAL FIELDS
Roseburg	Agriculture Distributive Education Office Education (3) Trade and Industrial (2)
Salem School District	Agriculture Distributive Education (2) Diversified Occupations Home Economics Office Education (6) Trade and Industrial
Seaside	Agriculture Diversified Occupations Office Education (3) Trade and Industrial (2)
Springfield School District	Agriculture (2) Distributive Education Office Education (2) Trade and Industrial
The Dalles	Agriculture Home Economics Trade and Industrial (3)
Tillamook	Agriculture Distributive Education Diversified Occupations Office Education (3)
Warrenton	Agriculture Diversified Occupations Office Education (2) Trade and Industrial (2)
West Linn	Agriculture Distributive Education (3) Office Education (3) Trade and Industrial

Note: Numbers in parentheses denote number of programs in district.

CHART 1h COMMUNITY COLLEGES WITH FIVE OR MORE OCCUPATIONAL FIELDS OFFERED 1969-70

COMMUNITY COLLEGES	OCCUPATIONAL FIELDS
Blue Mountain	Agriculture Health Office Home Economics-Useful Technical Trade and Industrial
Central Oregon	Agriculture Distributive Health Office Technical Trade and Industrial
Chemeketa	Distributive Health Home Economics-Useful Home Economics-Gainful Office Technical Trade and Industrial
Clackamas	Agriculture Distributive Health Home Economics-Useful Home Economics-Gainful Office Technical Trade and Industrial
Clatsop	Agriculture Distributive Health Home Economics-Useful Office Technical Trade and Industrial
Lane	Agriculture Distributive Health Home Economics-Gainful Home Economics-Useful Office Technical Trade and Industrial

CHART 1h COMMUNITY COLLEGES WITH FIVE OR MORE OCCUPATIONAL FIELDS OFFERED 1969-70 - continued

COMMUNITY COLLEGES	OCCUPATIONAL FIELDS
Linn-Benton	Agriculture Distributive Health Home Economics-Useful Office Technical Trade and Industrial
Mt. Hood	Agriculture Distributive Health Home Economics-Useful Office Technical Trade and Industrial
Portland	Distributive Health Home Economics-Gainful Home Economics-Useful Office Technical Trade and Industrial
Southwestern Oregon	Distributive Health Home Economics-Gainful Home Economics-Useful Office Technical Trade and Industrial
Treasure Valley	Agriculture Distributive Health Home Economics-Useful Office Technical Trade and Industrial
Umpqua	Agriculture Health Home Economics-Useful Office Technical Trade and Industrial

2.3

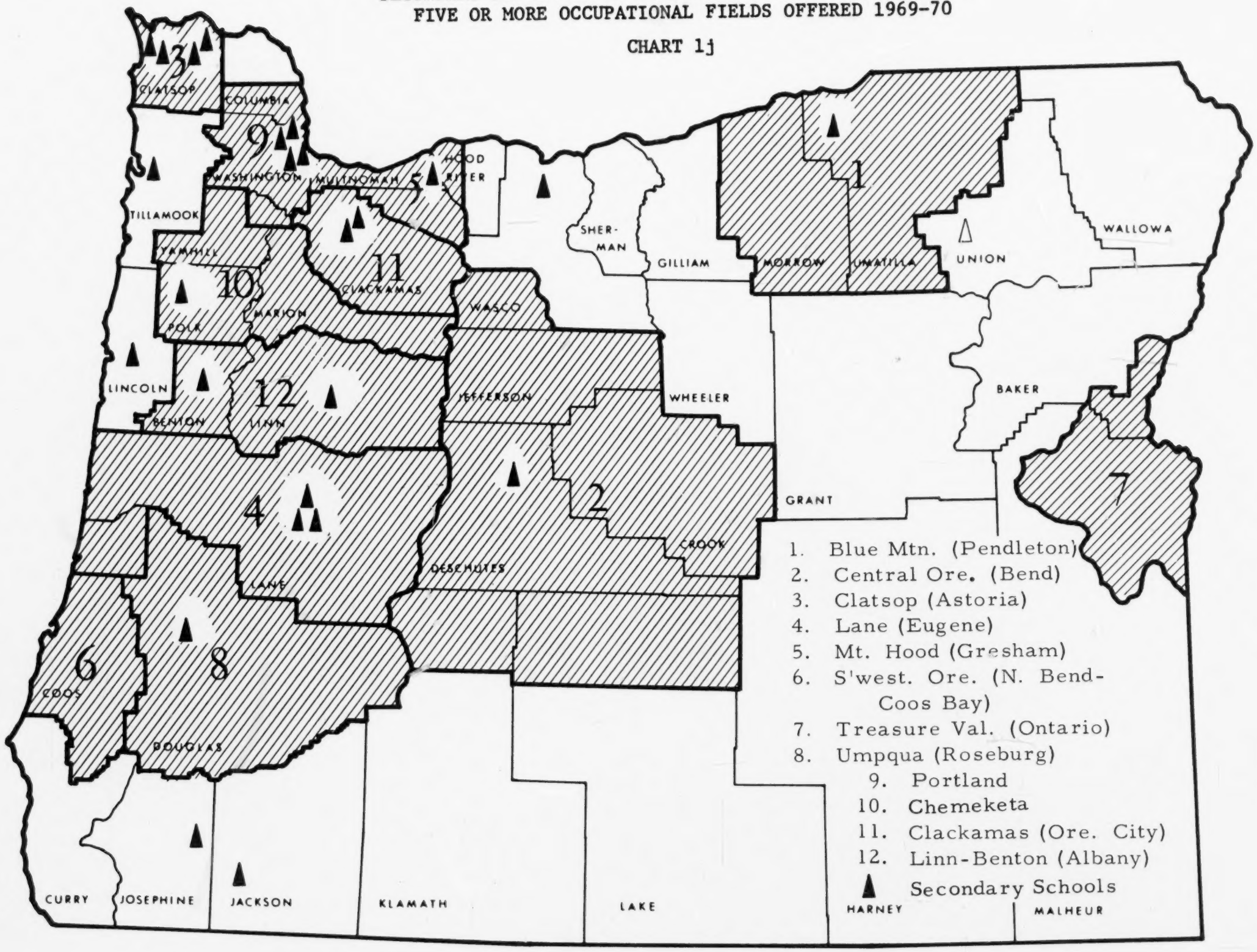
CHART 11 NUMBER OF SECONDARY AND COMMUNITY COLLEGE SCHOOL DISTRICTS HAVING VOCATIONAL EDUCATION PROGRAMS IN OREGON 1969-70 1/

Number of Schools	Number of Reported Programs
36	1
25	2
9	3
11	4
7	5
32 1/	more than 5

1/ Includes Oregon's 12 community colleges.

SECONDARY SCHOOL AND COMMUNITY COLLEGE DISTRICTS WITH FIVE OR MORE OCCUPATIONAL FIELDS OFFERED 1969-70

CHART 1j



3.0 State's Population Relating to Vocational Education Needs

3.1 Population Characteristics

The following tables show population characteristics of Oregon as they relate to vocational education needs:

3.11 Table 2 page 216 Analysis of State's Population Relating to Vocational Education Needs

3.12 Table 2a page 217 Population Characteristics and Vocational Education Needs

3.13 Table 2b page 219 Population of State

3.14 Table 2c page 220 Civilian Work Force Table, 1967

3.11

TABLE 2 ANALYSIS OF STATE'S POPULATION RELATING TO VOCATIONAL EDUCATION NEEDS

POPULATION CHARACTERISTICS

POPULATION FACTOR OR CHARACTERISTICS	LATEST AVAILABLE DATA 1967-68	1971-72 (ESTIMATED)	1975-76 (PROJECTED)
1. Secondary (public only) enrollments, grades 7-12			
Grade 7	40,080	37,568	39,172
8	39,699	39,854	42,116
9	40,323	41,593	43,330
10	40,533	41,950	42,812
11	38,270	40,411	40,637
12	33,532	37,546	38,124
Total (9-12)		161,500	164,903
Dropouts (9-12)	3,865	4,370	3,957
2. Community Colleges	44,941	51,615	57,027
3. Private and Parochial School graduates	1,560	1,526	1,549

Source: Historical Data
PPA - Oregon Board of Education
Developed by Statistical Department

TABLE 2a POPULATION CHARACTERISTICS AND VOCATIONAL EDUCATION NEEDS

POPULATION FACTOR OR CHARACTERISTICS	LATEST AVAILABLE DATA 1969	1971 (ESTIMATED)	1975 (PROJECTED)
1. Total general population	2,075,640	2,133,540	2,278,290
2. Age distribution of population	1969		
0-17	707,750	727,494	776,843
18-44	709,986	729,792	779,298
45-64	439,347	451,602	482,224
65+	218,557	224,652	239,905
TOTAL	2,075,640	2,133,540	2,278,290
3. Age distribution of disadvantaged* population to			
21 and under	74,591	76,672	81,871
22-44	57,131	58,724	62,707
45 and over	26,980	27,732	29,613
4. Handicapped population	18,100	18,604	19,867
5. Total Universe of Need (Number of different individuals in year)	176,802	181,734	194,058
a. Poor	79,489	81,706	87,247
(1) Disadvantaged	61,559	63,276	67,567
(2) Other Poor	17,930	18,430	19,680
b. Non-Poor	79,215	81,425	86,946
(1) Unemployed	64,786	66,593	71,109
(2) Other Under Utilized	14,429	14,831	15,837
6. Unemployed and Under Utilized Disadvantaged: Total by category	61,559	63,276	67,567
a. Unemployed	12,030	12,365	13,204
b. Under Utilized	49,529	50,910	54,363
(1) Employed part-time for economic reasons	6,337	6,513	6,956

*Portland State University Center for Population Research and Census 1970

TABLE 2a POPULATION CHARACTERISTICS AND VOCATIONAL EDUCATION NEEDS - continued

POPULATION FACTOR OR CHARACTERISTICS	LATEST AVAILABLE DATA 1969	1971 (ESTIMATED)	1975 (PROJECTED)
(2) Employed full-time, but with family income at or below poverty level	41,062	42,207	45,070
(3) Individuals not in labor force, but who should be	2,130	2,189	2,338

TABLE 2b POPULATION OF STATE

COUNTY	TOTAL 1/ JULY 1969 POPULATION	TOTAL 2/ NON-WHITE	2/ NEGRO	2/ SPANISH-AMERICANS	2/ AMERICAN INDIAN	2/ ORIENTALS
Baker	16,410	63	25	11	16	19
Benton	51,000	718	96	56	80	368
Clackamas	164,800	987	132	54	262	459
Clatsop	28,800	385	75	15	21	155
Columbia	30,140	92	11	18	38	10
Coos	57,200	331	40	53	162	59
Crook	9,725	43	1	15	29	8
Curry	13,180	76	8	20	63	4
Deschutes	29,220	176	23	35	98	20
Douglas	74,150	340	36	138	188	35
Gilliam	2,695	34	16	5	15	2
Grant	7,395	32	3	11	21	8
Harney	7,275	205	6	12	137	54
Hood River	14,130	499	18	10	99	371
Jackson	93,700	427	44	113	141	152
Jefferson	9,040	1,512	7	16	1,453	0
Josephine	35,990	147	7	18	89	23
Klamath	49,760	2,254	489	259	1,490	120
Lake	6,800	45	3	10	29	5
Lane	209,400	1,516	447	149	316	457
Lincoln	25,130	356	11	39	297	9
Linn	68,880	233	5	87	109	53
Malheur	24,900	1,517	89	645	69	1,326
Marion	155,600	1,295	297	551	562	228
Morrow	4,600	5	0	8	1	1
Multnomah	559,500	24,962	18,147	700	1,299	4,681
Polk	32,820	286	5	173	219	40
Sherman	2,370	19	0	5	8	6
Tillamook	17,860	81	8	8	47	12
Umatilla	45,370	1,317	262	140	918	86
Union	19,590	124	77	16	36	7
Wallowa	6,440	21	10	9	10	0
Wasco	21,570	667	55	13	518	31
Washington	143,300	520	80	112	108	226
Wheeler	1,880	2	0	3	2	0
Yamhill	41,020	274	30	10	151	49
State Total	2,081,640	41,561	20,563	3,537	9,101	9,084
Portland SMSA	935,000	27,337	18,860	942	1,790	5,504
Eugene SMSA	204,000	1,516	447	149	316	457
Salem SMSA	183,200	1,581	302	724	781	268

1/ Center for Population Research, District Facts, p. 38, Table 38

2/ State of Oregon, Office of the Governor, District Facts, CAMPS, November 1968

TABLE 2c CIVILIAN WORK FORCE TABLE, 1967

COUNTY	TOTAL JULY 1967 WORK FORCE	TOTAL NON-WHITE	NEGRO	SPANISH AMERICAN	AMERICAN INDIAN	ORIENTAL
Baker	7,300	13	5	2	3	4
Benton	21,710	148	20	12	16	76
Clackamas	65,200	203	27	11	54	95
Clatsop	12,840	79	15	3	4	32
Columbia	11,550	19	2	4	8	2
Coos	24,110	68	8	11	33	12
Crook	4,110	9	1	3	6	2
Curry	5,770	16	2	4	13	1
Deschutes	12,760	36	5	7	20	4
Douglas	34,650	70	7	28	39	7
Gilliam	1,410	7	3	1	3	1
Grant	3,390	7	1	2	4	2
Harney	3,320	42	1	2	28	11
Hood River	6,600	103	4	2	20	76
Jackson	36,550	88	9	23	29	31
Jefferson	4,710	361	1	4	347	0
Josephine	16,860	30	1	4	18	5
Klamath	22,170	505	110	58	334	27
Lake	2,860	9	1	2	6	1
Lane	82,200	706	208	69	147	215
Lincoln	10,870	73	2	8	61	2
Linn	30,960	48	1	18	22	11
Malheur	11,920	672	39	286	31	581
Marion	60,550	376	86	160	163	66
Morrow	2,110	1	0	2	1	1
Multnomah	255,100	10,634	7,731	298	553	1,994
Polk	13,640	59	1	36	45	6
Sherman	1,430	4	0	1	2	1
Tillamook	7,390	17	2	2	10	2
Umatilla	20,230	271	54	29	189	18
Union	8,270	26	16	3	7	1
Wallowa	2,770	4	2	2	2	0
Wasco	10,800	137	11	3	107	6
Washington	58,750	107	16	23	22	47
Wheeler	800	1	0	1	1	0
Yamhill	18,940	56	6	2	31	10
State Total	894,600	15,005	8,398	1,126	2,379	3,356
Portland SMSA	429,400	11,283	7,969	352	676	2,190
Eugene SMSA	82,200	706	208	69	147	213
Salem SMSA	74,190	435	87	196	208	74

State of Oregon, Office of the Governor,
District Facts, CAMPS, November 1968

4.0 Vocational Education Program Needs

4.1 Vocational Education Needs Which Will Receive Priority in Terms of the Disadvantaged and Handicapped

(a) It is projected that by 1975 unemployment among youth, age 15 to 24, will be approximately 20 percent of total unemployment; and among adults, age 25 to 64, 66 percent of the total unemployed. This suggests strongly that both secondary and post-secondary occupational programs must be increased to combat this problem before it becomes fully developed.

(b) Specific vocational programs for the physically handicapped need to be adapted to the specific needs of each category of handicap and matched with manpower needs by occupational category. This will be accomplished by an accelerated inter-agency effort to identify the handicapped and coordinate with the needs of the various industries.

(c) There is a need to identify and meet the needs of specific categories of disadvantaged in the following categories:

(1) Hard core unemployed, i.e., jobless for prolonged periods, lacking in skills recognized for regular employment, and in need of supportive services to adjust to the demands of the labor market.

(2) Youth 16-21 who lack marketable skills and encounter other problems in entering the world of work.

(3) Residents of chronically deprived areas with heavy concentrations of social and economic problems.

(4) Persons threatened by automation, relocation of industry, skill obsolescence, and similar conditions.

(5) Various categories of persons handicapped in competing for jobs because of age, language or educational difficulties, or membership in a minority group which faces special job market problems.

(6) Completers of other programs such as Neighborhood Youth Corps who need further manpower development services to be prepared for employment.

(d) Most of Oregon is rural in character. There is a need to provide to rural area residents complete employability services including counseling, referral to training, and referral to non-agricultural employment.

4.2 Depressed Areas--Areas With High Rates of Unemployment

Sixteen counties within the State indicate problems of persistent unemployment. Priorities must be established for interagency cooperation to determine the prime reasons for this continued unemployment, and then to create and implement occupational education programs that will help alleviate the problem.

4.3 Program Emphasis--New Careers and Public Service Occupations

Projected labor demands to 1975, when compared with estimated labor supply projected to 1975, indicate the necessity to generate an intensive effort to provide more vocational education programs. With a few exceptions, all employment areas show a predicted growth.

At this time only 39 public educational agencies offer vocational programs that include five or more occupational preparations. Twelve of these programs are in Oregon's community colleges and 27 are in secondary schools.

The emphasis for program development at the secondary level will be focused on the development of comprehensive occupational programs based on the occupational cluster concept. The occupational cluster concept simply holds that occupations may be classified into logically related groups on the basis of identical or similar elements or characteristics. This means that a "cluster of occupations" is composed of recognized occupations which are logically related because they include identical or similar teachable skill and knowledge requirements.

In applying this concept for program planning and implementation, twelve initial occupational clusters were identified:

Mechanical & Repair	Wood Products
General Clerical	Secretarial

Basic Marketing	Metal Working
Agriculture	Bookkeeping and Accounting
Food Service	Health
Construction	Electrical

The minimum numerical requirements needed to develop a cluster were present employment in Oregon of 10,000 workers and a forecast need for 2,000 workers within the next four years.

As reliable employment data becomes available, new clusters are being identified for future development into instructional programs. Program emphasis for post-secondary and adult programs will be placed on programs that are based on statewide and regional employment opportunities. Special efforts will be focused on the development of health, public service, conservation, outdoor recreation, wood products, mid-management (marketing), agri-business, metal, electronics, environmental control, and programs that will help provide a labor force for manufacturing, durable goods, contract construction, wholesale and retail trade, and services.

.4 Summary of Oregon's Vocational Education Needs

(a) There is a need to expand occupational offerings in the community colleges to accommodate some 45,000 youth and adults who will be in full- or part-time attendance by 1975. This total would reach about 15,000 in terms of FTE, and is roughly three times the enrollment served at present.

(b) The dramatic anticipated growth in enrollments must be made possible through the provision of adequate facilities and equipment to support program growth.

(c) A continuing and intensive effort needs to be made to assure the availability of occupational education to all students in all areas of the State. Where population and distance factors make it possible and advisable, cooperative efforts among educational agencies are needed to place effective occupational education in facilities that are within the reach of all students. Effective ways to promote cooperative effort and support area facilities are badly needed.

(d) Curriculums and courses offered at the junior high school level need to be reoriented to reflect the world of work and realistic life situations, and to include occupational exploratory experiences for all students. In this connection, there is an immediate need to provide the resources needed to develop the required materials and introduce them through experimental and exemplary offerings.

(e) Preparation for entry employment through occupational-cluster-based curriculums needs to be introduced into virtually all the secondary (grades 11 and 12) schools in the State--or at least made available to the students in these schools.

(f) Experience in recent years has made it clear that given the training, counseling, and other services appropriate to their needs, disadvantaged individuals can be helped to qualify for and obtain productive jobs. However, it is just as clear that the availability of such programs falls far short of meeting the needs that exist in Oregon.

(g) Many of the disadvantaged could be served through adaptations and adjustments of present occupational education programs, especially if these were reinforced with supplementary instruction in basic education and coupled with adequate resources for guidance, counseling, and placement in entry-level jobs. There is an urgent need to develop the program required to apply the special potential of occupational education to the problems of the disadvantaged.

(h) Occupational education offerings at all levels must be attuned to actual requirements for employment in the occupational area and the realities of employment opportunities. In both of these there is a continuous shortage of reliable and current information. Development of improved and systematic means for gathering and disseminating the required information is vital to the continuing expansion and improvement of occupational education in the State.

(i) The functions and responsibilities of the various agencies concerned with and related to occupational education need to be firmly established. Effective coordination of these agencies will make for more effective training and strengthen

the functioning of all the agencies and organizations involved. Delineation of these functions and responsibilities needs to be in harmony with the defined role of occupational education, as well as borne out in the patterns of staffing, financing, and operation.

(j) Existing programs and opportunities designed to develop leaders to administer, supervise, and develop occupational education programs are seriously inadequate in number and capacity. There is an urgent need to expand them in a variety of settings if the field is to receive the direction required to serve its defined mission adequately.

5.0 Career Education Objectives

The State Board has established that the public schools are responsible for providing every young person with educational opportunities that will enable him to develop to his full potential.

Giving a new emphasis and a new look to "career" education beginning with career awareness in the elementary grades and ending with specialized training in the community colleges will go a long way toward meeting this responsibility. Because friendships, life style, community service, voting habits, citizenship, leisure time, and family life are all vitally affected by career choice, "career consciousness" can and should pervade teaching and learning and should seek to remove the distinction between vocational and academic subjects.

In Oregon, we are building an approach aimed at the development of skills and understandings which relate to families of occupations. To put it another way, selected occupations are clustered in logical groups in which the occupations are related because they have similar teachable skill and knowledge requirements.

Obviously, the implication is that most high school experiences will be centered upon the knowledge and skills common to the occupations which comprise a cluster, or family. This structure not only has a motivational effect but will prepare students for entry into a broad family of occupations rather than a specific occupation. This cluster approach is the bridge to further specialization in the community colleges, on-the-job training, apprenticeship, and private vocational schools.

Specific objectives:

(1) Make available to 75 to 80 percent and enroll 50 percent of the eleventh and twelfth graders in the state during the next five-year period in a career education program based on the occupational cluster concept.

(2) Establish specific occupational training programs in the community colleges which will allow 15,000 full-time equivalent students to be enrolled in such programs by 1975.

(3) Develop needed job training programs that will provide for a three-fold increase by 1975 in the upgrading and retraining of adult workers in all occupational areas.

(4) Develop and implement in cooperation with other public and private agencies regular vocational technical programs which will serve disadvantaged and handicapped persons.

(5) Plan and initiate in cooperation with other public and private agencies special job training programs that will serve disadvantaged and handicapped persons who cannot succeed in regular vocational technical programs.

(6) Develop statewide pilot demonstration programs in several secondary schools with varying degrees of emphasis on career clusters.

(7) Plan with and assist local school districts within a given region to act in cooperation with one another to provide the resources needed for the development and operation of effective educational programs in the secondary schools.

(8) Redefine the role of occupational education in the public schools to assume a major role in the field of manpower development.

(9) Establish that schools, to meet state standards, design their offerings to make available a minimum number of the occupational cluster curriculums directly related to the size of the district, either in self-contained programs or in programs offered on a cooperative basis.

(10) Enhance learning about careers at the elementary school level in order to enlarge childrens' understanding of vocational choice and develop economic competence in a changing world of work.

(11) Provide for articulation and coordination of the efforts of all educational agencies, secondary and post-secondary, so that all clientele served may benefit from uninterrupted instructional sequences.

(12) Develop and implement occupational guidance programs which will be continuing integral parts of the educational program of all students in the public school system.

(13) Provide for concurrent planning, program expansion, and identification of supportive exploratory occupational programs, grades 7 through 10.

(14) Identify and develop, in cooperation with all relevant agencies and programs, a planned procedure for the preparation of vocational education personnel.

5.1

5.1 Secondary Objectives

		Current Status 69-70	Outcomes Sought 1971	1975
(a)	Percentage of secondary school students enrolled in Voc Educ - Consumer Home Ec included	20%	32%	45%
(b)	Percentage of 11th and 12th grade students enrolled in Voc Educ program (Consumer Home Ec not included)	22%	27%	50%
(c)	Percentage of 11th and 12th grade students enrolled in Voc Educ Program (Consumer Home Ec included)	28%	41%	64%
(d)	Percentage of secondary vocational student completions that continue full time school	35%	37%	44%
(e)	Percentage of vocational students completing programs and are available for work, who were placed in jobs following training	94.5%	96%	98%
(f)	Student guidance counselor ratio	350:1	300:1	250:1

5.2 Post-Secondary Objectives

(a)	Community college vocational education enrollment (FTE)	10,090	11,750	15,216
(b)	Percentage of total post-secondary enrollment age 18-24 enrolled in post-secondary vocational education 1/			
	Vocational Technical Prep.	27.0%	30%	34%
(c)	Percentage of total post-secondary vocational technical preparatory of total vocational preparatory and lower division collegiate	44%	46%	48%

1/ Higher Education Student Enrollment Distributions and Trends in Oregon Fall 1967, Educational Coordinating Council, May 1968, pp. 7,39. 230

	Outcomes Sought		
	1970	1971	1975
(d) Percentage of students available for work, placed in jobs following completion of training (completed total program requirements)	93.09%	95%	97%
(e) Percentage of vocational preparatory students (fall '67)			
Metropolitan Area (Portland, Clackamas, Mt. Hood community colleges)	44.3%		
Other community college areas	55.7%		

5.3 Adult objectives

(a) Enrollments - adult vocational education	23,308	32,242	43,303
(b) Percentage of population age 15-64 enrolled in vocational education	2.5%	3%	4%
(c) Adult vocational supplementary enrollment, percentage by institution			
Local school district	16%	14%	10%
Community College	84%	86%	90%

5.4 Disadvantaged Objectives

(a) Estimated number of disadvantaged enrolled in regular technical-vocational programs in Oregon:			
Secondary	4,000*	4,000	5,000
Post-Secondary and Adult	2,000*	2,500	3,000

*Served in regular high school programs with program modifications to meet individual needs. Secondary estimate based on 20 percent of vocational enrollment; post-secondary estimate based on 25 percent of vocational enrollment.

5.4

		Outcomes Sought		
		1970	1971	1975
(b)	Disadvantaged in special programs			
(1)	Minority unemployment, identify and provide appropriate vocational education to improve marketable skills	500	750	1000
(2)	Orientation, basic education language difficulties which prevent further skill training	250	1000	2000
(3)	Unemployed youth lacking marketable skills	250	1000	2000
(4)	Hard core unemployed lacking skills for regular employment	250	750	1000
(5)	Rural area residents unemployable due to lack of marketable skills	250	1000	2000

5.5 Handicapped

Public schools in Oregon currently provide a limited number of specific programs in vocational education for the handicapped. Two state institutions, Oregon School for the Blind, and Oregon State School for the Deaf, are operated to assist the blind and deaf to become adjusted to their environment. The School for the Deaf offers a wide variety of vocational courses.

The Oregon Program of Special Education, administered by the Oregon Board of Education to handicapped and mentally retarded children, assists and serves 21,696 boys and girls.

(a) Mentally Retarded

4,470 in public schools

1,300 in community programs

3,450 in state institutions

(b) Deaf--Hard of Hearing

577 by state agencies

(c) Speech Impaired

10,000 by state programs

(d) Visually Handicapped

321 legally blind by state agencies

(e) Emotionally Disturbed

310 by agencies through public schools

(f) Physically Handicapped, Other than Blind or Deaf

1,268

Measurable Objectives	1971	1972	1973	1974	1975
(a) Provide basic and general education job counseling and vocational orientation to	1750	2000	2000	2000	2000
(b) Provides entry skill training, skill upgrading work experience and job placement to	1750	2000	2000	2000	2000

5.6 Special Programs

5.61 Research

The objectives identified for research will place priority on programs that will relate to:

(1) Research and training programs involving the development of materials, techniques, and processes, or combinations of these, leading to more relevant career education.

(2) Experimental, developmental, or pilot programs dealing with outcomes that are known and describable; and those created to determine whether materials, techniques, or processes can accommodate to a new or different setting by translating the usable findings of research and experimentation as they apply to career education programs.

(3) Dissemination of information from research and demonstration programs and projects in the state and in other states.

	State Priorities	1970	1971	1972	1973	1974	1975
a.	Cluster curriculum development and job cluster implementation on secondary level (grades 11-12)	x	x	x			
b.	Development of criteria for demonstration school selection for career clusters	x					
c.	Teacher training for career clusters	x	x	x	x	x	x
d.	Development of relevant occupational guidance and counseling related to career cluster curriculums	x	x	x	x		
e.	Articulation of career oriented education programs (grades 7-14)	x	x	x			
f.	Occupational placement and student follow-up related to career cluster curriculums		x	x			
g.	Relevancy of career education and articulation (grades K-14)	x	x	x			
h.	Testing and evaluation of occupational programs related to career cluster education			x	x	x	

5.62 Exemplary Programs

Identify objectives for exemplary programs to be carried out during the year.

	State's Priorities	Year Initiated 1971	1972	1973	1974	1975
a.	Implement developmental cluster programs	x	x	x		
b.	Cluster demonstration program	x	x	x		
c.	Develop occupational exploratory programs:					
	Secondary	x	x	x	x	x
	Post-Secondary		x	x	x	x
d.	Relevancy of academic education to world of work		x	x	x	
e.	Interrelation of academic and vocational instruction (inter-disciplinary approach)	x	x	x	x	
f.	Demonstration programs post-secondary occupational guidance		x	x		
g.	Total placement service		x	x		
h.	Small school secondary preparatory programs			x	x	x
i.	Orientation to occupations--elementary grades		x	x	x	x

5.63 State Residential Vocational Schools

	Objectives	Outcomes Sought 1969	1970	1975
a.	Number of schools	0	NF*	4
b.	Number of students to be served	0	NF*	1000

*Not funded.

5.64 Consumer and Homemaking Education

	Objectives	Outcomes Sought 1969	1971	1974	1975
a.	Number of programs serving youth in economically depressed areas	NA	8		20
b.	Number of programs serving adults in economically depressed areas	NA	6		12
c.	Number of programs serving youth (secondary - useful)	98	198		
	- Number of such programs emphasizing consumer education		130		190
d.	Number of programs serving adults (post-secondary - useful)	27	12*		13
	- Number of such programs emphasizing consumer education	NA	NA	NA	7

*Only community colleges to operate adult programs in the future.
NA = Not Available
NF = Not Funded

5.65 Cooperative Education

Objectives		Outcomes Sought				
		1969	1971		1975	
			B 1/	G 2/	B	G
a.	Number of programs	132	142	61	264	115
b.	Number of secondary schools offering programs	86	93	39	193	76
c.	Number of post-secondary schools offering programs	3	8	10	12	12
d.	Number of employers participating	980	7,000	6,000	15,000	13,500
e.	Percentage of secondary vocational students enrolled	7.5	24.5	10.5	75	35

5.66 Work-Study

Objectives		Outcomes Sought		
		1969	1971	1975
a.	Number of secondary schools offering programs	NF	90	150
b.	Number of post-secondary vocational students enrolled	NF	250	1800
c.	Percentage of secondary vocational students enrolled	NF	11.5	13
d.	Percentage of post-secondary vocational students enrolled	NF	4.5	8

1/ Cooperative Part B Funds

2/ Cooperative Part G Funds

6.0 Analysis of Oregon's Vocational Education Programs

The following tables show the current and projected vocational education programs in the State:

6.1 See Table 3 page 238 Vocational Education Enrollment

6.2 See Table 3a page 239 Occupational Cluster Enrollment

6.3 See Table 4 page 241 Schools Offering Vocational Education

6.3 See Table 5 page 241 Construction Projects

6.4 See Table 6 page 242 Number of Teachers in Vocational Education Programs

6.5 See Table 7 page Teacher Training Enrollment

6.6 See Table 8 page 244 Estimates of Funds Needed for Vocational Education

TABLE 3 VOCATIONAL EDUCATION ENROLLMENT

Level of Program	1971	Projected Enrollment 1972	1973	1974	1975
Secondary--Grades 9-12	24,321	27,696	32,417	37,523	43,688
Consumer & Homemaking Education, Grades 9-12	27,341	28,041	28,441	28,941	29,441
Grades 11-12 (duplicated)	(20,721)	(23,824)	(28,238)	(33,269)	(39,363)
Grades 8 & below "	--	(90)	(130)	(170)	(230)
Post-Secondary	13,645	14,964	16,623	18,883	23,460
Adult	32,242	34,954	37,509	40,950	43,303
TOTAL	97,549	105,655	114,990	126,297	139,892
Special Programs:					
Disadvantaged.....Total	6,000	6,500	7,000	8,000	8,000
Secondary	4,000	4,000	4,500	5,000	5,000
Post-Secondary and Adult	*2,000	2,500	2,500	3,000	3,000
Handicapped.....Total	1,350	1,750	2,000	2,000	2,000
Secondary	750	1,000	1,000	1,000	1,000
Post-Secondary and Adult	*600	750	1,000	1,000	1,000
Cooperative Program.....Total (Part G only)	3,100	4,100	4,750	5,800	6,900
Secondary	1,600	2,500	3,000	3,800	4,500
Post-Secondary	1,500	1,650	1,750	2,000	2,400
Adult					
Group Guidance.....Total (Pre-Vocational)	1,500	2,000	4,000	6,000	8,000
Work-Study.....Total	1,000	1,350	1,700	2,000	2,350
Secondary	750	1,000	1,250	1,500	1,750
Post-Secondary	250	350	450	500	600
Consumer & Homemaking Education.....Total	27,341	28,041	28,441	28,941	29,441

*Breakdown between post-secondary and adult not available at this time.

1780

TABLE 3a OCCUPATIONAL CLUSTER ENROLLMENT

Program	Current Enrollment 1969-70		Projected Enrollment 1970-71		1971-72		1972-73		1973-74		1974-75	
SECONDARY	9-10	11-12	9-10	11-12	9-10	11-12	9-10	11-12	9-10	11-12	9-10	11-12
Agriculture 01.0100 - .0900	3,530	3,232	3,600	3,304	3,872	3,345	4,179	3,563	4,254	3,677	4,325	3,852
Marketing 04.0800	45	2,172		2,937		3,238		3,756		4,269		5,287
Health 07.7900	106	227		828		1,214		1,711		2,086		2,485
Consumer & Homemaking * 09.0101	(11,032)		(27,341)		(28,041)		(28,441)		(28,941)		(29,441)	
Child Care 09.0201		192		248		277		342		502		612
Clothing Services 09.0202		33		34		34		35		40		90
Food Services 09.0203		196		385		486		642		854		953
Accounting & Bookkeeping 14.0100 - .0200		1,256		1,462		1,667		1,875		2,084		2,890
Clerical 14.0300 - .0500		2,780		2.987		3,194		3,400		3,606		3,814
Stenographic 14.0700		3,237		3,450		3,665		3,883		4,100		4,317
Industrial Mechanics 17.0300		1,640		2,255		2,865		3,647		4,596		5,647
Metals 17.2300		572		851		1,177		1,601		2,173		2,751
Construction 17.1000		676		948		1,269		1,766		2,448		3,092
Electricity/Electronics 17.1500		386		606		836		1,193		1,650		2,053
Other Trade and Industrial 17.1900		340		426		557		824		1,184		1,520
TOTALS	3,681	16,939	3,600	20,721	3,872	23,824	4,179	28,238	4,254	33,269	4,325	39,363

*Consumer and Homemaking not included in totals.

TABLE 3a (continued)

OCCUPATIONAL CLUSTER ENROLLMENT

Program	Current Enrollment 1969-70	Projected Enrollment 1970-71	1971-72	1972-73	1973-74	1974-75
POST-SECONDARY						
Agriculture	406	452	514	673	758	850
Marketing	1,684	2,008	2,240	2,560	3,000	4,000
Health		1,750	1,900	2,000	2,250	2,500
Gainful Homemaking						
Child Care		100	140	160	180	200
Clothing Services		80	80	100	120	140
Food Services		45	60	100	125	160
Accounting & Bookkeeping	800	920	980	1,020	1,110	1,400
Clerical	1,400	1,730	1,810	1,910	2,020	2,600
Stenographic	1,400	1,810	1,990	2,050	2,120	3,060
Technical	1,600	1,650	1,850	2,150	2,400	2,700
Trade & Industrial	2,800	3,100	3,400	3,900	4,800	5,850
TOTALS	10,090	13,645	14,964	16,623	18,883	23,460
ADULT						
Agriculture	584	628	689	795	912	1,053
Marketing	1,524	1,800	1,970	2,240	2,710	3,300
Health		850	950	1,100	1,250	1,500
Consumer & Homemaking		6,894	8,300	9,374	10,928	11,000
Accounting & Bookkeeping	1,100	1,200	1,290	1,320	1,380	1,420
Clerical	3,200	3,400	3,520	3,640	3,680	3,760
Stenographic	2,800	2,940	2,990	3,040	3,340	3,670
Technical	2,300	2,430	2,545	2,700	2,850	3,100
Trade & Industrial	11,800	12,100	12,700	13,300	13,900	14,500
TOTALS	23,308	32,242	34,954	37,509	40,950	43,303

TABLE 4 SCHOOLS OFFERING VOCATIONAL EDUCATION

Type of School	1971		1972		1973		1974		1975	
	No.	Enroll.	No.	Enroll.	No.	Enroll.	No.	Enroll.	No.	Enroll.
Specialized Secondary	*2	300	2	380	2	400	3	525	3	800
Vocational-Technical Post Secondary	--	--	--	--	--	--	--	--	--	--
Regular or Comprehensive Secondary	141	23,999	160	27,376	185	32,147	201	37,168	215	43,118
Consumer and Homemaking Ed.		27,341		28,041		28,441		28,941		29,441
Junior or Community College	12	45,887	12	49,918	12	54,132	14	59,833	14	66,763
College or University	--	--	--	--	--	--	--	--	--	--
Secondary Post-Secondary Combination	**1	22	1	30	--	--	--	--	--	--
# Other Public Institutions	***1	400	1	480	1	560	1	680	1	790
# Private (Under Contract)	--	--	--	--	2	40	3	60	4	80
TOTALS	156	97,549	175	105,745	199	115,120	218	126,467	232	140,122

* Vocational Village, Portland
Residential Training Center, Portland
** Medford, Oregon - Practical Nursing
*** Oregon Technical Institute, Klamath Falls, Oregon

Not included in total

TABLE 5 CONSTRUCTION PROJECTS

Area Vocational Schools (as defined in the 1968 Amendments)	1971		1972		1973		1974		1975	
	S	PS	S	PS	S	PS	S	PS	S	PS
Construction Projects Planned	12	0	15	9	15	0	10	5	17	2
Expansion, Alteration, and Remodeling	1	0	5		5	0	3	0	5	2
New Construction	11	0	10	9	10	0	7	5	12	
Acquisition	4	4	5	7	4	6	3	4	--	--

NOTE: S - Secondary
PS - Post Secondary

TABLE 6 NUMBER OF TEACHERS IN VOCATIONAL EDUCATION PROGRAMS

Vocational Programs	1971			1972			1973			1974			1975		
	S*	PS	A	S*	PS	A	S*	PS	A	S*	PS	A	S*	PS	A
Total Number Teachers (Unduplicated)	1046	756	941	1217	831	1048	1374	982	1155	1517	1130	1266	1684	1280	1404
Special Programs	12	2	-	18	6	-	24	10	4	20	10	4	20	10	4
- Exemplary Group Guidance (Prevoc'l)	35	4	-	50	8	-	65	12	-	80	16	-	95	20	-
Pre-Post-secondary	Not Available														
- Remedial (Basic Education)	50	32	24	55	35	26	60	38	29	66	42	31	74	46	35
- Cooperative, Part G	52	14	-	65	19	-	78	24	-	89	31	-	125	54	-
- Disadvantaged	15	6	4	20	10	5	20	10	5	20	10	5	20	10	10
- Handicapped	10	2	-	10	5	5	20	10	5	20	10	5	20	10	10
- Other 1/ (90.0101)	244	9	147	251	9	162	276	10	165	316	10	181	341	15	185
Occupational Programs (Specify by OE Code)															
01 0100 - Agriculture Production	68	8	19	69	9	21	70	10	23	73	12	24	74	14	26
01 0700 - Wood Products	1	1	-	5	1	-	8	1	0	12	1	0	16	2	0
01 9901 - Agriculture-other	64	21	23	68	22	26	73	24	31	79	27	37	86	31	45
04 0800 - Marketing-Distributive Education	51	36	52	72	41	54	81	45	58	88	50	62	95	54	66
07 9900 - Health Occupations	21	116	45	22	125	50	26	135	52	30	150	52	32	165	54
09 0201 - Child Care Services	8	5	-	11	5	-	11	6	-	12	7	-	12	7	-
09 0202 - Clothing Services	1	2	-	1	3	-	2	4	-	2	4	-	3	5	-
09 0203 - Food Services	15	3	-	17	4	-	20	5	-	21	7	-	22	8	-
14 0100 - Accounting and Bookkeeping	3	25	48	45	30	52	55	35	54	60	38	56	65	40	58
14 0300 - Clerical Occupations	111	40	55	120	45	57	125	50	62	130	52	64	135	55	66
14 0700 - Stenographic Occupations	116	55	55	120	60	58	122	65	64	128	68	66	130	72	90
16 0000 - Technical Education	-	93	67	-	105	73	-	120	83	-	137	99	-	158	119
17 0300 - Mechanical	48	45	43	60	47	45	72	152	48	84	54	52	98	58	56
17 1000 - Construction	35	41	16	50	44	18	62	46	20	76	48	23	92	50	28
17 1500 - Electrical, Electronics	25	22	34	30	23	36	38	25	40	43	27	44	50	29	50
17 2300 - Metals	30	40	138	38	43	143	45	45	150	54	50	155	62	60	165
17 9900 - Other	10	5	4	14	6	6	16	7	8	18	9	10	20	10	14
17 9901 - Sanitation Operators	-	4	-	-	5	-	-	5	-	-	6	-	-	6	-

S - Secondary; PS - Post-Secondary; A - Adult

1/ Other types of vocational education personnel such as aides and other personnel involved in the conduct of the state plan programs -- Consumer and Homemaking.

TABLE 7 TEACHER TRAINING ENROLLMENT

Vocational Program Emphasis	Level of Program									
	1971		1972		1973		1974		1975	
	P	I	P	I	P	I	P	I	P	I
Total Unduplicated 1/	1170	1971	1345	2209	1548	2430	1775	2666	2025	2916
Vocational Programs: (Specify by OE Code)										
01 0100 Agriculture Production	40	90	40	82	42	73	44	64	46	56
01 9901 Agriculture - Other	40	40	45	53	50	65	57	78	66	90
04 0800 Marketing - Distributive Ed.	30	55	45	8	50	90	75	105	90	120
07 9900 Health Occupations	32	40	45	50	60	62	75	75	90	85
09 0100 Consumer & Hmkg.	380	686	400	711	420	736	430	760	450	785
09 0201 Child Care Services 1/	Included in 09.0100									
09 0202 Clothing Services 1/	Included in 09.0100									
09 0203 Food Services 1/	Included in 09.0100									
14 0100 Accounting and Bookkeeping	35	60	35	65	38	70	40	72	42	75
14 0300 Clerical Occupations	45	75	45	78	50	82	52	85	55	88
14 0700 Stenographic Occupations	55	85	55	88	60	90	65	95	68	98
16 0000 Technical	60	60	72	72	87	87	104	104	125	125
17 0300 Mechanical	116	180	139	198	167	217	200	239	240	263
17 1000 Construction	70	109	84	120	101	132	121	145	145	160
17 1500 Electrical, Electronics	40	62	48	68	66	86	79	95	95	105
17 2300 Metals	55	85	66	94	70	92	84	101	101	111
17 1900 Graphic Arts	24	38	29	42	35	46	42	51	50	56
ANCILLARY										
Administration	8	30	10	37	12	45	14	52	16	60
Guidance and Counseling	80	90	110	125	135	160	165	195	195	225
Other (Specify)	--	--	--	--	--	--	--	--	--	--
SUPPORTING										
Cooperative	30	30	50	50	70	70	90	90	110	110
Disadvantaged*	5	50	5	80	5	100	5	120	5	150
Handicapped	5	--	5	--	5	--	5	--	5	--
Remedial	20	106	22	116	25	127	28	140	31	154
Other (Specify)										

P - Preservice; I - In-service

1/ Count an enrollment only once even though prepared for two programs. Consumer and homemaking education and home economics gainful.

* Disadvantaged and Handicapped In-Service treated as one program.

TABLE 8 ESTIMATES OF FUNDS NEEDED FOR VOCATIONAL EDUCATION

Program/Purpose	Funds	1971	1972	1973	1974	1975
State Programs	Total	13,827,292	23,235,028	23,235,028	28,842,879	31,493,107
Part B	Federal	3,735,049	5,250,000	5,250,000	5,040,000	5,040,000
	S & L	10,092,243	18,035,028	18,035,028	23,802,879	26,453,707
Secondary	Total (F,S,L)	3,277,330	5,809,000	5,809,000	7,200,000	7,925,000
Post-Secondary	Total	6,519,615	6,038,000	6,038,000	6,970,000	7,732,000
Adult	Total	2,406,720	2,767,728	2,767,728	3,182,879	3,214,707
Disadvantaged	Total	560,257	787,500	787,500	756,000	756,000
Handicapped	Total	373,504	525,000	525,000	504,000	504,000
Construction	Total	10,000,000	15,438,000	15,438,000	18,066,000	18,996,000
Guidance & Counseling	Total	49,200	73,800	73,800	75,000	75,000
Contracted Instruction 1/	Total	40,000	44,000	44,000	48,000	52,000
Ancillary Services	Total	600,666	1,802,000	1,802,000	2,041,000	2,239,000
Sec. 102(B) Disadvantaged	Total	204,000	400,000	400,000	380,000	380,000
Research and Training	Total	616,000	825,000	825,000	825,000	
Part C	Federal	560,000	750,000	750,000	750,000	
	S & L	56,000	75,000	75,000	75,000	
Exemplary Programs	Total	645,000	838,125	838,125	838,125	
Part D	Federal	575,000	750,000	750,000	750,000	
	S & L	70,500	88,125	88,125	88,125	
Residential Schools -	Total	1,050,000	1,500,000	1,500,000	1,500,000	
State Programs	Federal	350,000	500,000	500,000	500,000	
Part E	S & L	700,000	1,000,000	1,000,000	1,000,000	
Consumer & Homemaking	Total	1,661,000	1,761,000	1,761,000	1,911,000	
Education	Federal	250,000	350,000	350,000	500,000	
Part F	S & L	1,411,000	1,411,000	1,411,000	1,411,000	
Cooperative Education	Total	675,000	725,000	725,000	725,000	
Part G	Federal	350,000	500,000	500,000	500,000	
	S & L	325,000	525,000	525,000	525,000	
Work-Study	Total	437,500				
Part H	Federal	350,000				
	S & L	87,500				
	Total	5,084,500	5,649,125	5,649,125	5,799,125	
GRAND TOTAL	Federal	2,639,000	3,250,000	3,250,000	3,380,000	
	S & L	2,650,000	3,099,125	3,099,125	3,099,125	

1/ Indicated here is the amount of the above funds, allocated by purpose (except construction), which is to be contracted. These amounts are not included in the grand total at bottom.

PART III

ANNUAL PROGRAM PLAN PROVISIONS

FOR VOCATIONAL EDUCATION

Oregon Board of Education

TABLE OF CONTENTS

Section		Page
PART III		
1.0	General	245
1.1	Summary of Allocation of Funds	245
1.2	Transfer of Allotments	245
1.3	Other Vocational Education Programs	245
2.0	State Vocational Education Programs	251
2.1	Instructional Programs	251
2.2	Guidance and Counseling Programs	259
2.3	Construction of Area Vocational Education Schools	259
2.4	Ancillary Services and Activities	260
3.0	Disadvantaged Persons	267
4.0	State Research and Training in Vocational Education	269
4.1	Research and Coordination Units	269
4.2	Grants and Contracts	269
5.0	Exemplary Programs and Projects	271
5.1	Planning	271
5.2	Establishment, Operation, and Evaluation	271
6.0-6.3	Residential Schools	273
7.0	Consumer and Homemaking Programs	275
7.1	Instruction	275
7.2	Ancillary Services	278
8.0	Cooperative Vocational Education Programs	281
8.1	Instruction	282
8.2	Ancillary Services and Activities	282
9.0-9.2	Work-Study Programs	285

TABLES

Table

PART III — Page

1 Estimated Allocation of Funds for State Vocational Education Programs 287

2 Instructional Programs Planned Which Are Continuing or Expanding in FY 71 289

3 New Instructional Programs Planned in FY 71. 295

4 Summary of Instructional Programs Planned. 298

5 Construction Projects on Which Construction Will Start in Coming Year. 301

CHARTS

Chart

PART III

1 Federally Assisted Manpower Programs in Operation FY 71. . . . 247

2 Staffing Pattern 303

3 Staff Directory. 304

1.0 General

The State Board shall set forth in the following annual program plan the established priorities for the development of new and improved vocational programs, services, and activities for the 1971 fiscal year.

1.1 Summary of Allocations of Funds

Budgeted funds for vocational education priorities for the 1971 fiscal year are presented on page 287 Table 1.

1.2 Transfer of Allotments

No request for transfer of funds.

1.3 Other Vocational Education Programs

The following list shows the major programs which are funded by other federal programs and agencies and other agencies operating work training programs which have implications for vocational education.

-- Baker County IED, Title III ESEA,
Institutionalizing Innovations in Oregon Small Schools
Provide a link between research and development products and educational programs in public and private small schools (grades 1-12). Will provide leadership development opportunities for school boards, administrators, and staff members to assure the effectiveness and acceptance of desirable changes. Involves 110 districts, 29,000 students, 900 teachers - projected funding, $1,117,496.

-- Malheur County IED, Title III ESEA,
Occupational Education for the Non-College Bound Student
A county-wide cooperative program to provide a suitable opportunity for non-college bound students to receive occupational education. Will utilize resources of public schools, the community college, and private enterprises. Involves 12 districts, 200 students, 25 teachers - projected funding, $47,775.

1.3

-- Portland School District #1, Title III ESEA
Vocational Training for Low Potential Students
Provides a special vocational training opportunity for low potential mentally retarded students. Proposes to meet needs which have not been met by regular programs for mentally retarded students. Involves 1 district, 150 students, 5 teachers - projected funding $103,057.

-- Salem School District #24J, Title III ESEA
Provide model program for junior high schools to bridge the gap between the instructional program and the world of work. Involves 1 district, 1,120 students, 55 teachers - projected funding, $65,000.

CHART 1 FEDERALLY ASSISTED MANPOWER PROGRAMS IN OPERATION FY 71

PROGRAM NAME	AGENCY	SOURCE OF FUNDS	AMOUNT FUNDS	TARGET GROUPS	NUMBER SERVED
Operation Mainstream	Eastern Oregon Community Development Council	EOA - Title 1B Dept. of Labor	$ 180,000 $ 45,000	Unemployed, Untrained Low income adults	228 45
Manpower Project - Hire, Train, & Retrain	Jackson County Community Action Council	Office of Economic Opportunity	$ 37,630	Low income adults	738 enrolled
MDTA-OJT	Valley Migrant League	DOL-MDTA	$ 142,730	Primarily disadvantaged persons depending on provisions of contract. Minimum of 65% disadvantaged	200
BLEOC	Benton-Linn Economic Opportunity Council, Inc.	Office of Economic Opportunity	$ 23,150	Hard-core unemployed	90
Job Development, Placement & Follow-up	Lane Human Resources, Inc.	OEO & Community	$ 74,761 Federal $ 17,150 Non-fed.	Lane County 16-22 yrs. of age 22-55 yrs. of age	300 place. 100 educ.
Senior Opportunities & Services	Lane Human Resources, Inc.	OEO& Community	$ 17,635 Federal $ 6,520 NF	Lane County 55+ yrs. of age	125 plac.
Summer Camping	SWOCAC	OEO	$ 7,473	Work study, NYC & children of poor families	534
Head Start	SWOCAC	OEO	$ 23,379	Children of poor families who meet Head Start Guidelines	90
Homemaking	SWOCAC	OEO	Portion of $ 64,460	Female head of families & other poor persons	48
Skill Improvement Training	Linn-Benton C. C.	Dept. of Labor - MDTA	$ 110,000	Standard Target Groups	25
Sewage Treatment	Oregon State University	Dept. of Labor - MDTA - OJT	$ 75,000	Standard Target Groups	75
MDTA	Employment Div. Oregon Board of Ed.	MDTA	$1,149,000	Minimum of 65% disadvantaged as defined in MAO 1-69	440-500
MDTA-Section 241	EDA-DOL DHEW	MDTA	$ 57,950	All disadvantaged as defined in MAO 1-69 & OEO income criteria as amended	25
JOBS	Employment Div. National Alliance of Businessmen	Dept. of Labor	Regional funding contract basis	Disadvantaged	---
WIN	Employment Div. Public Welfare	Federal & State	$1,900,000	ADC & ADC-UF	2,200

FEDERALLY ASSISTED MANPOWER PROGRAMS IN OPERATION FY 71 (con't)

PROGRAM NAME	AGENCY	SOURCE OF FUNDS	AMOUNT FUNDS	TARGET GROUPS	NUMBER SERVED
TEC Migratory	Employment Div.	DOL-MDTA	$ 62,956	Migratory Farm families	110 fam.
NDVR	Public Welfare	Federal & State	$ 930,102	ADC-APTD-AB	713
Vocational Rehabilitation	Vocational Rehabilitation Div.	Federal, HEW, SRA State & local government	$2,800,000 Title I $2,392,000 $ 408,000	Disabled population potentially employable	4,100
Adult Basic Education	HEW, Board of Education	Federal Law 89-750 U.S. Office of Ed.	$ 225,639	Persons over 16 with less than 8 year education	2,526
Bureau of Indian Affairs	Dept. of Interior	Dept. of Interior	Regional funding	Warm Springs & Umatilla Indians	N/A
NYC - Out of school	Dept. of Labor	EOA - Title IB	$ 253,540	High school drop-outs from low income families	154*
NYC - In school	Dept. of Labor	EOA - Title IB	$ 336,050	Potential drop-outs income families	579
NYC - Summer	Dept. of Labor	EOA - Title IB	N/A	Students from low income families	N/A

PORTLAND SMSA CAMPS 1971

PROGRAM NAME	AGENCY	AMOUNT FUNDS	TARGET GROUPS	NUMBER SERVED
MDTA	Oregon State Employment Service	$ 738,000	Minimum 65% disadvantaged	550
NYC	City of Portland	$ 100,590	Out of school disadvantaged youth	52
Vocational Village	Portland School District #1	$ 80,000	School dropouts age 14-21	150-210
CEP	Metropolitan Steering Committee	$ 841,194	Low income, disadvantaged	900
New Careers	Metropolitan Steering Committee, CEP	$ 184,092	Low income individuals	69
Adult Basic Education	Oregon Board of Education	$ 135,383	Persons over 18 with less than 8 years schooling	1,200
Vocational Rehabilitation	Dept. of Vocational Rehabilitation	$1,283,711	Physically, mentally, socially handicapped	4,710
CAP	Metropolitan Steering Committee	$ 40,500	Low income	350
CAP	Clackamas County EOA, Inc.	$ 37,500	Low income	500
CAP	Washington County EOA, Inc.	$ 16,000	Low income underemployed	200
CAP	Valley Migrant League	$ 10,000 Clackamas $ 95,000 Washington	Migrant farm workers	510 Clackamas 4,320 Washington
NDVR	Multnomah County Welfare	$ 90,000	Employable welfare clients	90
JOBS	National Alliance of Businessmen	$1,700,000 Portland $2,000,000 SMSA	Disadvantaged	2,000

*Program serves the counties of Union, Baker, Wallowa, Umatilla, Morrow, Wasco, Hood River & Sherman

FEDERALLY ASSISTED MANPOWER PROGRAMS IN OPERATION FY 71 (con't)

PORTLAND SMSA CAMPS 1971 (con't)

PROGRAM NAME	AGENCY	AMOUNT FUNDS	TARGET GROUPS	NUMBER SERVED
OJT	Portland Metropolitan Steering Com.	$ 67,580	Low income, untrained, deprived	150
OJT	Washington County Welfare	N/A	P.A. recipients	15
OJT	Clackamas County Welfare	N/A	Welfare recipients	25
Work Experience & Training	Washington County Welfare	N/A	Unemployed males on P.A.	45
Work Experience & Training	Clackamas County Welfare	N/A	Welfare Recipients	50
Non-disabled Vocational Rehabilitation	Clackamas County Welfare	N/A	Welfare Recipients	75
RISE	Washington County Welfare & Extension Service	N/A	Unskilled female welfare recipients	45
CAP	Columbia County Community Action Team	$ 25,000	Low income	500
Work Experience & Training	Multnomah County Welfare	$ 12,500	Welfare clients	25
WIN	Oregon State Employment Service	N/A	Welfare, ADC Recipients	600

2.0 State Vocational Education Programs

2.1 Instructional Programs

2.11 Summary

A resume' of vocational education programs at the secondary and adult levels is provided on Tables 2-4 beginning on page 289.

2.12 Persons to be Served

The allocation of funds budgeted for each category of persons to be served is shown in Table 1, page 287.

2.12-1 Secondary

The State Board has established the long-range goal of enrolling 50 percent of the eleventh and twelfth graders during the next five-year period in occupational cluster curriculums (see Section 5.0, page 227, Part II of the State Plan). The achievement of this goal would result in having approximately 50,000 students enrolled in the 12 or more occupational clusters by 1975. The occupational clusters are identified in Section 4.3, page 222, Part II of the State Plan.

To accomplish this goal, project "Career Education" was launched in 1969 and will continue through fiscal year 1971. The development of career education in secondary schools is based on the following:

(1) Federal funds available under Part B (see Table 1) will be available for allocation to secondary schools which meet program approval requirements as outlined in Section 3.0 of Part I of the State Plan.

These funds will be used for:

(a) Program grants for the operation of occupational cluster programs. It is anticipated that approximately 22,000 eleventh and twelfth graders will be enrolled in 438 continuing, 76 expanded, and 118 new occupational cluster curriculums.

(b) Planning grants for local schools to do essential program and curriculum planning.

(c) Funding for developmental occupational cluster programs.

(2) The priority during 1970-71 will be to concentrate financial resources on occupational cluster curriculum development and program implementation and evaluation, primarily at grades 11 and 12.

(3) State staff members will concentrate efforts on development and dissemination of guidelines and data for effective planning of occupational cluster and exploratory programs and on continued evaluation of local programs.

(4) Tables 3 and 4 project the number of occupational programs to be continued and initiated during the 1971 fiscal year. Set-aside funds and the categorical funds will be coordinated with Part B funds to accomplish the priorities of career education programs.

2.12-2 Post-secondary

The State Board has established the long-range goal of developing specific occupational training

programs in the community colleges which will allow 15,000 full-time equivalent students to be enrolled in such programs by 1975.

Grant B funds (see Table 1) will be utilized to assist in the development of additional job training programs which will allow for 11,750 FTE's for the 1970-71 school year. Funds will be allocated to local agencies as outlined in section 3.0 of Part I of the State Plan. A resume' of continuing and new programs is provided in Tables 2 and 3. The addition of 49 new programs as demanded by occupational needs within the state will allow more students to participate in an increased variety of specific job training programs.

To receive funding all community college occupational programs must be closely aligned to local, state and/or regional employment opportunities.

2.12-3 Adult

The State Board has established the goals of developing job training programs that will provide for a three-fold increase by 1975 in the upgrading and retraining of adult workers in those occupational areas requiring trained workers.

Grant B funds (see Table 1) will be utilized to establish programs which will provide training opportunities for 20,000 persons for the 1971 fiscal year. The funds will be allocated to local districts as outlined in section 3.0 of Part I of the State Plan. Continued efforts will be made in the identification of needed programs for upgrading the skills of underemployed and unemployed persons.

2.12-4 Disadvantaged Persons

The goal of the State Board will be to expand job training programs to serve disadvantaged persons. The first priority will be to continue to provide educational services required to allow disadvantaged and handicapped persons to succeed in regular vocational programs.

Approximately 5 percent of the secondary, post-secondary, and adult funds will again be utilized for added cost factors of serving identified disadvantaged and handicapped enrolled in regular vocational education programs.

Sound vocational educational principles will be incorporated into all disadvantaged and handicapped programs - such things as individual progression rates, varied exit points, and other innovations which are necessary for successful vocational education of the handicapped are good practices for all vocational education.

A major portion of the 15 percent set-aside funds and 102(b) disadvantaged be allocated to local educational agencies to provide services on a project proposal basis (see Table 1, page 287).

Types of programs planned for disadvantaged:

1. Funding for programs at secondary and community college levels to upgrade the basic skills required to maximize benefits attainable by the special needs persons and in regular ongoing vocational programs.
2. Consideration will be given to establishing comprehensive cluster programs in an existing metropolitan school(s) serving these areas containing the majority of the culturally disadvantaged. (CEP and Model Cities areas.)

3. Continue support of the personalized educational programs (Vocational Village) including the extended-day program.
4. The development of articulated programs will be encouraged.
5. Special supportive programs at the community college level which enable special needs groups to succeed in other regular ongoing programs are to be given financial assistance.
6. Inservice training for community college vocational educators will be continued and expanded and consideration will be given to initiating preservice and inservice training for secondary vocational teachers.
7. Secondary and community college programs which encourage retention of potential dropouts and/or enrollment of dropouts in vocational programs.
8. Funding of developmental, approvable regular vocational programs to specifically serve the needs of disadvantaged groups within a geographic area.
9. Expansion or development of vocational exploratory programs.
10. Placing emphasis on quality vocational counseling and guidance.
11. Supporting tutoring programs based on capable tutors.
12. Supporting instructionally related work experience programs.

2.12-5 Handicapped Persons

The State Board staff, both vocational and special, will cooperate with other State agencies in planning and implementation of realistic vocational education for handicapped persons.

Cooperation with the Special Schools Division, School for the Deaf, and the Regional Facilities for the Deaf and the Blind in Portland will be continued.

Approximately 75 percent of the funds will be distributed to local educational agencies for implementation and planning of secondary, post-secondary and adult vocational education programs.

Approximately 10 percent will be utilized for preservice and inservice vocational teacher training programs dealing with the needs of the handicapped.

Approximately 15 percent will be used for statewide planning and coordination including coordination with other agencies in educating the handicapped for employment.

Types of Programs for Handicapped:

1. Cooperated with special education and other State agencies in planning and implementing vocational education for handicapped persons.
2. Major emphasis will be on the inclusion of handicapped in regular ongoing vocational education programs by providing necessary supportive services.
3. Regional facilities for the deaf and blind will be provided continued high priority funding of supportive programs including occupational exploration, vocational counseling and guidance, and work experience.

4. Oregon State School For The Deaf will be encouraged to implement approvable vocational cluster programs utilizing the assistance of the various specialists in the program operation of the Oregon Board of Education.
5. Attempts will be made to maximize vocational education services available to the handicapped by cooperative approaches with the Division of Vocational Rehabilitation, Employment Division, Welfare, and other appropriate agencies.
6. When appropriate, special supportive services that serve the needs of both disadvantaged and handicapped will be implemented.
7. Consideration will be given to developing training, in-service, and preservice for educators of the handicapped.

2.13 Areas to be Served

The allocation of funds to geographical areas will be based on the projected numbers of persons to be enrolled in approved vocational programs.

2.13-1 Economically Depressed and High Unemployment Areas

As reported by the Department of Employment, Research and Statistics Division, see Chart 1c of Long Range Plan, 16 areas of the State are identified as economically depressed areas with high rates of general unemployment. Of these 16 areas, three are classified as having substantial unemployment and ten are classified as persistent unemployment areas.

All of these areas are rural. Based on projected programs and student enrollments, it is anticipated that 18 percent of Grant B funds will be allocated to school districts within these areas.

2.13-2 Areas of High Youth Unemployment and School Dropouts

As identified in Chart 1e of Long Range Plan there are 13 counties in the State that have school dropout rates above the State average. Of these, six have a persistent school dropout rate (above State average for three consecutive years). Chart 1d of Long Range Plan shows the areas with high youth unemployment. Funds from Part B for ongoing vocational programs will be allocated on a weighted and full-time equivalent student base in these areas.

Approximately 32 percent of the funds will be used in those areas with high youth unemployment and high school dropouts rates. In addition, a portion of the categorical funds for research and demonstration, cooperative education, and special planning grants, will be used to assist in the development of programs for areas needing special assistance.

2.13-3 Areas of High Population Density

The areas of high population density (Chart 1f Long Range Plan) will receive their proportionate share of the funding since the allocation of basic support for secondary, post-secondary, and adult programs will be on a weighted per student and full time equivalent basis. Based on projected programs and student enrollments, it is anticipated that approximately 40 percent of Grant B funds will be used in the three areas of high population density.

2.14 Occupational Offerings

The summary of employment data in Table 1, page 190 of the Long Range Plan provides a resume' of job opportunities within

the State This information was provided by the State Employment Service. The established secondary occupational cluster curriculums (minimum requirements for a cluster are a present employment in Oregon of 10,000 workers and a forecast of need for 2,000 workers in the next four years) that are eligible for financial reimbursement are based on this information and, accordingly, are geared directly to manpower needs and job opportunities in the State. To receive funding, post-secondary and adult programs must be directly related to local, regional, and statewide employment needs.

In Tables 2 and 3 those areas that are the farthest from supplying the projected manpower needs reflect the greatest growth.

2.15 Vocational Instruction Under Contract

State and local education agencies may contract for vocational instruction when such contracts meet the conditions set forth in section 1.8 of Part I of the State Plan and funds are available. No funds are budgeted for the 1971 fiscal year.

2.2 Guidance and Counseling Programs

Funds for guidance and counseling are included as a part of the basic grants to secondary and post-secondary programs; therefore, no Part B funds are budgeted separately for this purpose.

Funds are budgeted for exploratory and vocational guidance and counseling under the categorical funds for exemplary programs (see section 5.2, Part III).

2.3 Construction of Area Vocational Education Schools

2.31 Projects Planned

There are no federal funds allocated for construction of facilities.

2.32 Need for Construction of Area Schools

There are no federal funds allocated for construction of facilities.

2.4 Ancillary Services and Activities

2.41 Administration and Supervision

The staffing pattern, under the Director of Vocational Education, is shown in Chart 2, page 303. Of the positions shown, 20 will be funded during the fiscal year. Part D funds are budgeted in Table 1 for eleven positions plus one staff position each for Part D, F, and G set-aside funds.

Major activities staff will be involved with include:

1. Developing and implementing exploratory, career cluster, and specific job training programs in cooperation with local educational agencies.
2. Evaluating occupational cluster(s) curriculums and specific job training programs in local educational agencies.
3. Implementing cooperative work experience as an integral part of occupational clusters.
4. Developing criteria for approving occupational curriculums, courses, and special projects for funding.
5. Directing and coordinating statewide activities of vocational youth organizations.
6. Identifying needs and providing for effective in-service education programs for instructors of occupational clusters.
7. Planning preservice education needs for occupational cluster instructors in cooperation with teacher education staffs.
8. Developing and improving curriculum and instructional materials for cluster(s).

9. Developing examples of occupationally oriented experiences that can be infused into all of general education.
10. Developing guidelines and instructional materials to be used in exploratory programs and for programs serving the needs of the disadvantaged and handicapped.
11. Determining needs and supervising contracted task force activities conducted for curriculum development and special projects.

In addition to State Board staff personnel, funds have been budgeted to provide for ten regional vocational coordinators, who will be contracted for through appropriate local educational agencies. The purpose of these positions will be to provide cooperative program planning and evaluation on a regional base.

2.42 Evaluation

Major emphasis in program evaluation will continue to be on assisting local educational agencies in conducting self-evaluations of their programs. Districts will be encouraged to use the self-evaluation procedures and instruments developed by the State Board, field tested during the 1968 fiscal year and revised in 1970. Occupational specialists on the State staff will assist secondary and post-secondary institutions in this task. Funding will be provided for the establishment of regional and/or statewide inservice meetings to orient local personnel to the evaluation procedures. In addition, special study grants within the limitations of funds will be made available to meet priority needs. The following criteria will be used as the basis for evaluating local vocational programs:

1. The administration develops and plans programs to meet the needs, interests, and abilities of students who

want, need, and can benefit from vocational education.

2. The administration cooperates with and encourages teaching staff to improve instruction.
3. The effectiveness of the vocational education program in meeting student needs is evaluated on a continuing basis.
4. Students are admitted to the vocational education program on the basis of occupational objectives and potential for achieving occupational competency.
5. Vocational guidance is available to all students who want, need, and can benefit from vocational education.
6. Vocational programs are offered for all students who can benefit from vocational education instruction.
7. Instruction creates learning experiences which meet the educational needs of individual students.
8. Students are provided with adequate instruction to help them achieve the occupational objectives of the curriculum pattern.
9. Students are provided with adequate instruction to encourage sound safety practices and promote healthy work attitudes.
10. Facilities, including equipment, instructional aids and supplies, enable students to meet the objectives of the program with efficiency.
11. The administration insures that the vocational education program is responsive to changing job requirements and labor market needs.
12. The administration plans and organizes a statement of future needs including costs for administration, guidance services, instruction and facilities.
13. Accurate and current information about employment opportunities in regional and local labor markets is maintained.
14. Program is designed to enable students to develop competencies necessary for further education or entry employment in the recognized occupations.
15. There are substantial and identified opportunities for employment in the occupations taught.

16. The vocational education program is designed to prepare individuals in an occupation or a group of closely related occupations.
17. The program is developed and conducted with the advice of an occupational advisory committee.
18. Facilities and equipment are comparable to conditions and equipment used in actual working situations.
19. Instruction is based on skills and knowledge required in the occupation or cluster of closely related occupations.
20. Adult supplementary vocational education courses are available to meet the occupational training needs of employed and temporarily unemployed adults.

State Board guidance and vocational staff will cooperate in the development of a State assisted vocational graduate follow-up system. It is planned that the follow-up will be carried out through the local districts, but the processing and accumulation of data will be carried out at a central location, thus orienting the data collection to a statewide analytical process.

Evaluation of all aspects of local vocational programs will be an integral part of the State Board's emphasis and activities for overall educational program evaluation and audits.

2.43 Teacher Education

The supply of qualified teaching personnel continues to fall below the required need for the occupational programs in secondary and post-secondary institutions. In addition, few persons currently enrolled in teacher education are adequately prepared to educate disadvantaged and handicapped students for employment. Oregon State University will continue to be the primary institution designated

to provide preservice education for teachers in the ongoing occupational areas.

Emphasis will be given during the year to the development and implementation of a State Plan for the development of vocational education personnel as a part of the State's activities under an EPDA grant.

The State Board shall use the Part B funds budgeted in Table 1, page 287, to meet established priorities such as the following:

(a) Development and improvement of teacher education programs to train teachers for implementing secondary career cluster curriculums.

(b) Coordination of the development and implementation of professional improvement programs for community college vocational-technical instructors.

(c) Implementation of inservice education for community college instructors, secondary career cluster instructors, apprenticeship and other adult instructors, and secondary and post-secondary administrators.

(d) Continuation of the Vocational Education Leadership program, which was initiated during the 1968 fiscal year. Interns will be placed in cooperating agencies for year-long educational programs that will prepare them for administrative and/or other leadership positions in vocational education. Emphasis will be placed on identifying the needs for training leaders for programs serving the disadvantaged and handicapped.

(e) Implementation of an "extern" leadership development program for teachers and other vocational personnel employed by local districts.

(f) Development of preservice and inservice education for vocational instructors of disadvantaged and handicapped students.

The indicated teacher education activities will be supplemented by programs funded with grants under EPDA Parts B and F:

(a) Recruitment and training of teachers from business and industry for vocational programs in secondary schools.

(b) Recruitment and training of teachers for post-secondary and adult vocational programs.

(c) Development of teaching competencies for the vocational instruction of persons with special needs.

2.44 Research and Demonstration Projects

The major effort for fiscal year 1971 will continue to be concentrated on cluster curriculum development and implementation at the secondary level, articulated with specific job training programs at the post-secondary level. To meet established priority needs, federal and State monies will be used to promote research, developmental and demonstration projects in areas such as the following:

(a) Individual career cluster programs

(b) Occupational guidance and exploration

(c) Articulation between career cluster programs.

(d) Interdisciplinary approaches to career education

(e) Occupational placement for students

Essentially equal priority for funding will be given to secondary and post-secondary institutions. Local applications for funds will be evaluated against priority needs according to the procedures outlined in section 3.27 of the Continuing Plan.

2.45 Curriculum Development

To support the established priority of improving career education, the major effort for fiscal year 1970-71 in curriculum development will be the development, production, and dissemination of occupational cluster curriculum

guides. The funds budgeted in Table 1 for curriculum development will be used in the following major areas:

(a) Secondary occupational cluster curriculums

(b) Post-secondary vocational-technical curriculums

(c) Preapprenticeship and apprentice related training material

(d) Community college preparatory and special adult programs

(e) Instructional materials for special needs.

3.0 Disadvantaged Persons

(1) Special funds for disadvantaged programs provided by section 102(b) of the Act will be allocated to local education agencies on a project basis.

A major portion of the funds will be utilized in similar type projects as outlined in 2.12-4(b).

(2) Approximately one-third of the funds will be used to provide summer or extended year (thru August 31, 1971) programs.

A portion of the "Extended Year Programs" funded will deal with the problems of retaining dropouts by providing necessary services.

(3) These funds will be utilized to best meet the needs of academically, socio-economically, or culturally disadvantaged persons. Emphasis will be on serving these individuals in regular ongoing vocational programs at the secondary (grades 11 and 12) and post-secondary (community college) levels. Ninety percent of the students will be served in the programs listed in tables 2 and 3, page 289-297.

Seventy-five percent of the funds will be spent in areas having high youth unemployment or a high dropout rate (refer to amended Chart 1d and 1e, pages 201-203, Part II of State Plan)

In addition to those areas shown on Chart 1d, Part II, page 201, Portland and Multnomah County is an area of high youth unemployment. Multnomah County contains both the Model Cities and CEP areas.

The following supportive data is excerpted from the March 1970 annual manpower planning report for Portland

prepared by the Research and Statistics staff of the Oregon State Division of Employment.

Unemployment rates by race for 1969

	SMSA	Portland	Model Cities	CEP
White	3.5	3.5	3.6	4.3
Non-White	6.3	7.0	8.2	8.4
Non-White Males	7.4	8.0	8.9	9.4

The Oregon Manpower Plan for 1971 shows:

25% of the disadvantaged population of Portland SMSA is non-white;
75% of the State's non-whites and 95% of the Negroes live in SMSA;
71% of the non-whites and 92% of the Negroes live in Multnomah County.

Priority will be given to areas having both high youth unemployment and a high dropout rate. Approximately 50% of the funds will be spent in these areas.

(4) Additional programs to be funded will include inservice teacher training and special planning seminars designed to provide realistic exchange of information between business and industry and vocational education educators.

4.0 State Research and Training in Vocational Education

4.1 Research Coordination Units

Due to the limitation of and priority needs for funds, the Research Coordination Unit functions will be carried on a limited basis by State Board staff members under the Coordinator of Program Development and Evaluation.

4.2 Grants and Contracts

Federal monies budgeted in Part C of Table 2, page 288, will be used for awarding grants and contracts to institutions planning projects that will support the State Board priorities for the development of the statewide career education program.

Funds allocated under these grants will also be used for awarding grants and contracts to institutions and agencies for disseminating information derived from exemplary vocational programs or from research and demonstration projects conducted specifically to aid in development of career education grades K-14.

5.0 Exemplary Programs and Projects (Part D of the Act)

5.1 Planning

To meet priority needs in the area of exemplary programs for vocational education, funds budgeted in Table 1, page 287, will be used to engage professional personnel to carry out statewide planning and administrative responsibilities.

5.2 Establishment, Operation, and Evaluation

Federal funds will be expended to initiate development of demonstration programs representative of typical school settings, such as consideration of population density, school size factor, and geography, for the purpose of providing model exemplary programs with varying degrees of emphasis on career clusters, occupational relevance, and articulation.

Emphasis will be placed on exemplary programs and projects in the areas of occupational guidance and counseling, occupational exploratory programs and instructional practices in keeping with priorities established by the State Board.

Part D funded projects will, in part, supplement exemplary demonstration projects for career cluster programs developed with State funds and Part B funds.

Program operation will be the responsibility of the local educational agencies under supervision of the State administration. The local agencies shall provide continuing evaluation of programs to assure meeting the expressed objectives.

Evaluation of exemplary programs and projects will be made periodically by the administrative staff of the State Board and/or persons from other organizations and agencies, and continuously on the local level by qualified personnel in the local educational agencies. Results of these evaluations will be used to initiate necessary changes or improvements.

6.0 Residential Schools

Federal funds are not budgeted for residential schools for the 1971 fiscal year.

6.1 Does not apply.

6.2 Does not apply.

6.3 Does not apply.

7.0 Consumer and Homemaking Programs

7.1 Instruction

Funds budgeted for instruction in Consumer and Homemaking Education, Table 1, page 288, in fiscal year 1971 will be used as follows:

(1) Approximately one-third of the total funds will be allocated for expansion and redirection of existing programs with priority given to implementation and/or expansion of previously funded projects. Instructional programs developed under this allocation must be designed to assist consumers, thus improving home environments and the quality of family life.

Suggestions for programs might include the following:

Implement adult education in home and family living.

Develop innovative ways to better prepare students, both boys and girls, for the dual role of homemaker-wage earner through emphasis on home management and family relations.

Develop home and community projects as extended classroom learnings, either individual or group experiences.

Plan summer programs.

Plan teacher-parent-student conferences with home visits.

- Participate in local, district, state, and national FHA program as an integral part of the regular homemaking program.
- Develop consumer education units for comprehensive homemaking courses at all levels.
- Cooperate with other classes; i.e., social studies, in team approach.
- Cooperate with business education teachers planning and teaching units in Consumer Education.
- Provide structured leadership training through FHA.

All-school assemblies sponsored by homemaking classes or FHA.

- Develop classes for homemaker aides and shoppers at community colleges.
- Develop cooperative program with Federal Cooperative Extension personnel.
- Produce TV or radio programs.
- Conduct a series of meetings with Aid To Dependent Children mothers based on their questions and problems.
- Develop programed materials on consumer problems, i.e.,

  Selecting a store or shopping center

  Buying for cash or credit

  Choosing - quality vs. quantity

  Caring for consumer goods

  Deciding - to make or buy, to stay at home and conserve or to work and earn.
- Team teaching project in Consumer Education and Family Life, i.e.,

  Develop a plan whereby homemaking teacher and social studies teacher cooperate in American Problems classes - one homemaking teacher work with one social studies teacher, with an exchange or combination with homemaking class, different section each six weeks. Or - one homemaking teacher for five social studies teachers, taking a different section for each teacher for six week period on rotating basis.

  Plan for sharing of information with community groups in Consumer Education semester courses. Cooperation with extension, Aid To Dependent Children mothers, OEO, or simply a group of low income homemakers in a housing project, to give students and the homemaker an opportunity to work together to develop understandings about consumer choices.

  Provide special help to those who work with handicapped people - mothers, fathers, sisters, and brothers

of handicapped or mentally retarded children; students who are interested in working with handicapped homemakers who could learn homemaking skills and who could also contribute to the understanding of the needs and problems of such persons.

(2) Approximately one-third of the budgeted funds, Table 1, page 288, will be allocated for new innovative, special demonstration and/or experimental programs. In this category, priority will be given to those projects designed to meet the urgent needs of the local community. Special consideration will be given to programs to be developed for economically depressed areas. Such approvable programs may receive up to 90 percent funding.

Suggestions for specific program plans might include:

Offer and publicize classes especially designed to assist the homemaker/wage earner with the management aspects of her dual role.

Specific program plans might include:

- Developing plans to systematically work with elementary teachers to improve early family life education.
- Organizing classes in community action centers and housing projects.
- Expanding mobile unit concepts.
- Developing games, simulations, and programed materials for all phases of homemaking education.

Develop special consumer education classes for high school students who are engaged or married.

Develop joint proposals by several agencies; i.e.,

- High school and community college write joint proposal whereby the high school gives orientation to the world of

work and basic homemaking skills. The community college provides laboratory for child care and household equipment.

Develop projects through interagency approach.

7.2 Ancillary Services

Plans for ancillary services, Table 1, page 288, call for activities sufficient to insure continuation of ongoing programs and leadership in development of new, innovative, demonstration, and experimental programs. Provision for in-service and preservice teacher education will assure qualified preparation of personnel to develop total comprehensive consumer homemaking programs for the State.

Contracted services for personnel to plan and conduct the annual state homemaking teachers' conference will permit the continuation of this in-service function.

Contracted service for half-time employment of a person, along with appropriate secretarial assistance, to handle the program planning and coordination for the Oregon Association of Future Homemakers of America will assure continuation of this integral part of the program. In addition, at least half-time services will be continued for a special consultant. This person will be an experienced vocational homemaking instructor with special experiences relative to such activities as may be assigned to this position, i.e., development of programs for the disadvantaged, special needs, economically depressed, and consumer education. The State Board personnel shall continue to supply teachers with information on program planning, curriculum development, and facility planning, and with coordination of such ancillary services as: curriculum development, instructional materials, and evaluation procedures.

The approximate one-third remaining funds will be used for these ancillary services.

7.21 Teacher Education

The allocation of funds, Table 1, page 288, for continuing programs through approved institutions will permit development of special demonstration programs in teacher education. Priority shall be given to in-service development of teachers to strengthen classroom teaching and develop leadership. Special emphasis will be placed on improving teaching techniques and achieving better understanding of student needs. Special efforts will be made to assist teachers in developing programs especially designed for the economically disadvantaged and the handicapped, and to improve consumer education.

The teacher education program will include workshops, institutes, seminars, and classes conducted in cooperation with the approved teacher education institutions for preservice and in-service education of home economics education teachers. Plans include permitting allocations for professional education and supporting subject matter courses to strengthen the background of teachers working in the special needs areas.

7.22 Curriculum Development

Priority shall be given to curriculum development, Table 1, page 288, in the areas of family living and child care for coeducational programs and consumer education for all levels.

(1) Establish a state curriculum committee composed of state department personnel, teacher educators from each institution, and selected teachers and students to work as an advisory committee in identifying curriculum "scope and sequence." Local areas can then work on specific aspects of curriculum.

(2) Provide a state curriculum specialist to work with teachers and groups in curriculum and develop research projects.

(3) Provide learnings in in-service sessions on the

"unipac" idea so teachers may prepare lessons and deposit at a central source for others to secure copies.

(4) Assess the needs for implementing consumer and home-making programs with differentiated staffing possibilities for all ability, social, and economic levels, i.e., for working with small groups and individuals and/or for preparing self-instructional materials.

7.23 Evaluation

As curriculum is developed, methods of evaluation will be built into programs.

Additional program evaluation will be developed for each new innovative, special demonstration, or experimental program as approved.

Consumer and Homemaking programs will be continually evaluated according to the criteria established under 2.42 in this part of the State Plan.

7.24 Research

Funds may be used, Table 1, page 288, to support research projects under direction of the State Board by contracting with individuals or other agencies as rapidly as can be developed.

8.0 Cooperative Vocational Education Programs (Part C of the Act)
Funds allocated from Part G, Table 1, page 288, of the Act are to be utilized in meeting the need for increased opportunities for secondary and post-secondary students to be engaged in a cooperative work experience as a part of an approved vocational program in which both the classroom or laboratory and the work experience are an integral part of the curriculum. Cooperative work experience education is very limited in relationship to the number of approved vocational education programs and will be increasingly in demand as a complement to the numerous emerging programs in career education. The objective in the use of Part G funds is to tie cooperative work experience education to each program in vocational education insofar as is both possible and feasible.

Activities involved in the use of these funds shall include planning and development of cooperative work experience opportunities by the appropriate educational agency staff--such a program to be an expansion or innovation of cooperative work experience education beyond what is presently in existence, evaluation and follow-up procedures, program supervision and coordination by the educational specialist of the Oregon Board of Education, teacher in-service and preservice education in assuring proper understanding, development, and conduct of cooperative education programs.

As a result of the expenditure of Part G funds it is expected that those students enrolled in approved vocational education programs will become better prepared to make the eventual transitition from school into an occupation representing a career interest or objective. This will be especially true for those students who are economically, culturally, and/or educationally disadvantaged. Cooperative work experience education, as it becomes more of an integral and necessary part of all programs in occupational education whenever possible on the secondary and post-secondary levels, will in a large measure assist in facilitating this transition.

8.1
8.1 Instruction

The $271,245 of State and Federal funds allocated to the purposes of instruction under part G of the Act for the 1971 fiscal year will be used as follows:

(1) Approximately 50 percent will be used to support secondary programs.

(2) Approximately 50 percent will be used to support post-secondary programs.

(3) One hundred percent will be used to support occupational clusters or specialized work experience based on occupational needs. Special effort will be directed toward identifying and supporting new and emerging occupations.

(4) A minimum of 25 percent of instruction funds will be allocated to programs in areas identified as having high youth unemployment and above average dropout.

(5) Five percent may be used for reimbursement of additional costs to employers.

(6) No funds are allocated to unusual costs for students.

Programs operating under part G funds are integrated with and a part of the various service areas. Specific programs to be supported are shown in Tables 3 and 4 of this part of the State Plan.

8.2 Ancillary Services and Activities

8.21 Program Supervision

A full-time program specialist for supervision of cooperative work-experience programs has been added to the State staff as indicated in section 2.41, page 260.
Approximately 40 percent of the $51,000 budget for ancillary services for fiscal year 1971 will be used for this purpose.

8.22 Program Evaluation and Student Follow-Up

The program specialist will work with local educational agencies to provide for program evaluation and student follow-up following procedures as outlined in 2.42 of this part of the State Plan.

8.23 Teacher Education

Preservice and inservice teacher education conducted in cooperation with State teacher training institutions will be conducted to help insure quality coordination of cooperative work-experience programs. Approximately 40 percent of funds budgeted for ancillary services will be used for this purpose.

8.24 Research and Demonstration Projects

Priority for research in cooperative work experience will be given to projects recommended by service area specialists. Emphasis will be given to these proposals which tend to serve the interest of one or more clusters. Continued emphasis will be given to demonstration projects which provide curriculum and resource materials for related classes for cooperative programs.

8.25 Curriculum Development

Emphasis will be given to the development of instructional materials for cooo-related classes. Approximately 20 percent of funds budgeted for Part G, Table 2, page 287, ancillary services will be used for this purpose.

9.0 Work Study Programs

9.1 The annual work study program shall be conducted during the academic and/or summer portion of the school year. The majority of work study funds, Table 1, page 287, 50 percent or more, will be used to assist those school districts located in areas of high youth unemployment or high rate of dropouts. School districts shall pay each enrollee no less than the minimum wage and shall follow the guidelines on hours to be worked and wages to be earned as defined in Part I, section 10.23 (a) of the State Plan. Student eligibility under the work study program shall be based upon the following criteria:

(1) has been accepted for enrollment, or is enrolled as a full-time student in good standing and in full-time attendance, in a program which meets the standards prescribed by the State Board for vocational programs under the 1963 Act; and

(2) is in need of the earnings from such employment to commence or continue his vocational education program; and

(3) is at least 15 years of age and less than 21 years of age at the date of commencement of employment, and is capable of maintaining good standing while so employed; and

(4) shall generally meet the poverty guidelines as set forth by the Office of Economic Opportunity.

9.2 Plan Development and Administration

All federal and state or local matching funds, Table 1, page 287, will be used for the payment of student wages. Necessary administration and supervision are to be provided through funds from other sources.

State of Oregon | TABLE 1 | Fiscal Year 1971

Estimated Allocation of Funds
for State Vocational Education Programs

Amended 4/27/70

Program/Purpose	Total Funds	Federal Funds	State Funds	Local Funds
Part B State Programs				
Secondary*	3,167,247	984,347	42,900	2,140,000
Post Secondary**	5,460,978	785,478	3,765,500	910,000
Adult**	1,458,269	198,869	983,400	276,000
Disadvantaged	710,831	470,831	30,000	210,000
Handicapped	434,287	313,887	40,400	80,000
Contracted Instruction	6,000	----	----	6,000
Guidance and Counseling	290,100	----	154,100	136,000
Construction of Area Vocational Schools	----	----	----	----
Ancillary Services (Total)				
Administration and Supervision	1,190,000	154,000	716,000	320,000
Evaluation	42,000	21,000	21,000	----
Teacher Training	230,000	125,000	105,000	----
Research and Demonstration Projects	87,460	45,460	----	42,000
Curriculum Development	74,000	40,000	26,000	8,000
Total	13,151,172	3,138,872	5,884,300	4,128,000
Section 102(b) State Programs				
Disadvantaged	213,422	173,422	22,000	18,000

Note: Estimate of expenditures as projected in accordance with the policies and procedures in the State Plan.
* Funds will be allocated to secondary districts on a "weighted per student" base.
** Funds will be allocated to community college districts on "full-time equivalent" base.

State of Oregon

Fiscal Year 1971

Amended 4/27/70

TABLE 1 (Cont'd.)

Estimated Allocation of Funds
for State Vocational Education Programs

Program/Purpose			Total Funds	Federal Funds	State Funds	Local Funds
Part C	Research	(Total)	27,400	15,000	-----	12,400
	RCU		----	----	-----	----
	Grants and Contracts		27,400	15,000	----	12,400
Part D	Exemplary Programs	(Total)	218,576	112,476	9,100	97,000
	Planning		27,300	18,200	9,100	----
	Operating		191,276	94,276	-----	97,000
Part E	Residential (State)	(Total)	----	----	----	----
	Planning					
	Construction					
	Operation					
Part F	Consumer and Homemaking	(Total)	858,485	152,985	76,100	629,400
	Instruction		712,885	103,885	28,000	581,000
	Ancillary		145,600	49,100	48,100	48,400
Part G	Cooperative Programs	(Total)	322,494	234,994	-----	87,500
	Instruction		271,245	183,745	-----	87,500
	Ancillary		51,249	51,249	-----	----
Part H	Work-Study Experimental	(Total)	53,025	42,525		10,500
	Student Compensation		53,025	42,525	-----	10,500
	Administration					

Note: Estimates of expenditures as projected in accordance with the policies and procedures in the State Plan.

1827

Table 2

Instructional Programs Planned Which Are Continuing or Expanding in FY71

Instructional Program (OE Code) 1/ *	Purpose 2/ (1)-(4)(A), (4) (B),(6)*	Number of Programs		Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
		Continuing	Expanded			
01.0100	S (C)	93	5	127	6,904	1,593
	(D)	5	3	(8)	(95)	(30)
.9901	S (C)	2(91)	(5)	5(127)	(6,904)	(1,593)
	(D)	(5)	(3)	(8)	(95)	(30)
	(G)		(3)			
01.0100	PS (C) (D) (H)	1	2	3	80	35
.0200	PS (C) (D)		1	1	28	8
.0300	PS (C) (D)		1	1	62	13
.0400	PS (C) (D)		1	1	15	8
.0500	PS (C)	1	2	3	40	15
.0600	PS (C) (D) (H)		3	3	35	15
.0700	PS (C) (D)	4	4	16	112	35
01.0100	A	20	5	19	453	453
.0200	A	1	1	1	40	40
.0500	A	2	3	5	90	90
.0700	A	3	1	3	45	45
04.0800	S (C)	44	12	46	2,690	1,988
	(D)	1		1	20	20
	(G)		(12)	(12)	(900)	(900)
04.01	PS (D) (H)	2		2	355	54
.08	PS (D) (H) (G)	10	2	24	903	135
.13	PS (D) (H)	1		1	84	13
.17	PS (D) (H)	5		6	422	66
.19	PS (D) (H)	1		2	216	32

Numbers appearing in parentheses indicate duplicated count. *See page 299 for Key

Table 2

Instructional Programs Planned Which Are Continuing or Expanding in FY71

Instructional Program (OE Code) 1/ *	Purpose 2/ * (1)-(4)(A), (4) (B),(6)	Number of Programs Continuing	Number of Programs Expanded	Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
04.01	A (D)	2		6	280	99
.03	A	1		1	30	11
.04	A	3		7	345	124
.06	A	1		1	30	11
.08	A (D) (H)	8	2	18	544	211
.09	A	1		1	40	14
.11	A (D)	1		2	64	23
.13	A	1		2	72	27
.17	A	5		12	355	128
07.9900	S (D) (G)	12	6	15	450	200
07.0101	PS (D)	4		6	145	120
.0102	PS (D)	1		4	32	16
.0103	PS (D)	1		3	40	15
.0203	PS (D)	1	1	2	47	30
.0301	PS (D) (H)	3	1	24	240	118
.0302	PS (D) (H)	12	1	27	540	240
.0303	PS (D) (G)	2		6	130	98
.0401	PS (D)	1		3	35	30
.0402	PS (D)	1		3	45	20
.0501	PS (D) (H) (G)	1		5	50	30
.0703	PS (D) (G)	1		2	25	15
.0903	PS (D)	3		5	45	22
.0904	PS (D)	2		3	30	15
.0909	PS (D)	1		1	30	15
.99	PS (D)	1		1	35	15
07.0101	A (D)	2		2	40	35
.0102	A	1		2	20	18
.0103	A (D)	1		3	45	30

Numbers appearing in parentheses indicate duplicated count. *See page 290 for Key

Table 2

Instructional Programs Planned Which Are Continuing or Expanding in FY 71

Instructional Program (OE Code) 1/ *	Purpose 2/ (1)-(4)(a), (4) (B),(6)*	Number of Programs		Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
		Continuing	Expanded			
07.0301	A (D)	2		3	45	30
.0302	A (D)	3		5	240	200
.0303	A	2		3	35	30
.0501	A (D)	1		1	20	15
.0703	A (D)	2		2	35	30
.99	A (D)	5		10	160	140
09.0101	S (D) (H)	[120]	[7]	[119]	[27,341]	NA
.0201	S (D) (H)	4	1	8	248	145
.0202	S (D) (H)	1		1	34	15
.0203	S (D)	9	6	15	351	214
09.0100	PS (D) (H) (G)		[9]	[9]	NA	
.0201	PS (D) (H) (G)	2	3	5	100	60
.0202	PS (D) (H) (G)	2		2	80	40
.0203	PS (D) (H) (G)	2	1	3	45	45
09.0101	A (D) (H)	[12]		[147]	[6,894]	[6,894]
14.0100 - .0200	S (C)	30 (5)	8	35	1,233	590
.0300 - .0500	S (C) (D) (H)	100(10)	9 (4)	111	2,638	1,350
.0700 - .9900	S (C) (D) (H)	100(10)	27 (4)	116	3,268	1,550
14.0100	PS	16	3	19	500	250
.0200	PS	10	1	(10)	420	250
.0300	PS	12	1	33	1,730	1,150
.0700	PS (C)	25 (5)	2	27	910	600

Numbers appearing in parentheses indicate duplicated count.
Numbers appearing in brackets indicate Consumer and Homemaking and are not counted in totals on Table 4, page 60.

*See page 299 for Key

Table 2

Instructional Programs Planned Which Are Continuing or Expanding in FY71

Instructional Program (OE Code) 1/ *	Purpose 2/ (1)-(4)(A), (4) (B),(6)*	Number of Programs Continuing	Number of Programs Expanded	Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
14.0900	PS (D) (H) (G)	25	2	22	900	600
14.0100	A	15	2	25	800	600
.0200	A	16	1	16	400	375
.0300	A	15	1	49	3.400	2,500
.0700	A (H)	28	2	55	1,000	1,000
.0900	A (D)	30 (5)	2	(45)	1,000	1,000
.99	A (G)	6	1	10	940	650
16.0100	PS (D) (H) (G)	1	3	6	64	7
.0101	PS (D) (H)	1	1	3	23	10
.0104	PS (D) (H)	2	1	3	30	22
.0105	PS (D) (H)	1		1	10	7
.0106	PS (D) (H)	9	1	14	150	90
.0108	PS (D) (H)	7	5	30	1,060	690
.0113	PS (D) (H)	2		2	45	35
.0601	PS (D) (H)	5	1	12	100	45
.0602	PS (D) (H)	4	1	10	68	45
.0605	PS (D) (H)	10	2	12	100	80
16.0100	A (D) (H)	2		2	60	54
.0107	A (D) (H)	10		10	240	216
.0108	A (D) (H)	3		4	1,065	958
.0111	A (D) (H)	1		3	170	153
.0601	A (D) (H)	2		12	250	225
.0602	A (D) (H)	4		14	340	306
.0605	A (D) (H)	2		12	305	275

Numbers appearing in parentheses indicate duplicated count.

*See page 299 for Key

Table 2

Instructional Programs Planned Which Are Continuing or Expanding in FY71

Instructional Program (OE Code) 1/ *	Purpose 2/ (1)-(4)(A), (4) (B),(6)*	Number of Programs		Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
		Continuing	Expanded			
17.0300	S (D) (H)	21		48	1,631	1,204
.1000	S (D) (H)	21		35(82)	576	550
.1500	S (D) (H)		16	25	287	60
.2300	S (D) (H)	15		30	435	335
.9900	S (D) (H)	16		10(15)	426	295
17.0200	PS (D) (H)	2		3	20	10
.0300	PS (D) (H)	3	1	5	80	45
.0301	PS (D) (H)	3		3	35	10
.0302	PS (D) (H)	11	1	24	225	50
.0401	PS (D) (H)	2		5	226	80
.0402	PS (D) (H)	2		2	110	28
.0900	PS (D) (H)	1		1	40	2
.1200	PS (D) (H)	2		4	70	20
.1300	PS (D) (H)	11	1	35	1,000	700
.1500	PS (D) (H)	8		15	680	190
.1503	PS (D) (H)	3		5	40	30
.2200	PS (D) (H)	1		2	30	20
.2300	PS (D) (H)	10	2	26	277	100
.3600	PS (D) (H)	1		1	15	10
.3700	PS (D) (H)	6	2	11	60	40
.9900	PS (D) (H)	2		3	40	25
17.0200	A (D) (H)	2		2	120	5
.0300	A (D) (H)	12		(14)	500	
.0301	A (D) (H)	3		4 (2)	100	2
.0302	A (D) (H)	7		23 (12)	1,375	20
.0303	A (D) (H)	2		13 (4)	830	
.0401	A (D) (H)	1		2	114	2
.0900	A (D) (H)	2		3	140	10

Numbers appearing in parentheses indicate duplicated count.

*See page 299 for Key

Table 2

Instructional Programs Planned Which Are Continuing or Expanding in FY71

Instructional Program (OE Code) 1/ *	Purpose 2/ (1)-(4)(A), (4) (B),(6)*	Number of Programs		Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
		Continuing	Expanded			
17.1100	A (D) (H)	8		10	1,290	40
.1200	A (D) (H)	12		2(8)	391	10
.1300	A (D) (H)	2		4	264	20
.1500	A (D) (H)	10		12(73)	105	40
.1700	A (D) (H)	8		20	1,100	150
.2200	A (D) (H)	2		2	30	20
.2300	A (D) (H)	24		74(39)	2,400	150
.2800	A (D) (H)	8		41	1,821	150
.2802	A (D) (H)	8		16	1,000	160
.3100	A (D) (H)	2		2	305	200
.3700	A (D) (H)	3		3	135	35
DIVERSIFIED OCCUPATIONS						
01.0100	S (C)(D)(H)(G)	32	12	35	58	54
04.0800	S (C)(D)(H)(G)	(32)	(12)	(35)	135	110
07.9900	S (C)(D)(H)(G)	(32)	(12)	(35)	72	52
09.0203	S (C)(D)(H)(G)	(32)	(12)	(35)	32	20
14.0100	S (C)(D)(H)(G)	(32)	(12)	(35)	25	25
14.0300	S (C)(D)(H)(G)	(32)	(12)	(35)	21	21
14.0700	S (C)(D)(H)(G)	(32)	(12)	(35)	55	55
17.0300	S (C)(D)(H)(G)	(32)	(12)	(35)	290	265
17.1000	S (C)(D)(H)(G)	(32)	(12)	(35)	67	53
17.1500	S (C)(D)(H)(G)	(32)	(12)	(35)	110	92
17.2300	S (C)(D)(H)(G)	(32)	(12)	(35)	88	67

Numbers appearing in parentheses indicate duplicated count.

*See page 299 for Key

Table 3

New Instructional Programs Planned in FY 71

Instructional Program (OE Code) 1/*	Purpose 2/ (1)-(4) (A), (4) (B),(6)*	Number of Programs	Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
01.0100	S (C) (D)	1	1	(40)	
	S (G) (D)	(1)	(1)		
01.9901	S (C) (D)	1	1	(30)	
	S (G) (D) (H)	(2)	(2)		
01.0700	S (C)	1	1	(20)	
01.0100	PS (C) (D)	1	1	20	
.0500	PS (C) (D)	2	2	25	20
.0600	PS (C) (D)	1	1	15	
.0700	PS (C)	1	1	20	
01.9901	A	13	13	(195)	(195)
04.0800	S (C)	4	4	80	30
04.0800	PS (C) (G)	1	1	28	3
04.0800	A (D)	2	2	40	14
07.9900	S	6	6	300	150
07.0101	PS (D) (G)	2	3	35	28
.0102	PS (D) (G)	2	4	32	
.0203	PS (D) (G)	1	2	20	
.0301	PS (D)	1	4	40	
.0303	PS (D)	2	4	80	70
.0801	PS (D)	1	1	18	10
.0904	PS (D)	1	1	20	16
.99	PS (D) (H)	2	2	36	
07.0399	A (D)	6	12	175	150
.0401	A	1	2	35	15

Numbers appearing in parentheses indicate duplicated count. *See page 299 for Key

1834

Table 3

New Instructional Programs Planned in FY 71

Instructional Program (OE Code) 1/*	Purpose 2/ (1)-(4)(A), (4)(B),(6)*	Number of Programs	Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
09.0101	S	[2]	[4]	[60]	
	S (H)	[1]	[1]	[100]	
	S (D)	[5]	[5]	[100]	
.0201	S	1	(1)	(40)	(20)
	S (H)	1	(1)	(30)	(30)
	S (D)	1	(1)	(30)	(15)
.0203	S (D) (H) (G)	3	(3)	(80)	(40)
09.	PS	[2]	[2]	[40]	[40]
.0201	PS (G)	1	(2)	(60)	(30)
.0203	PS	3	(3)	(45)	(45)
14.0100- .0200	S (C) (H)	19 (5)	(19)	(200)	(100)
	S (D)	(3)			
.0300- .0500	S (C) (H)	21 (5)	(21)	(325)	(150)
	S (D)	(4)			
.0700- .0900	S (C) (H)	6 (2)	(6)	(120)	(50)
	S (D)	(3)			
14.0100- .0200	PS (G)	6	6	(75)	(70)
.0300- .0500	PS	7	7	(100)	(85)
.0700- .0900	PS (H)	6	6	(75)	(70)
14.0100- .0200	A	7	7	(70	65
.0300- .0500	A	6	6	125	120
.0700- .0900	A	8	8	55	50
17.0800	S (D)	5	5	321	70
.1000	S (D)	10	10	300	120
.1500	S	5	5	200	90
.2300	S (D)	11	11	320	145

Numbers appearing in brackets indicate Consumer Homemaking and are not counted in totals on Table 5, p.298

Numbers appearing in parentheses indicate duplicated count.

*See page 299 for Key

Table 3

New Instructional Programs Planned in FY 71

Instructional Program (OE Code) 1/*	Purpose 2/ (1)-(4)(A), (4)(B),(6)*	Number of Programs	Number of Teachers 3/	Estimated Enrollment	Estimated No. to Complete FY 1971
17.0200	PS (D) (G)	1	1	20	15
.0300	PS (D)	1	1	12	8
.1000	PS	1	1	20	
.1003	PS (D)	1	1	10	10
.2302	PS (H)	1	1	40	
.2801	PS (D)	1	1	20	14
.3200	PS	1	1	15	
.99	PS (G) (D)	1	2	15	
17.2801	A (D)	1	1	40	
.3200	A	1	1	40	
DIVERSIFIED OCCUPATIONS					
01.0100	S (D) (H) (G)	3	3	6	6
04.0800	S (D) (H) (G)	(3)	(3)	12	10
07.9900	S (D) (H) (G)	(3)	(3)	6	5
09.0203	S (D) (H) (G)	(3)	(3)	2	2
14.0100	S (D) (H) (G)	(3)	(3)	4	3
14.0300	S (D) (H) (G)	(3)	(3)	3	3
14.0700	S (D) (H) (G)	(3)	(3)	7	6
17.0300	S (D) (H) (G)	(3)	(3)	13	10
17.1000	S (D) (H) (G)	(3)	(3)	5	5
17.1500	S (D) (H) (G)	(3)	(3)	9	9
17.2300	S (D) (H) (G)	(3)	(3)	8	8

Numbers appearing in parentheses indicate duplicated count.

*See page 299 for Key

Table 4

Summary of Instructional Programs Planned

Purpose	Number of Programs			No. of Teachers	Estimated Enrollment	Estimated No. Completing
	Continuing	Expanded	New			
(1) Secondary (S)	506	105	99	679	23,740	11,604
	[120]	[7]	[8]	[129]	[27,601]	-
(2) Post Secondary (PS)	264	54	49	549	13,645	6,808
	-	[9]	[2]	[11]	[40]	[40]
(3) Adult (A)	318	21	45	588	25,598	11,544
	[12]	-	-	[147]	[6,894]	[6,894]
(4)(A) Disadvantaged (D)	510	107	75	1,149	33,857	14,186
	[132]	[16]	-	[156]	[34,235]	[6,894
(B) Handicapped (H)	484	100	30	1,011	32,598	13,985
	[132]	[16]	-	[156]	[34,235]	[6,894]
(6) Guidance and Counseling (prevocational instruction)(PV)	20	8	6	30	1,400	-
TOTALS	1,088	180	193	1,816	62,983	29,956

Numbers appearing in brackets indicate Consumer Homemaking and are not counted in the total.

Totals include (1), (2) and (3) only.

KEY
Tables 2, 3, and 4

S	Secondary
PS	Post Secondary
A	Adult
D	Disadvantaged
H	Handicapped
C	Cooperative under Part B
G	Cooperative under Part G

O.E. CODE	INSTRUCTIONAL PROGRAM
Secondary	
01.0100	Agriculture (Production)
01.9901	Agriculture (Other)
04.0800	Marketing-Distributive Education
07.9900	Health Occupations
09.0101	Homemaking (Comprehensive)
09.0201	Child Care Services
09.0202	Clothing Services
09.0203	Food Services
14.0100	Accounting & Bookkeeping
14.0300	Clerical Occupations
14.0700	Stenographic Occupations
17.0300	Mechanical
17.1000	Construction
17.1300	Drafting
17.1500	Electrical, Electronics
17.2300	Metals
Post Secondary and Adult	
01.0100	Agricultural Production
01.0200	Agricultural Supplies/Services
01.0300	Agricultural Mechanics
01.0400	Agricultural Products
01.0500	Ornamental Horticulture
01.0600	Agricultural Resources
01.0700	Forestry
04.0100	Advertising Services
04.0300	Automotive
04.0400	Finance and Credit
04.0600	Food Distribution
04.0800	General Merchandise
04.0900	Hardware, Building Materials
04.1100	Hotel and Lodging
04.1300	Insurance
04.1700	Real Estate
04.1900	Transportation
07.0101	Dental Assistant
07.0102	Dental Hygiene
07.0103	Dental Laboratory Technology
07.0203	Medical Laboratory Assisting

O.E. CODE	INSTRUCTIONAL PROGRAM
07.0301	Nursing (Associate Degree)
07.0302	Practical (Vocational) Nursing
07.0303	Nursing Assistance (Aid)
07.0399	Nursing (Other)
07.0401	Occupational Therapy
07.0402	Physical Therapy
07.0501	Radiologic Technology (X-Ray)
07.0703	Sanitation Assistant
07.0801	Mental Health Technician
07.0903	Inhalation Therapy
07.0904	Medical Assistant (Assistant in Physician's Office)
07.0909	Mortuary Science
07.99	Health Occupations Education, Other
09.0101	Comprehensive Homemaking
09.0201	Care and Guidance of Children
09.0202	Clothing Management, Production, & Services
09.0203	Food Management, Production, & Services
14.0100	Accounting and Computing Occupations
14.0200	Business Data Processing Systems Occupations
14.0300	Filing, Office Machines & General Office Clerical
14.0700	Stenographic, Secretarial & Related Occupations
14.0900	Typing and Related Occupations
14.99	Office Occupations, Other
16.0100	Engineering Related Technology
16.0101	Aeronautical Technology
16.0104	Automotive Technology
16.0105	Chemical Technology
16.0106	Civil Technology
16.0107	Electrical Technology
16.0108	Electronic Technology
16.0111	Industrial Technology
16.0113	Mechanical Technology
16.0601	Commercial Pilot Training
16.0602	Fire and Fire Safety Technology
16.0605	Police Science Technology
17.0200	Appliance Repair
17.0300	Automotive Services
17.0301	Body and Fender
17.0302	Mechanics
17.0303	Specialization, Other
17.0401	Aircraft Maintenance
17.0402	Aircraft Operations
17.0900	Commercial Photography Occupations
17.1100	Custodial Services
17.1200	Diesel Mechanic
17.1300	Drafting
17.1500	Electronics Occupations
17.1503	Radio/Television
17.1700	Foremanship, Supervision & Management Development
17.2200	Maritime Occupations
17.2300	Metalworking
17.2800	Public Service Occupations
17.2802	Law Enforcement Training
17.3100	Small Engine Repair, Internal Combustion
17.3600	Woodworking
17.99	Trade & Industrial Occupations, Other

Table 5

Construction Projects on Which Construction Will Start in Coming Year

Name and Address County and Cong. District	Type of School	Vocational Programs (Ag.,DE,etc.)	Level Programs	Estimated Beginning Constr. Date	Estimated Completion Date	Total Cost of Project Eligible under 1968 Act	Building Capacity	Type of Construction
		N O	F U N D S	B U D G E T	E D			

Chart 2

STAFFING PATTERN
Vocational-Technical Education

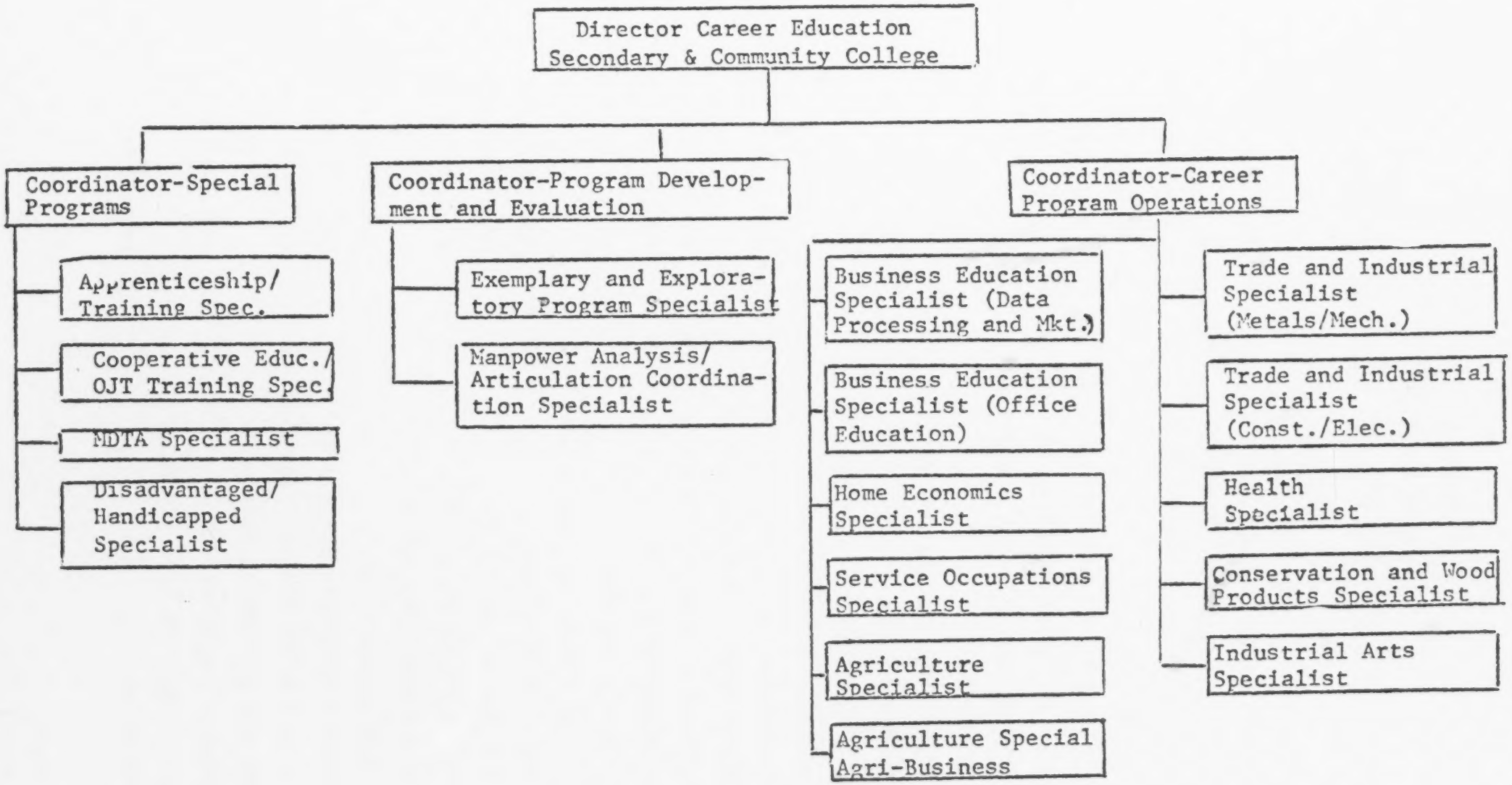


Chart 3

STAFF DIRECTORY

DIVISION OF COMMUNITY COLLEGES AND CAREER EDUCATION

Associate Superintendent	Carrol deBroekert
EPD 2 Director, Career Education	Leonard Kunzman
EPC Coordinator, Special Programs	Al Ringo
EPS 2 Apprentice Training Specialist	Larry Mathews
EPS 2 MDTA Specialist	Kirby Brumfield
EPS 2 Disadvantaged & Handicapped Specialist	David Backman
EPS 2 Cooperative Education & O.J.T. Specialist	Jerry Leadham
EPC Coordinator, Program Development and Evaluation	Don Gilles
EPS 2 Exemplary and Exploratory Program Specialist	Tom Williams
EPS 2 Manpower Analysis - Articulation Coordination Specialist	to be filled
EPD 1 Coordinator, Career Program Operations	Monty Multanen
EPS 2 Business Education Specialist - Distributive Education and Marketing	Sydney Thompson
EPS 2 Home Economics Specialist	Pauline Goodwin
EPS 2 Agriculture Specialist	Gordon Galbraith
EPS 2 Trade and Industrial Specialist - Metals and Mechanics	George Warren
EPS 2 Health Specialist	Joan Stoddard
EPS 2 Industrial Arts Specialist	John Fessant
EPS 2 Business Education Specialist, Office Occupations	Jesse Kauffman
EPS 2 Service Occupations Specialist	Don Lindahl
EPS 2 Agriculture Specialist - Agribusiness	Curtis Loewen
EPS 2 Trade and Industrial Specialist, Construction/Electricity	Jim Hargis
EPS 2 Conservation and Wood Products Specialist	Howard Brock

VT 013 823
BISHOP, HAROLD P.
HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES.

HUMAN RESOURCES RESEARCH ORGANIZATION, ALEXANDRIA, VA.
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IDENTIFIERS - *INFRARED RADIATION

ABSTRACT - THE RESEARCH REPORTED HERE IS PART OF A LARGER EFFORT TO IDENTIFY CRITICAL HUMAN FACTORS PROBLEMS IN THE USE OF NEW NIGHT OBSERVATION DEVICES, AND TO DEVELOP EFFECTIVE TECHNIQUES OF TRAINING MEN IN THE USE OF THESE DEVICES. TWO TECHNIQUES FOR TRAINING OPERATORS OF THE AN/TSS-7 LONG RANGE NIGHT OBSERVATION DEVICE ARE DESCRIBED AND COMPARED. PICTORIAL TRAINING AIDS ARE DEVELOPED AND EVALUATED; TRADITIONAL PLATFORM INSTRUCTION IS COMPARED WITH A VIDEOTAPED INSTRUCTIONAL SEQUENCE. (AUTHOR)

VT 013 823

Professional Paper 9-71

HumRRO

Hardware Parameters Related to Operator Training Capabilities

Harold P. Bishop

HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street • Alexandria, Virginia 22314

Presentation at
16th Annual Army Human Factors
Research and Development Conference
Fort Bliss, Texas October 1970

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June 1971

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16. Abstract

The research reported here is part of a larger effort to identify critical human factors problems in the use of new night observation devices, and to develop effective techniques of training men in the use of these devices. Two techniques for training operators of the AN/TSS-7 long range night observation device are described and compared. Pictorial training aids were developed and evaluated; traditional platform instruction was compared with a videotaped instructional sequence.

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Prefatory Note

This paper was presented at the 16th Annual U.S. Army Human Factors Research and Development Conference, held at Fort Bliss, Texas, in October 1970. Research for the paper was performed under Work Unit NIGHTSIGHTS, Training Techniques for New Night Vision Devices, at the Human Resources Research Organization, Division No. 2, at Fort Knox, Kentucky.

Dr. Bishop presented the paper at Session VI of the conference, titled, "Behavioral Science Support of System Development: Night Observation."

HARDWARE PARAMETERS RELATED TO OPERATOR TRAINING CAPABILITIES

Harold P. Bishop

INTRODUCTION

The broad objectives of HumRRO research Work Unit NIGHTSIGHTS are to identify critical human factors problems in the use of new night observation devices and to develop effective techniques of training men in the use of these devices. We have carried out a number of studies that can be characterized by two examples.

First, I will outline our approach to the development of training programs for immediate application to the training of operators of specific devices. Some of the results obtained in an experimental comparison of two techniques in training operators of the AN/TSS-7, a long range night observation device will be presented.

Second, I will describe our approach to the study of factors that limit operator effectiveness in target acquisition and to the development of training guidelines applicable to the requirements of devices that are being developed for future use.

TRAINING THE AN/TSS-7 OPERATOR

The work described here is representative of our effort to develop training programs and pictorial training aids for a selected set of high-priority night observation devices. Other devices for which training programs were, or are, being developed include the Airborne Search Light, the AN/ASQ-132 Iroquois Night Fighter and Night Tracker, the Ground Surveillance Radar, and the AN/VAS-1 Far Infrared Target Indicator.

Problem

The AN/TSS-7 Night Observation Device, Long Range, is a versatile device that can be operated in a number of active and passive modes. Since the device is more complex than many night vision devices, it presents more stringent training requirements. The objectives of the research were the development of a suitable training program, an experimental evaluation of a Pictorial Guide to be used as a training aid, and an experimental comparison of traditional platform instruction with a videotaped instructional sequence.

Approach

The development of the training program was carried out in two main steps. The first was the development of a set of *Training Objectives*, statements of capabilities the trainee should have at the end of the training period. For this step, it was necessary to analyze the application of the device, to analyze the operator's tasks, and to specify the skills and knowledges the operator needed to perform these tasks. The next step, using the results of these analyses, was the development of the *Lesson Plans* and materials to implement the training objectives. This included the specification of the training program or sequence of materials, the development of appropriate written and performance tests, and the development of a *Prototype Pictorial Guide* to be used as a training aid.

To evaluate the training program and to determine the effectiveness of the use of videotaped instruction when compared with standard platform instruction, a total of 37 enlisted men were given training in night observation device, long range (NODLR) operation. The men were divided into two groups—one received standard platform instruction, the other videotaped instruction. Within each group half of the men were given the Pictorial Guide for use as a training aid. The experimental conditions are summarized in Table 1.

Table 1

Conditions in Experimental Comparison of Methods of Instruction

Training Aid	Platform Instruction	Videotaped Instruction
Pictorial Guide	Group 2 *N* = 9	Group 4 *N* = 10
No Pictorial Guide	Group 1 *N* = 10	Group 3 *N* = 8

Except as indicated by the experimental variables, all the men received the same hours of training, the same subject matter, and the same amount of practice with the NODLR. Written and work-sample tests were administered at the end of each training sub-unit and at the end of the course.

Results

The end-of-course scores on the written and work-sample tests are shown in Figure 1. The main results are:

(1) Specific knowledge, as tested by the written examination, did not vary significantly with the type of instruction or the use of the Pictorial Guide.

Mean End-of-Course Scores for Groups Trained With Different Techniques

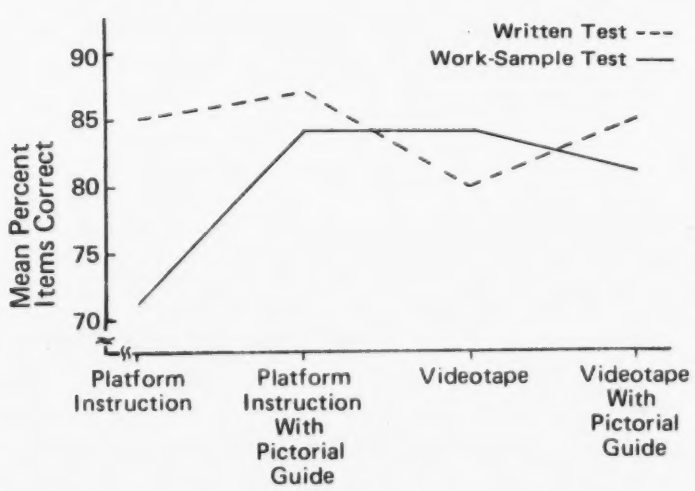

Figure 1

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(2) Mean group-skill level, as measured with the work-sample test, was greater for the group trained with the videotape than for the group trained with platform instruction.

(3) The lower mean group-skill level of those given platform instruction reflects the low scores obtained by the subgroup not using the Pictorial Guide. The scores obtained by the subgroup that used the Pictorial Guide did not differ from scores obtained by the groups trained with the videotape.

The results show the effectiveness of the Pictorial Guide as a training aid used with platform instruction, and also the effectiveness of videotape presentation. A zoom-type camera lens was used for recording the training material. One interpretation of the data is that the effectiveness of the videotape presentation is due in part to the use of this lens to record detailed information, similar information to that included in the Pictorial Guide.

TRAINING FOR FUTURE REQUIREMENTS

The limited data available from other sources, plus results we have obtained in working with night observation devices, indicate that the utility of these devices is often operator limited. Further, this limitation is related to the operator's failure to note, or his inability to perceive and interpret, the critical target information the device presents.

In the future, the perceptual and mental limitations of the operator will be the greatest hindrance to full use of the potential of night observation devices. New devices will be much more sophisticated and complex, and are expected to be employed in a widening range of situations. In order to realize the potential utility of new devices, it is necessary to systematically study the limitations of the operator and to develop training guidelines for techniques that will reduce these limitations. The resulting information will provide needed input for device designers and for personnel responsible for planning and doctrine, as well as providing a factual basis for solving training problems pertaining to specific devices and applications.

Problem

An important characteristic of the observer is his capacity for processing visual information quickly and accurately. In many surveillance situations, an observer using a night observation device may be expected to detect and identify a target that appears and moves across the visual display in a very short time. For example, the device may have an automatic scan feature or the operator and his device may be located in a moving vehicle. Under such observation conditions, the probability of target detection and identification may be very low.

For our purpose, we may simplistically attribute this performance limitation to two sources of interacting variables. The first, hardware and display characteristics, includes, for example, the field of view of the device, its sensitivity and resolution, type of viewing, target-ground contrast, location and size of target in the field of view, and its rate of motion. The second source of variables is the observer whose perceptual and mental characteristics limit his capacity to utilize information that the display may offer. The problem is first to isolate, identify, and relate these variables to the display variables, then to develop effective training techniques to increase the observer's proficiency in target acquisition.

Approach

Since the first problem is to identify and isolate the most important variables, our present efforts are laboratory experiments where the influence of hardware variables as well as extraneous variables that might affect performance can be controlled. Through our choice of targets and observation conditions, we can study the effects of display configurations and determine to some extent the physiological or sensory limitations of the observer's performance. The knowledge and understanding gained in these studies will provide the basis for the development of training techniques to improve the observer's performance, and for developing more cost-effective programs for training men to operate specific devices.

Procedure

The first series of experiments is designed primarily to determine the performance limits of untrained observers under a variety of simple observation conditions. The variables include type of target, location of the target in the visual field, and number of targets the observer must identify. The general procedure is to determine the minimum brightness required for detection and identification of a target projected on a dimly illuminated field for a short time.

The following results were extracted from a pilot experiment on the effects of the number of different targets the observer had to recognize. The targets were presented one at a time from sets of two or eight targets. The targets were flashed repeatedly at successively greater brightnesses and the task of the observer was to detect and then identify each target at the lowest possible brightness level. The targets were silhouettes of geometric figures, random forms, and military targets. The observer viewed the screen with one eye and the conditions were chosen to roughly represent the task of observing a target of tank size at 1,000 meters through an image intensification device on an overcast moonless night.

Results

The results are unverified and are used simply to illustrate the subjects' performance.

The trend of the responses of Subject T to two simple targets, a square and a triangle, is shown in Figure 2. Two features of the data are shown in the Figure—(a) the

Mean Relative Log Brightness Thresholds for Target Detection and Identification
(Subject T)

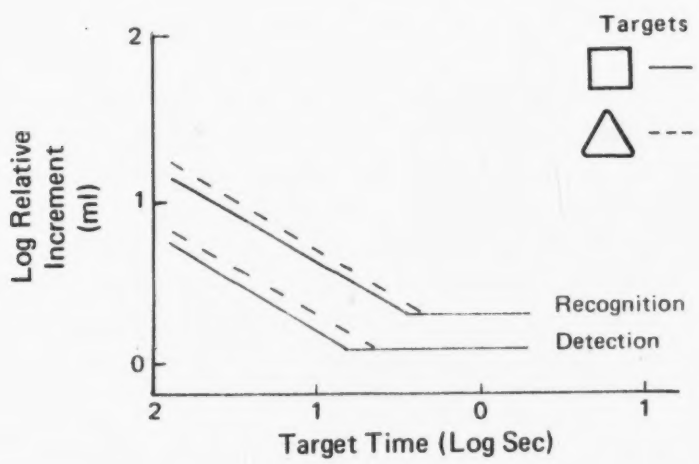

Figure 2

subject required considerably greater target brightness to identify the targets than to detect them, and (b) when the targets were exposed for a critical time of less than about 0.1 second, the target brightness required for detection and identification increased very rapidly as exposure time was decreased.

The trend of the responses of another man, Subject J, on a set of eight targets, including three military targets, is shown (Figure 3). These salient data show that (a) Subject J required much greater target brightness to detect or to recognize the targets than Subject T did; (b) the critical time of approximately one second is very much longer than the critical time obtained for Subject T.

Mean Relative Log Brightness Thresholds for Target Detection and Identification
(Subject J)

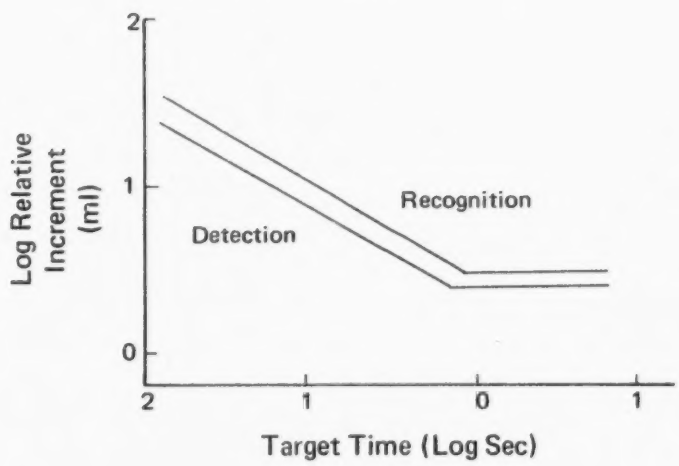

Figure 3

These data probably suggest the upper limits of performance of untrained observers. The subjects were extremely well motivated and better than average in intelligence, and the observation conditions were extremely simple. The differences in target brightness requirements for detection and identification and the long target presentation time that Subject J required, clearly suggest, however, that target acquisition performance may be significantly improved by training. We plan, in the next series of experiments, to determine the effects of target movement on the observer's performance and to study techniques of training operators for efficient target acquisition under conditions of limited target exposure time.

CONCLUSIONS

In this overview of some of the activities under Work Unit NIGHTSIGHTS, a primary objective has been to emphasize the variety of problems that may require solution in the process of developing training concepts and programs. The operator and his device are elements in a system, small or large, and have the vital function of gathering and processing information necessary to accomplish the mission of the system. We cannot limit our concern to training men to perform specific operations with certain devices, but must consider all aspects of the behavior required of them. We must be more concerned than we have been in the past, with the operator as a processor of information, and with the factors which limit his behavior in this capacity. These limitations concern not only those involved in training, but also everyone involved in the process of maximizing operator and system effectiveness.

VT 013 826
INDUSTRIAL ARTS: MUSEUM RESOURCES. A
DIRECTORY OF SELECTED CENTERS.

NEW YORK STATE EDUCATION DEPT., ALBANY.
BUREAU OF INDUSTRIAL ARTS EDUCATION.
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*GUIDELINES; TECHNOLOGY; INDUSTRIAL ARTS
IDENTIFIERS - *NEW YORK

ABSTRACT - THIS DIRECTORY OF SELECTED MUSEUM
CENTERS WITH CATEGORIZED RESOURCES RELATING
TO TECHNOLOGY HAS BEEN EXTRACTED FROM A STUDY
UNDERTAKEN BY AN ASSOCIATE OF THE NEW YORK
BUREAU OF INDUSTRIAL ARTS EDUCATION. GUIDING
PRINCIPLES FOR UTILIZING MUSEUM RESOURCES AND
A DIRECTORY LISTING OF MUSEUMS IN THE STATE
ARE PROVIDED ALONG WITH SUGGESTED ACTIVITIES
FOR STUDENTS, TEACHERS, SUPERVISORY
PERSONNEL, AND TEACHER EDUCATORS.
(AUTHOR/GEB)

VT 013 826

Industrial Arts

MUSEUM RESOURCES

A Directory of Selected Centers

VT013826

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THE UNIVERSITY OF THE STATE OF NEW YORK / THE STATE EDUCATION DEPARTMENT
BUREAU OF INDUSTRIAL ARTS EDUCATION / ALBANY, NEW YORK 12224
1971 1854

INDUSTRIAL ARTS

MUSEUM

RESOURCES

A Directory of Selected
Centers

The University of the State of New York/The State Education Department
Bureau of Industrial Arts Education/Albany, New York 12224/1971

1855

THE UNIVERSITY OF THE STATE OF NEW YORK

Regents of the University (with years when terms expire)

1984	Joseph W. McGovern, A.B., LL.B., L.H.D., LL.D., D.C.L., Chancellor	New York
1985	Everett J. Penny, B.C.S., D.C.S., Vice Chancellor	White Plains
1978	Alexander J. Allan, Jr., LL.D., Litt.D.	Troy
1973	Charles W. Millard, Jr., A.B., LL.D., L.H.D.	Buffalo
1972	Carl H. Pforzheimer, Jr., A.B., M.B.A., D.C.S., H.H.D.	Purchase
1975	Edward M. M. Warburg, B.S., L.H.D.	New York
1977	Joseph T. King, LL.B.	Queens
1974	Joseph C. Indelicato, M.D.	Brooklyn
1976	Mrs. Helen B. Power, A.B., Litt.D., L.H.D., LL.D.	Rochester
1979	Francis W. McGinley, B.S., LL.B., LL.D.	Glens Falls
1980	Max J. Rubin, LL.B., L.H.D.	New York
1986	Kenneth B. Clark, A.B., M.S., Ph.D., Litt.D.	Hastings on Hudson
1982	Stephen K. Bailey, A.B., B.A., M.A., Ph.D., LL.D.	Syracuse
1983	Harold E. Newcomb, B.A.	Owego
1981	Theodore M. Black, A.B.	Sands Point

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Robert H. Bielefeld

Chief, Bureau of Industrial Arts Education
Arthur J. Dudley

FOREWORD

This publication is a directory of selected museum centers with categorized resources relating to technology. Their varied resources can fulfill an important educational role in the interpretation of our technologically oriented society.

Assuming that information about museums and their resources was not generally available to educators a study was undertaken by B. John Ross, associate, Bureau of Industrial Arts Education, to relate museum resources to instructional programs. The recommendations of both industrial arts and museum professionals were used in compiling the material included in this publication.

Guiding principles for utilizing museum resources and a directory listing of museums with resources relating to technology have been extracted from the study. Suggested activities for students, teachers, supervisory personnel, administrators, and teacher educators have been identified.

These guidelines and directory of centers were planned as a selective resource rather than an exhaustive treatment of all museums within the State. Use of this publication should lead the professional toward further exploration of similar resources as supplements to instruction.

CONTENTS

	Page
Foreword	iii
Guidelines	1
Onsite Visitations	1
Loan Materials	2
Inservice Programs	3
Resource Persons	4
Consultive Services	5
Activities	6
Onsite Visitations	7
Loan Materials	8
Inservice Programs	9
Resource Persons	11
Consultive Services	12
Other Aids to Utilization	12
Organizations	13
Directories	15
Location of Museums	17
Illustration	17
Museums and Historical Societies	18
Binghamton Area	18
Buffalo Area	20
Capital District	22
Elmira Area	25
Mid-Hudson Area	27
Mohawk Valley Area	29
New York City	31
Nassau-Suffolk District	33
Northern Area	36
Rochester Area	39
Syracuse Area	42
Westchester-Rockland District	44

A design for educational change provides for a degree of flexibility and adaptability of method to meet the needs of each locality. General guidelines aid educators in strengthening their individualized programs through the utilization of appropriate resources and services of museums.

Procedures for planned effective utilization need to include:

- Preliminary preparation.
- Preliminary discussion of instructional objectives.
- Utilization of the resources and/or services.
- Followup activity and evaluation relating to objectives.
- Followup activities initiated and/or continued as a result of utilization experiences.

Onsite Visitations

Trips by individuals or groups, extended research "on location," or special tasks with organizations outside the school are accepted and essential parts of education at various instructional levels. The visit to a museum represents a dynamic learning situation in which experiences can be completely realistic. Guidelines chart helpful suggestions for effective planning and implementation of these stimulating experiences:

1. Provide opportunities for student participation in the planning of field trips to area museums.
2. Determine distances to and from the museum and arrange for transportation.
3. Preview the museum resources to determine appropriate resources and plan for the orientation of students.

4. Make necessary reservations and arrange details well in advance of the visit. Availability of restrooms and eating facilities should be noted.

5. Establish objectives and guidelines for behavior of students and safety on the trip. Cooperative plans involving students are desirable.

6. Initiate and accomplish the necessary requests for transportation, records of students leaving the school for trip, and permission statements from parents.

7. Establish specific purposes for visiting the museum, suggest activities for student involvement, and assign specific responsibilities to individuals within the group.

8. Document the onsite activities as a basis for evaluation at a later time. Include such items as arrival and departure times, persons contacted and/or who assisted the group, highlights of the visit, problems encountered, conduct, and reactions of the group.

9. Review and reinforce the onsite visit with appropriate activity related to the objectives established for the learning experience.

10. Provide followup experiences through discussion, construction projects, developed displays, scrapbooks and/or reports, notes of appreciation, library and/or related research, and further museum research for the group or individuals.

Loan Materials

Museum professionals have developed a wide range of loan materials to supplement instructional programs. This capacity is represented by audiovisual resource materials, loan kits, and mobile display units. The resources of museums and know-how of museum professionals are extended through these means to many who for numerous reasons cannot visit the museum itself. Museum professionals have established procedures for intermuseum loans which generally are appropriate to school/museum relationships as well. Those related to expenses, insurance, preservation, reproduction, credit,

and recordkeeping follow:

1. Maintain reference files of appropriate museum loan materials and exhibits which are available.

2. Select loan materials appropriate to the support of instructional objectives, individual research, display, and promotion of learning in industrial arts education.

3. Determine the feasibility of use and cost as related to such details as availability, transportation, packing and handling, and insurance.

4. Plan for the need to protect loan materials from such hazards as fire, exposure to deteriorating light, extremes in temperature, dirt, theft, insects, or mishandling.

5. Refrain from altering loaned items through such activities as treatment, cleaning, repairing, or remounting.

6. Duplicate packaging procedures when returning loaned items to the lender.

7. Keep records of loan utilization and note relevance of the resource to supplement instruction.

8. Assure a businesslike relationship between museums and schools by maintaining records and receipts of loan transactions.

9. Evaluate the utilization of loan materials relating to instructional concepts. Records should be reviewed periodically to insure appropriate choice of resources in the future.

10. Communicate loan needs and evaluative results with museum professionals in order that coordinated loan services may be effective.

Inservice Programs

University programs and locally oriented courses should support the efforts of teachers to extend educational opportunities for students. The following practices are important to the implementation of appropriate formal and informal experiences of an inservice nature:

1. Review recent college catalogs, museum brochures, and supplemental resource center releases in order

to become acquainted with museum related educational programs for educators.

2. Apprise administrators of inservice needs and involve them in the promotion of inservice opportunities planned in cooperation with museum professionals.

3. Establish inservice programs with appropriate credit in keeping with staff responsibilities and salary schedules.

4. Secure the cooperation of service and/or parent-teacher organizations in efforts to promote educational programs mutually beneficial to the school district and area museums.

5. Review identified experiences outlined as inservice opportunities relating to utilization of museum resources and make choices according to individual needs.

6. Evaluate the appropriateness of inservice activities as they affect teacher performance in utilizing the resources and services of museums.

7. Involve museum professionals in the planning, implementation, and evaluation of inservice programs.

8. Include the topic of museum resources and services on the agenda for department and enlarged staff meetings.

9. Publicize the inservice relationships as cooperative action by school and area museums to affect improved educational experiences for students.

Resource Persons

The utilization of museum professionals can add a great deal to the instructional program. It can be an effective learning experience and profitable for all persons involved. Several guidelines will underscore the importance of proper utilization of human resources to supplement instruction:

1. Become familiar with school policy relative to the use of resource persons before extending them an invitation to visit your school and contribute to the instructional program.

2. Consider the possibilities of using resource persons in other classes in the school or as appropriate to large group situations.

3. Establish specifics regarding the time of day, date, and topic of discussion well in advance and communicate these to the resource persons.

4. Share final arrangements for using resource persons with colleagues and with superiors. Such information should aid publicity and circumvent possible embarrassment.

5. Identify specific discussion/demonstration topics for the resource persons and note specifics to be avoided if appropriate. Refrain from stringent restrictions that would limit their effectiveness.

6. Orient the speakers/demonstrators to the audience they will serve. Attention span and abilities of students suggest various approaches and time limits.

7. Assist resource persons in programing material to the level of the learners. A presentation/demonstration above or below student capability destroys any positive good for many.

8. Secure advance permission to tape or videotape presentations of resource persons for later use.

9. Prepare the audience before the resource persons arrive. Preparation should include biographical material about the persons and appropriate orientation to the presentation/demonstration.

10. Treat resource persons as guests of the school. Orient them to the building and introduce them to appropriate administrators.

11. Provide opportunity for members of the audience to thank resource persons for their contributions. Verbal appreciation at the time of presentation and/or written thank you letters provide effective teaching/learning situations.

Consultive Services

The special knowledge and skills which museum professionals possess may be considered as appropriate resources for strengthening educational programs. Therefore, it is important that the consultive services of these specialists be used wisely.

1. Request the advice and technical assistance of museum professionals when other sources cannot fulfill the instructional needs.

2. Involve administrators as leaders and coordinators when seeking consultation from museum professionals.

3. Share information and technical skill with museum professionals as appropriate to their knowledge of the school's curricular offerings.

4. Publicize the results of consultation with museum professionals, as they affect the quality of educational opportunities in the school district.

Activities Utilizing Museum Resources and Services

Planned learning experiences for students and the instructional methods of teachers, coordinating personnel, and teacher educators should be focused on a goal of providing maximum technological adaptability for each individual. The resources and services of museums as appropriate to industrial arts education can supplement the instructional experiences supporting this goal.

Suggested activities related to the identified methods of using museum resources and services are provided for students, teachers/chairmen/supervisors, and teacher educators. The knowledge and teaching skills of dedicated educators are necessary if the resources and services of museums are to be utilized effectively. Future evaluation of learning outcomes may be measured to a degree by the efforts which have been extended to improve programs through use of museum resources. The following activities are descriptive in nature and should not exhaust the imagination nor limit the usage of any one method and/or individual. The interrelationships of people and museum related activities are to be encouraged as prelude to innovative utilization.

Suggested activities are incorporated at this point in the plan in hopes that the reasoning and the stated practices of use will strengthen their implementation.

Onsite Visitations

For Students:

- Plan out-of-class independent research in a selected area of study to result in a term report, presentation to a class or other peer group, etc.
- Take group visits to experience realistic learning through planned involvement with museum resources.
- Engage in individual research concerned with the historical development of tools, machines, processes, and products.
- Assist in planning for a class visit and/or arrange for resource persons to visit the school or college.
- Visit as a recreational experience incidental to a specific learning task related to industrial arts.
- Visit for study related to other subject disciplines.

For Teachers/Chairmen/Supervisors:

- Utilize research facilities in support of formal undergraduate and/or graduate programs.
- Document available museum resources as a coordinated effort to identify instructional resources in the community.
- Correlate museum resources and services with instructional units.
- Obtain relevant background for authenticating instruction.
- Develop audiovisual materials using the resources of the museum.
- Make comparative studies of past, present, and futuristic stages of man's technological development.

- Provide accurate data for the interpretation of design characteristics and/or dimensions of such items as period furniture.

- Clarify scientific and/or mathematical principles relative to technological advancement in society.

- Document man's achievement and the accompanying societal changes brought about by advancing technology.

- Plan means for involving students in the learning experiences which museum visits can provide.

For Teacher Educators:

- Supplement instruction as it relates to the training of professionals charged with implementing industrial arts programs.

- Plan the involvement of students in using museum resources as an integral part of their undergraduate and graduate study.

- Plan cooperative programs for sharing technological information with museum professionals.

- Provide for student learning experiences in the environment of the museum as a part of their training.

- Organize and plan for the involvement of museum personnel in the instructional programs of the college/university.

Loan Materials

For Students:

- Participate in the location of artifacts for improving museum collections.

- Use loan materials to help identify and evaluate self-interests.

- Develop a showcase and/or bulletin board display using loan materials.

For Teachers/Chairmen/Supervisors:

- Coordinate audiovisual materials with instructional units.
- Develop learning units around loan materials from the museum.
- Organize special exhibits for special occasions, back-to-school nights - "open house."
- Plan for traveling exhibits to be brought to the school.
- Use loan materials as educational resources for students with special educational needs.
- Incorporate museum resources as reference for product planning related to individual and/or group activity.

For Teacher Educators:

- Coordinate special exhibits utilizing museum resources.
- Use loan materials as selected research projects for students.
- Work with museum educators to develop programs for providing appropriate audiovisual experiences and development of kit materials relating to industrial arts education.

Inservice Programs

For Students:

- Identify persons in the community with capabilities and special talents appropriate to industrial arts education.
- Serve as aids to museum personnel in museum operations.
- Assist school personnel in the use of museum resources and services.

For Teachers/Chairmen/Supervisors:

- Arrange professional meetings in museum facilities as a means of becoming familiar with museum resources.
- Prepare and include appropriate references for the utilization of museum resources and services as part of locally developed course outlines.
- Volunteer and/or seek part-time employment in museums as a method of self-help in becoming knowledgeable about museum resources and services.
- Join and participate in museum organizations as appropriate to individual educational needs.
- Help to restore and/or prepare museum exhibits.
- Plan and coordinate museum educational programs for teachers.
- Prepare and/or revise guidelines relating to museum resources and services as appropriate to the local district.

For Teacher Educators:

- Include appropriate museum personnel as participants in seminar classes.
- Invite museum professionals to staff meetings.
- Participate in museum organizations.
- Arrange formal inservice workshop sessions on the topic of using museum resources and services.
- Write articles for professional journals relating to museum resources as appropriate to instruction.
- Prepare and incorporate information about museum resources in college catalogs and brochures as supportive of the teacher training opportunities and resources.

Resource Persons

For Students:

- Participate in extra classroom activities at the school such as a speaker, demonstrator, and/or teacher.
- Provide learning experiences at the museum as interpreter.
- Assist in the directed learning of individuals as a research arm for the students.

For Teachers/Chairmen/Supervisors:

- Provide supplemental instruction in specific areas.
- Incorporate museum references in the shop/laboratory reference section and the main library of the school.
- Interpret loan exhibits.
- Help to coordinate curricular efforts and related guidelines by incorporating appropriate museum resources and services.
- Demonstrate and/or lecture to classes.
- Serve as liaison between educators and museum leadership.

For Teacher Educators:

- Work with individuals or groups on specific problems relating to instruction or long term research projects.
- Assist in providing museum information to the college/university staff.
- Review curricular needs and incorporate revisions into teacher training programs.

Consultive Services

For Students:

- Consult with museum professionals in regard to career choices, interpretation of museum resources, and/or assistance with technical problems within the capabilities of the museum professional.

For Teachers/Chairmen/Supervisors:

- Interpret special learning situations and utilize the technical know-how of museum specialists for innovative learning experiences.
- Assist in the design of inservice programs.
- Seek approval and assistance in developing informational brochures for coordinating museum services.
- Obtain advice for development of museum related programs for students with special needs.

For Teacher Educators:

- Coordinate total educational learning experiences.
- Assist in the development of teaching/learning capabilities for serving instructional needs of students at selected levels of learning.

Other Aids to Utilization

Membership organizations and directory type references provide support for the implementation of programs utilizing the resources and services of museums. The services of the organizations identified may be appropriate and current to the needs of educators and/or their students. Selected directory materials extend the possibilities of supplementary resources through more extensive definition of museums, their resources, and services. Organizations and references listed on the following pages are those with which the investigator is personally familiar. They should not be considered as representing all organizations with similar objectives nor is there any attempt to minimize the value of other directory references available from other sources.

Museum/Educational Organizations

American Association of Museums
2233 Wisconsin Avenue, N.W.
Washington, D.C. 20007

Nonprofit educational organization serving the interests of museums and the museum profession throughout the United States and Canada. (Founded in 1906.)

Membership: Institutions, libraries, individuals, and donors. Regular individual membership $15 a year.

Publication: Museum News is published monthly, September through June. Copies are mailed to all members.

Benefits: Subscription of Museum News; current information on museums and their programs throughout the United States. Members receive discount prices on Association publications.

Early American Industries Association, Inc.
P.O. Box 199
Williamsburg, Virginia 23185

Nonprofit organization whose purpose is to encourage a better understanding and appreciation of early American industries in the home, on the farm, in the shop, and on the sea.

Membership: Active memberships (new not accepted directly); associate memberships; and subscription memberships.

Publication: The Chronicle, published quarterly (March, June, September, and December), is sent to all members.

Benefits: Subscription to The Chronicle (all members); active members may hold office and vote; associate members are eligible for active membership as vacancies occur; subscription membership entitles members to the Association's publication.

New York State Association of Museums

Membership organization restricted to museum directors and/or executive officers.
Note: It is listed in order to highlight the regional coordination activities of museum professionals in New York State.

New York State Historical Association
Fenimore House
Cooperstown, New York 13326

Membership organization chartered by the Board of Regents of the State of New York; carrying on an active program in many fields of interest to those who are historically minded. (Organized in 1899.)

Membership: Individual adults: annual dues individual $7.50; junior $1.50; and joint membership, if husband and wife $7.50.

Publication: New York History, published quarterly (January, April, July, October) is sent without charge to members of the Association.

Benefits: Subscription to New York History; free admission to the museums (administered by the Association); use of the library discount on certain publications sold in the book shop; and fellowship with others interested in New York State and local history.

Yorker Club
Yorkers
New York State Historical Society
Cooperstown, New York 13326

Junior membership organization of the New York State Historical Association, a nongovernmental educational institution chartered by the Board of Regents of the State of New York.

Membership: Young persons, 18 years of age or less. Yorker Club member dues $1 a year; individual Yorkers $1.50 a year. High school graduates may continue as alumni members by applying directly to the Association.

Publication: The Yorker is issued five times during the school year by the Association for its junior membership.

Benefits: Subscription to The Yorker; free admission to the Association's museums in Cooperstown, Fenimore House, The Farmers' Museum, and The Carriage and Harness Museum.

Directories of Museums and Other Resources

American Association of Museums and the Smithsonian Institution, Museums Directory of the United States and Canada. Washington: American Association of Museums, 1965, 1039 pp.

A comprehensive directory containing 4,956 listings of museums. A revision of the directory is currently in process (1970).

Board of Education of the City of New York, A Guide to Some Educational Resources in the City of New York. New York: Board of Education, 1954, 107 pp.

A directory of the educational resources in museums, libraries, parks, zoos, and historic sites; and in certain government agencies, public utilities, and organizations. It includes suggestions for the way these resources can be used as part of the school curriculum.

Katz, Herbert and Marjorie Katz, Museums U.S.A., A History and Guide. Garden City: Doubleday & Company, Inc., 1965, 395 pp.

A background and historical treatment of art, science, history, children, and an infinite variety of museums. The appendix listing by state and city identifies more than 2,500 museums.

McDarrah, Fred W., Museums in New York. New York: E. P. Dutton & Company, 1967, 319 pp.

A descriptive reference guide to 79 fine art museums, local history museums, specialized museums, libraries, botanical and zoological parks, commercial collections, and historic houses and mansions open to the public within the five boroughs of New York City. Text and 200 photographs.

Museums Council of New York City, Museums of New York City, 1970-71. New York: The American Museum of Natural History, 1970, 12 pp.

A pocket-sized directory of art museums, botanical gardens, museums of art and science, historic houses, historical museums, science museums, and zoological parks and aquarium. Address, telephone numbers, subway/bus routes, and descriptive information are provided for each listing.

The University of the State of New York, Organization and Institutions of the University of the State of New York, Handbook 24d. Albany: The State Education Department, 1967-68, 1968-69, 59 pp.

A directory of public libraries, historical societies, and museums in the State of New York.

New York State Conservation Department, The New York State Historic Trust. Albany: New York State Conservation Department, n.d., 22 pp.

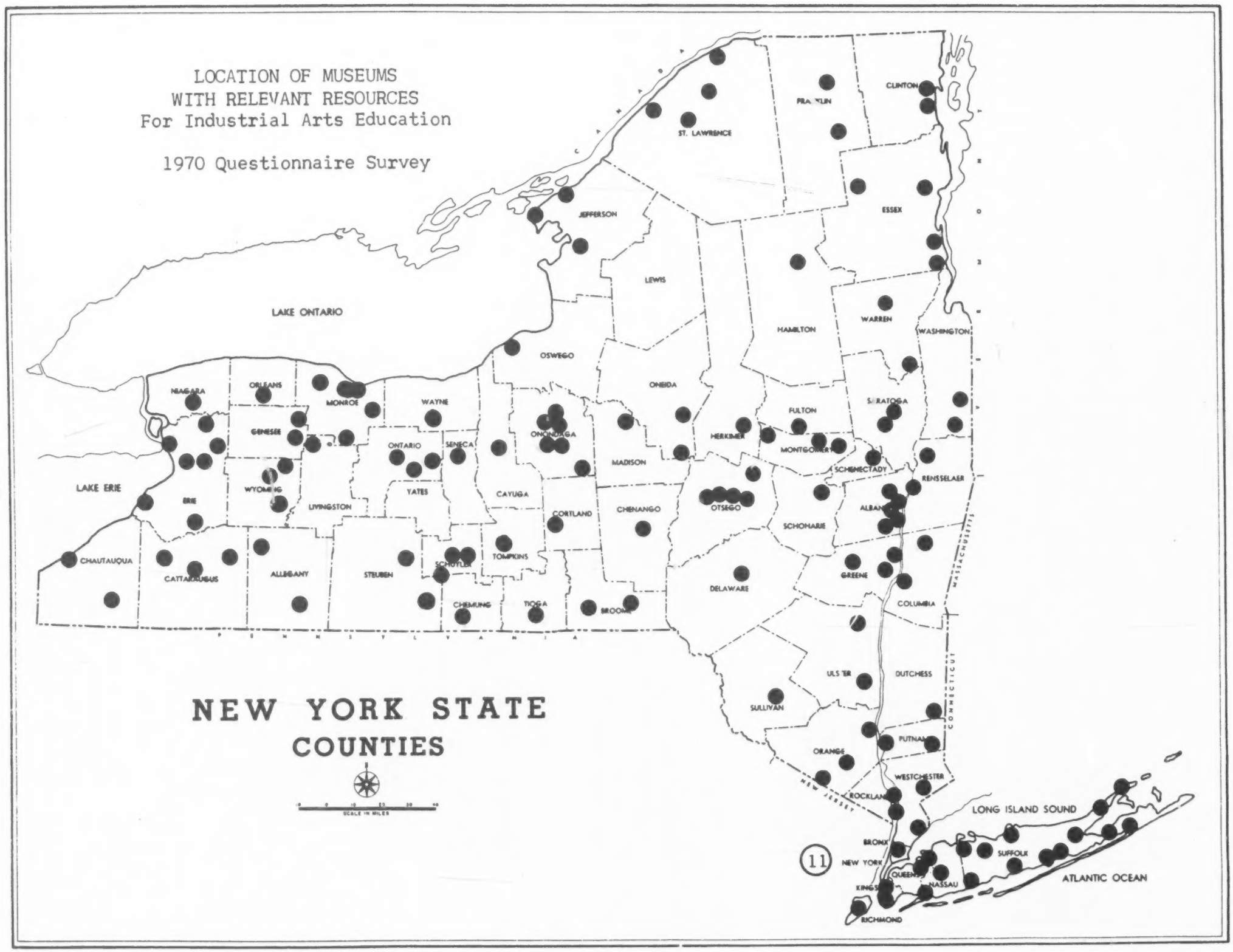
A brief background of New York State and a statement of position regarding historic preservation. Historic sites under the jurisdiction of the New York State Historic Trust are identified and geographically plotted.

State of New York, New York State Vacationlands. Albany: Department of Commerce, 1969, 96 pp.

A colorful booklet describing New York State's 11 vacation areas. General information about the area precedes descriptive listings of where to go and what to see.

Note to Users of the Plan:

The preceding has been developed as a descriptive rather than a prescriptive plan for action. Imagination, initiative, and resultant implementation will serve as basic criteria for future evaluation.


LOCATION OF MUSEUMS
WITH RELEVANT RESOURCES
For Industrial Arts Education
1970 Questionnaire Survey
NEW YORK STATE
COUNTIES
LAKE ONTARIO
LAKE ERIE
LONG ISLAND SOUND
ATLANTIC OCEAN
ST. LAWRENCE
FRANKLIN
CLINTON
ESSEX
JEFFERSON
LEWIS
HAMILTON
WARREN
WASHINGTON
OSWEGO
ONEIDA
SARATOGA
NIAGARA
ORLEANS
MONROE
WAYNE
FULTON
GENESEE
ONONDAGA
HERKIMER
MONTGOMERY
ONTARIO
SENECA
MADISON
SCHENECTADY
RENSSELAER
WYOMING
YATES
CAYUGA
ERIE
LIVINGSTON
CORTLAND
CHENANGO
OTSEGO
SCHOHARIE
ALBANY
CHAUTAUQUA
TOMPKINS
CATTARAUGUS
ALLEGANY
STEUBEN
SCHUYLER
GREENE
DELAWARE
CHEMUNG
TIOGA
BROOME
COLUMBIA
ULSTER
DUTCHESS
SULLIVAN
PUTNAM
ORANGE
WESTCHESTER
ROCKLAND
BRONX
NEW YORK
QUEENS
KINGS
NASSAU
SUFFOLK
RICHMOND
PENNSYLVANIA
MASSACHUSETTS
CONNECTICUT
NEW JERSEY
SCALE IN MILES
11

1875

MUSEUMS AND HISTORICAL SOCIETIES
WITH RESOURCES APPROPRIATE FOR
INDUSTRIAL ARTS EDUCATION

Compiled from Responses to 1970 Questionnaire Survey
of Museums and Historical Societies

Arranged by Economic Areas

Binghamton Area

Broome County

Organization	Resource Categories	Other Features
Roberson Center for the Arts & Sciences 30 Front Street Binghamton 13905	Early American industry Products of the craftsman Development of hand tools and their uses Transportation	Planetarium Craft shop Vocational information
The Old Onaquaga Historical Society Box 24 Ouaquaga 13826	Early hand tools and their development Early American industries Products of the craftsman	Museum located in basement of Saint Luke's Episcopal Church, a historic landmark

Chenango County

Chenango County Historical Society Silver and Rexford Streets Norwich 13815	Early hand tools and their development Early American industries Products of the craftsman Products of modern industry Raw materials Industrial processes	Early clothing (1800's) Exhibits of industries, railroad, and the Chenango Canal

NOTE: The resources identified in this directory represent various supplemental aids to industrial arts education. Educators should become familiar with specific details relating to each organization and its resources as appropriate to utilization in their programs.

Binghamton Area (Continued)

Delaware County

Organization	Resource Categories	Other Features
Delaware County Historical Association Delhi 13753	Early hand tools and their development Early American industries	Historic house

Otsego County

Cherry Valley Historical Association Main Street Cherry Valley 13320	Early hand tools and their development Early American industries Products of the craftsman	Iron farm implements Historic house Old fire engines
Cooperstown Indian Museum 1 Pioneer Street (P.O. Box 123) Cooperstown 13326	Development of hand tools and their uses Products of the craftsman Raw materials of industry	Indian artifacts Dioramas of Indian village life
Historical Society of Early American Decoration, Inc. c/o New York State Historical Association Cooperstown 13326	Early hand tools and their development Products of the craftsman	Decorated articles located in the Farmers' Museum
New York State Historical Association Lake Road Cooperstown 13326	Development of hand tools and their uses Early American industry Products of the craftsman Transportation	Agricultural history Historic house Folk art Carriage and Harness Museum Preservation project Early craft shops
The Town of Middlefield Historical Association Middlefield 13405	Early hand tools and their development Early American industries	Museum undergoing complete renovation

Binghamton Area (Continued)

Tioga County

Organization	Resource Categories	Other Features
Tioga County Historical Society 110-112 Front Street Owego 13827	Early hand tools and their development Early American industries Products of the craftsman	Gun collection Examples of 19th century architecture (doorway)

Buffalo Area

Cattaraugus County

Cattaraugus Area Historical Society 23 Main Street Cattaraugus 14719	Early hand tools and their development Early American industries Products of the craftsman	Booklets on area history available (Open by appointment)
Ellicottville Historical Society Washington Street Ellicottville 14731	Early American industry Development of hand tools and their uses Products of modern industry Development of machine tools and their uses Products of the craftsman	Program curtailed due to fire 8/22/69
Ischua Valley Historical Society R.D. #1 Franklinville 14737	Early hand tools and their development Early American industries Products of the craftsman	Ironstone china Hand woven articles Early agricultural tools Tools for making maple sugar

Chautauqua County

Chautauqua County Historical Society Westfield 14787	Early hand tools and their development	History of Chautauqua County Historic house Period furniture
Fenton Historical Society 68 South Main Street Jamestown 14701	Products of modern craftsman	Products of Jamestown industry

Buffalo Area (Continued)

Erie County

Organization	Resource Categories	Other Features
Alden Historical Society 13213 Broadway Alden 14004	Early hand tools and their development Machines and their development Early American industries Products of the craftsman Power/energy uses Labor/management	(Open by request)
Aurora Historical Society, Inc. East Aurora 14052		Aurora woolen mill Early sewing with materials and old time equipment
Buffalo and Erie County Historical Museum 25 Nottingham Court Buffalo 14216	Early American industry Transportation Development of hand tools and their uses Products of the craftsman Communications	Industry Marine Transportation items
Concord Historical Society (Pop Warner Museum) 98 East Main Street Springville 14141	Early hand tools Products of the craftsman	Historical collection of Town of Concord Indian baskets
Historical Society of the Town of Clarence Clarence 14031	Early hand tools and their development Early American industries Products of the craftsman Products of modern industry Raw materials	Local Indian and military items
The Orchard Park Historical Society 4 Faahs Drive Orchard Park 14127	Early hand tools and their development Early American industries Products of the craftsman Raw materials	Farm tools Displays depicting "The Homespun Age"

Buffalo Area (Continued)

Erie County (Continued)

Organization	Resource Categories	Other Features
Town of Evans Historical Society 9599 Erie Road Angola 14006	Early hand tools and their development Free enterprise	Historic house

Niagara County

Niagara County Historical Society, Inc. 215 Niagara Street Lockport 14094	Early hand tools and their development Products of the craftsman	Lockport glass Collection American glass candlesticks

Capital District

Albany County

Albany Institute of History and Art 125 Washington Avenue Albany 12210	Products of the craftsman	Collections on the history of art
Little Red Schoolhouse Historical Society Coeymans Hollow 12046	Early hand tools and their development Products of the craftsman	Documents pertaining to the school and vicinity of the Town of Coeymans
New York State Museum Washington Avenue Albany 12224	Raw materials of industry Development of hand tools and their uses Early American industry Products of the craftsman Transportation	Shaker collection Crafts Transportation items
Office of State History State Education Department Albany 12224	Early American industry Products of the craftsman Transportation Development of hand tools and their uses Development of machine tools and their uses	Military items

1880

Capital District (Continued)

Albany County (Continued)

Organization	Resource Categories	Other Features
Town of Bethlehem Historical Association Cedar Hill Selkirk 12158	Early hand tools and their development Early American industries	Town of Bethlehem old industry

Rensselaer County

Knickerbocker Historical Society, Inc. P.O. Box 1363 Schaghticoke 12154	Early hand tools and their development Products of the craftsman	Collection of early farm tools and implements Collection of old photographs Program of media available for school use
Rensselaer County Historical Society 59 Second Street Troy 12180	Products of the craftsman	Primarily 1800-1850 furniture and silver

Saratoga County

Ballston Spa Area Historical Society 36 Church Avenue Ballston Spa 12020	Products of the craftsman Early American industry Development of hand tools and their uses	Geological records
Historical Society of Saratoga Springs 34 Lefferts Street Saratoga Springs 12866	Early American industries	Rare collection of china Examples of Sheraton, Hepplewhite, Queen Anne, Duncan Phyfe, and Empire Furniture

Schenectady County

Schenectady County Historical Society 32 Washington Avenue Schenectady 12305	Early hand tools and their development	Furniture, children's room, Indian room, etc.

Capital District (Continued)

Schoharie County

Organization	Resource Categories	Other Features
Schoharie County Historical Society Old Stone Fort Museum P.O. Box 68 Schoharie 12157	Early hand tools and their development Products of the craftsman	Indian artifacts Early American household furnishings Firearms (Pre-Revolution through Civil War)

Warren County

Glens Falls Historical Association 348 Glen Street Glens Falls 12801	Early hand tools and their development Early American industries Products of the craftsman Power/energy uses	Lumbering Transportation by canal boat Spier Falls Dam (hydroelectric)
Historical Society of the Town of Chester, Inc. Town Hall Chestertown 12817	Early hand tools and their development Early American industries Products of the craftsman	Country store with original and authentic artifacts

Washington County

Cambridge Historical Society, Inc. 12 Broad Street Cambridge 12816	Early hand tools and their development Machines and their development Early American industries Products of the craftsman Raw materials Free enterprise system	Early military and hunting weapons Early firefighting apparatus
Old Red Barn Star Route Salem 12865	Development of hand tools and their uses Early American industry Products of the craftsman	Americana Firearms War relics Clocks

Capital District (Continued)

Washington County (Continued)

Organization	Resource Categories	Other Features
Skenesborough Museum The Boulevard Whitehall 12887	Transportation Products of modern industry Development of hand tools and their uses	Models of first U.S. shipyard Exhibits relating to the birthplace of the U.S. Navy Model of U.S.S. Saratoga

Elmira Area

Allegany County

Rushford Historical Society Main Street Rushford 14777	Early hand tools and their development Some products of the craftsman	Small farm equipment Dishes and household items
Thelma Rogers Genealogical and Historical Society Dyke Street Wellsville 14895	Early hand tools and their development	Home furnishings Early history of the area

Chemung County

Chemung County Historical Society, Inc. 304 William Street Elmira 14901	Early hand tools and their development Machines and their development Early American industries Products of the craftsman Products of modern industry Power/energy uses Free enterprise system	Indian items Biographical sketches Mark Twain collection

Schuyler County

American Life Foundation and Study Institute Irelandville Watkins Glen 14891	Early hand tools and their development Early American industries Products of the craftsman	Publications on Americana

Elmira Area (Continued)

Schuyler County (Continued)

Organization	Resource Categories	Other Features
Schuyler County Historical Society, Inc. Odessa 14869	Early hand tools and their development Products of the craftsman	Brochures of early industry One room school restored with early furnishings

Steuben County

Corning Glass Center and Museum of Glass Corning 14830	Products of the craftsman Early American industry Products of modern industry	Art and history of glass Craftsmen fashion and engrave Steuben crystal
Glenn Curtiss Museum of Local History Corner of Lake & Main Streets Hammondsport 14840	Development of hand tools and their uses Early American industry Power/energy sources Transportation	Early aircraft types including a 1911 Curtiss pusher and World War I "Jenny" Early motors
Hornby Historical Society R.D. #3 Beaver Dams 14812	Early hand tools and their development Machines and their development Early American industries Products of the craftsman	Small country schoolhouse

Tompkins County

DeWitt Historical Society of Tompkins County, Inc. Old Court House Ithaca 14850	Early hand tools and their development Machines and their development Early American industries Products of the craftsman Products of modern industry Power/energy uses	Farm and domestic items Old clothing

Mid-Hudson Area

Columbia County

Organization	Resource Categories	Other Features
American Museum of Fire Fighting Harry Howard Avenue Hudson 12534	Products of the craftsman Early American industry Development of hand tools and their uses Transportation Power/energy sources	Fire-fighting equipment and related materials
The Shaker Museum Shaker Museum Road Old Chatham 12136	Development of hand tools and their uses Early American industry Products of the craftsman Development of machine tools and their uses Raw materials of industry	Repository of furniture for study of style, construction, finish, etc. Buildings, shops, and living quarters depicting Shaker industry and everyday life

Dutchess County

Historical Society of Quaker Hill and Vicinity Quaker Hill Pawling 12564	Early hand tools and their development	Spinning Candlemaking Woven products Surveying

Greene County

Bronck Museum - Greene County Historical Society R.D. Coxsackie 12051	Products of the craftsman Early American industry Development of hand tools and their uses	Furniture Farming equipment Craft items
Durham Center Museums, Inc. East Durham 12423	Development of hand tools and their uses Early American industry Transportation Products of the craftsman	Natural history Indian artifacts Geological and mineral collection

Greene County

Organization	Resource Categories	Other Features
Greene County Historical Society, Inc. Coxsackie 12051	Early hand tools and their development Early American industries	Local industries and crafts Small research library

Orange County

Historical Society Town of Warwick Warwick 10990	Development of hand tools and their uses Early American industry Transportation Products of the craftsman Communications	Furniture Glass Rifles Indian relics
Museum Village of Smith's Clove Monroe 10950	Products of the craftsman Development of hand tools and their uses Early American industry Raw materials of industry Transportation	Restoration depicting Age of Homespun Age of the Craft Shop Age of Industry
Washington's Headquarters Newburgh 12550	Products of the craftsman	Collections include weapons and homemade objects of the Revolutionary Period

Putnam County

Putnam County Historical Society 63 Chestnut Street Cold Spring 10516	Early hand tools and their development Machines and their development Early American industries Products of the craftsman Industrial processes	Historic schoolhouse Cold Spring's West Point Foundry
Southeast Museum Association, Inc. Main Street Brewster 10509	Early hand tools Products of the craftsman	Extensive collection of minerals Furniture used by early settlers Farm implements

Mid-Hudson Area (Continued)

Sullivan County

Organization	Resource Categories	Other Features
Sullivan County Historical Society 11 Bank Street Monticello 12701	Early hand tools and their development	Tannery Suspension bridge model

Ulster County

Historical Society of Woodstock, Inc. Route 1, Box 506 Woodstock 12498	Early American industries Products of the craftsman Products of modern industry	Diorama showing how bluestone was quarried Ice harvesting Catskill Mountain folklore
Huguenot Historical Society P.O. Box 339 New Paltz 12561	Early American industries Products of the craftsman Raw materials Free enterprise system	Houses dating 1692-1712 Farm museum 4 miles out of town
Ulster County Historical Society Route 209, R.D. #3 Marbletown Kingston 12401	Early hand tools and their development Early American industries	Historic house

Mohawk Valley Area

Fulton County

Johnstown Historical Society 17 North William Street Johnstown 12095	Early hand tools and their development Machines and their development Early American industries Products of the craftsman Products of modern industry Raw materials Industrial processes	Glovemaking Sewing machines Leather gloves

Mohawk Valley Area (Continued)

Hamilton County

Organization	Resource Categories	Other Features
Adirondack Museum Blue Mountain Lake 12812	Transportation Products of the craftsman	Adirondack lumbering Boatbuilding Blacksmith's craft

Herkimer County

Little Falls Historical Museum, Inc. City Hall Little Falls 13365	Products of the craftsman	Harness shop tools Local materials

Montgomery County

Fort Klock Historic Restoration R.D. St. Johnsville 13452	Early hand tools and their development	General display Historic house
Old Fort Johnson Fort Johnson 12010	Development of hand tools and their uses Products of the craftsman Early American industry	Indian artifacts Mohawk Valley articles and weapons from 17th, 18th, 19th centuries
Walter Elwood Museum, Amsterdam School District 300 Guy Park Avenue Amsterdam 12010	Development of hand tools and their uses Early American industry	Children's museum American and Indian material

Oneida County

Oneida Historical Society 318 Genesee Street Utica 13502	Early hand tools and their development	American Indian artifacts Household artifacts Military items 19th century medical equipment Farm implements
Upstate Antique Auto Museum Route 20 Bridgewater 13313	Transportation Power/energy sources	Antique automobiles Bicycles Motorcycles

New York City

Bronx County

Organization	Resource Categories	Other Features
Bronx County Historical Society 3266 Bainbridge Avenue Bronx 10467	Early hand tools and their development Products of the craftsman	Indian tools and products Revolutionary War artifacts

Kings County

Brooklyn Children's Museum 1530 Bedford Avenue Brooklyn 11216	Products of the craftsman Development of hand tools and their uses Communications Transportation	Minerals, fossils Laboratory equipment Planetarium
Brooklyn Museum 188 Eastern Parkway Brooklyn 11238	Products of the craftsman Early American industry Development of hand tools and their uses	Period furniture Ceramics and pottery Industrial design

New York County (Manhattan)

American Museum of Natural History - Department of Education Central Park West at 79th Street New York 10024	Development of hand tools and their uses Products of the craftsman Raw materials of industry Power/energy sources	Anthropological developments of crafts and techniques Evidence of man's ingenuity
Cooper-Hewitt Museum of Decorative Arts and Design Third Avenue and Seventh Street New York 10003	Products of the craftsman	Textiles Drawings, prints Elements of design
Dyckman House Museum, Inc. 4881 Broadway New York 10034	Early hand tools and their development Early American industries Products of the craftsman	Hessian officer's hut Equipment of British and Continental armies

New York City (Continued)

New York County (Continued)

Organization	Resource Categories	Other Features
Museum of Contemporary Crafts 29 West 53rd Street New York 10019	Products of modern industry Products of the craftsman	Part of the American Crafts Council
Museum of Modern Art 11 West 53rd Street New York 10019	Products of modern industry	20th century examples of excellence in industrial design
Museum of the City of New York 1220 Fifth Avenue New York 10029	Early hand tools Products of the craftsman Products of modern industry Power/energy uses Free enterprise system	Culture and history of New York City
New York Fire Department Museum 104 Duane Street New York 10007	Development of hand tools and their uses Transportation Communications Power/energy sources Early American industry	Antique and historical fire equipment
Scalamandre Museum of Textiles 201 East 58th Street New York 10022	Products of modern industry Products of the craftsman	Textiles: originals and reproductions
The John H. Finley Museum of the Printed Word The New York Times 229 West 43rd Street New York 10036	Products of modern industry Communications	History of printing Production of newspapers
The New York Historical Society 170 Central Park West New York 10024	Products of the craftsman Transportation Early American industry Development of hand tools and their uses	History and development of American industry and crafts

New York City (Continued)

New York County (Continued)

Organization	Resource Categories	Other Features
The Seamen's Bank for Savings 30 Wall Street New York 10005	Transportation Products of the craftsman Early American industry	Ship models Scrimshaw

Richmond County

Staten Island Historical Society 302 Center Street Staten Island 10306	Development of hand tools and their uses Early American industry Transportation Products of the craftsman Raw materials of industry Communications	Preservation project (35 buildings comprising the Village of Richmondtown, 1695-1850)

Nassau-Suffolk District

Nassau County

Cow Neck Peninsula Historical Society 326 Port Washington Boulevard Port Washington 11050	Early American industries Products of the craftsman	Historic house Local documents
Historical Society of the Town of North Hempstead 220 Plandome Road Manhasset 11030	Hand tools and their development Products of the craftsman Products of modern industry Raw materials	Historic house (By appointment)
Nassau County Historical Museum Dwight D. Eisenhower Park East Meadow 11554	Development of hand tools and their uses Products of the craftsman Early American industry Transportation	Household articles Handcrafts Toys and games Aeronautics and military items

Nassau-Suffolk District (Continued)

Nassau County (Continued)

Organization	Resource Categories	Other Features
Old Grist Mill Historical Society of East Rockaway 160 Main Street East Rockaway 11518	Early hand tools and their development Machines and their development Early American industries Products of the craftsman	Historic mill
Bellport-Brookhaven Historical Society Box 112 Bellport 11713	Early hand tools and their development Machines and their development Products of the craftsman	Duck decoys Iceboats Early farm tools Early Sperry gyroscopes
Bridge Hampton Historical Museum Montauk Highway Bridge Hampton 11932	Development of hand tools and their uses Early American furniture Development of machines and their uses Products of the craftsman	Early gasoline engines Period rooms from early American to late Victorian Wheelwright shop

Suffolk County

Huntington Historical Society 2 High Street Huntington 11743	Early hand tools and their development Early American industries Products of the craftsman Raw materials	Historic house Folklore
Moriches Bay Historical Society Main Street East Moriches 11940	Early hand tools and their development Early American industries Products of the craftsman Raw materials Industrial processes Free enterprise system	Historic house (By appointment)

Nassau-Suffolk District (Continued)

Suffolk County (Continued)

Organization	Resource Categories	Other Features
Old Village Hall Museum 550 South Broadway Lindenhurst 11757	Early American industry Products of the craftsman Raw materials of industry Products of 1800's industry	Use of tools in home and industry (1800's)
Oysterponds Historical Society, Inc. Orient 11957	Development of hand tools and their uses Early American industry Products of the craftsman	Ship models and navigating instruments Furniture especially made for a family of dwarfs
Sayville Historical Society 39 Edwards Street Sayville 11782	Early American industry Development of hand tools and their uses Products of the craftsman	Marine occupations Local history
Smithtown Historical Society Route 25A Smithtown 11787	Early hand tools and their development Early American industries Products of the craftsman	Historic house
Southampton Colonial Society Main Street & Meeting House Lane Southampton 11968	Early hand tools and their development	Whaling exhibit Farming equipment Old schoolhouse
Southold Historical Society and Museum Main at Maple Southold 11971	Early hand tools and their development Products of the craftsman	Spinning equipment Battery and milkhouse items Sleighs and farm carts
Suffolk County Historical Society 300 West Main Street P.O. Box 689 Riverhead 11901	Early hand tools and their development	Farm implement display Blacksmith shop

Nassau-Suffolk District (Continued)

Suffolk County (Continued)

Organization	Resource Categories	Other Features
Suffolk Museum and Carriage House Stony Brook 11790	Products of the craftsman Development of hand tools and their uses Early American industry Transportation Raw materials of industry	Largest collection of horse drawn vehicles in world

Northern Area

Clinton County

Clinton County Historical Association Plattsburgh Public Library Plattsburgh 12901	Early hand tools and their development Products of the craftsman	Early architecture Early military history
Kent DeLord House 17 Cumberland Avenue Plattsburgh 12901	Early hand tools and their development Products of the craftsman	Early 19th century furniture

Essex County

Crown Point Reservation Crown Point 12928	Early American industry	Historic Crown Point Forts
Essex County Historical Society Route 9 Elizabethtown 12932	Early hand tools and their development Machines and their development Early American industries Products of the craftsman Products of modern industry Raw materials Industrial processes Power/energy uses	Displays on iron mining, agriculture, trapping, forestry, old vehicles

Northern Area (Continued)

Essex County (Continued)

Organization	Resource Categories	Other Features
Fort Ticonderoga Ticonderoga 12883	Early hand tools and their development Early American industries Products of the craftsman	Military memorabilia of the Colonial and Revolutionary Wars
Lake Placid-North Elba Historical Society Averyville Road Lake Placid 12946	Early hand tools and their development Products of the craftsman	Pioneer craftsmanship
The Penfield Foundation, Inc. Ironville Crown Point 12928	Early American industries Products of the craftsman Industrial processes Power/energy uses Free enterprise system	Historic house Material relating to local iron industry

Franklin County

Franklin County Historical and Museum Society 216 East Main Street Malone 12953	Early hand tools and their development Machines and their development Early American industries Products of the craftsman	General store Period furniture
Six Nations Indian Museum Onchiota 12968	Products of the craftsman	Special emphasis on Six Nations Indians Dwellings Types of fires

Jefferson County

Cape Vincent Historical Room Community House Market Street Cape Vincent 13618	Development of hand tools and their uses Products of the craftsman	Artifacts, pictures, and printed material of early history and local industry Records to aid genealogical research

Northern Area (Continued)

Jefferson County (Continued)

Organization	Resource Categories	Other Features
Jefferson County Historical Society 228 Washington Street Watertown 13601	Power/energy sources Early American industry Development of machine tools and their uses Development of hand tools and their uses	Exhibits of American Indians and early French settlement
Thousand Islands Museum Riverside Drive Clayton 13624	Early hand tools and their development Early American industries Products of the craftsman Raw materials	Boat and shipbuilding Lapidary rock exhibit

St. Lawrence County

History Center, St. Lawrence County P.O. Box 43 Canton 13617	Raw materials of industry Early American industry Power/energy sources Development of hand tools and their uses Transportation Communications	Mining exhibits
Macomb Historical Association R.D. Heuvelton 13654	Early hand tools and their development Early American industries Products of the craftsman	Pioneer life
Norwood Historical Association and Museum 39 North Main Street Norwood 13668	Early American industries	Exhibits pertaining to history of Norwood

Northern Area (Continued)

St. Lawrence County (Continued)

Organization	Resource Categories	Other Features
Town of Massena Museum Main Street Massena 13662	Development of hand tools and their uses Early American industry Products of modern industry Power/energy sources Transportation Communications Labor/management	Tools and clothing of pioneer times

Rochester Area

Genesee County

The Bergen Historical Society 24 Clinton Avenue Bergen 14416	Early hand tools and their development Early American industries Products of the craftsman	Early farm equipment Early household utensils Reference library
LeRoy Historical Society 23 East Main Street LeRoy 14482	Early hand tools and their development Early American industries Products of the craftsman	Historic house Early household furnishings Morganville Pottery Vehicles

Livingston County

Big Springs Historical Society Main Street Caledonia 14423	Early hand tools and their development	Farm items Materials from the homes of early Scottish settlers Early switchboards and telephones

Monroe County

George Eastman House 900 East Avenue Rochester 14607	Communications Products of the craftsman Products of modern industry	History and science of photography Exhibits of artists-photographers

Rochester Area (Continued)

Monroe County (Continued)

Organization	Resource Categories	Other Features
Honeoye Falls - Town of Mendon Historical Society 1 Allen Park Drive Honeoye Falls 14472	Early hand tools and their development Machines and their development Products of the craftsman Raw materials	Small display of artifacts
Ogden Historical Society Colby Street Spencerport 14559	Early hand tools and their development	Weaving (2 looms) Early toys Farm machines Dental artifacts
Perinton Historical Society 42 East Avenue Fairport 14450	Early hand tools and their development Early American industries Products of the craftsman Products of modern industry Industrial processes	Repository for manuscripts, papers, old newspapers Land records and maps
Rochester Museum and Science Center 657 East Avenue Rochester 14607	Products of the craftsman Development of hand tools and their uses Early American industry Transportation Raw materials of industry Communications	Development of lighting Business machines Agricultural hand tools Room and shop interiors of pioneer upstate New York

Ontario County

Geneva Historical Society 543 South Main Street Geneva 14456	Early American industry Development of hand tools and their uses Products of the craftsman	Period rooms Artifacts and records of the area

Rochester Area (Continued)

Ontario County (Continued)

Organization	Resource Categories	Other Features
Ontario County Historical Society 55 North Main Street Canandaigua 14424	Early hand tools and their development	Indian relics Period rooms
Town of Gorham Historical Museum South Street Gorham 14461	Development of hand tools and their uses Products of the craftsman	Historic church and school

Orleans County

The Cobblestone Society Albion 14411	Early hand tools and their development Products of the craftsman	One room schoolhouse

Seneca County

Waterloo Library and Historical Society East Williams Street Waterloo 13165	Early hand tools and their development Machines and their development Early American industries Products of the craftsman Raw materials	Historic house Memorial Day emphasis on the birthplace of the day

Wayne County

Wayne County Museum 21 Butternut Street Lyons 14489	Products of the craftsman Development of hand tools and their uses Early American industry Transportation Raw materials of industry	Penology exhibit housed in one cell block of the 1854 county jail Wildlife exhibits
Castile Historical Society 17 East Park Road Castile 14427	Early hand tools and their development Machines and their development Early American industries	Historic house Farm implements Seneca Indian relics

Rochester Area (Continued)

Wyoming County (Continued)

Organization	Resource Categories	Other Features
Middlebury Historical Society South Academy Street Wyoming 14591	Early hand tools and their development Products of the craftsman Raw materials	Cooperage Salt industry Building was the first school of higher learning west of Wyoming
Warsaw Historical Society 15 Perry Avenue Warsaw 14569	Early hand tools and their development Machines and their development Early American industries Products of modern industry Raw materials Industrial processes	Button manufacture Flax and wool

Syracuse Area

Cayuga County

Cayuga Museum of History and Art 203 Genesee Street Auburn 13021	Early hand tools and their development Machines and their development Products of the craftsman	Art History Archaeological items Hobbies

Cortland County

Cortland County Historical Society 25 Homer Avenue Cortland 13045	Early hand tools and their development Early American industries Products of the craftsman	War records from the Revolution to the Korean War

Madison County

Madison County Historical Society 435 Main Street Oneida 13421	Development of hand tools and their uses Transportation Products of the craftsman	Historic house Early American furnishings Civil War relics

Syracuse Area (Continued)

Onondaga County

Organization	Resource Categories	Other Features
Canal Museum - Weighlock Building Erie Boulevard East Syracuse 13202	Transportation Raw materials of industry Early American industry Power/energy sources Development of hand tools and their uses	Construction and development of American engineering Rise of American engineering Engineering - structure design
Daniel Parrish Witter Agricultural Museum New York State Fair Syracuse 13209	Development of hand tools and their uses Transportation Products of the craftsman Development of machine tools and their uses	Agricultural and home life in New York State prior to mechanization 1809 New York State log cabin
Fort Brewerton Museum Association 5439 Railroad Street Brewerton 13029	Early hand tools and their development Early American industries Products of the craftsman	Archaeological artifacts Indian and colonial American military
Pioneers Museum, Highland Forest Box 31 Fabius 13063	Early American industry Development of hand tools and their uses Products of the craftsman Transportation	Relics and objects from the area
Salt Museum & French Fort P.O. Box 146 Liverpool 13088	Development of hand tools and their uses Early American industry Transportation	Relics and pictures of the salt industry
Society for the Preservation and Appreciation of Antique Motor Fire Apparatus in America 184 Jasper Street Syracuse 13203	Early tools and their development Machines and their development Products of the craftsman	Fire apparatus

Syracuse Area (Continued)

Oswego County

Organization	Resource Categories	Other Features
Oswego County Historical Society 135 East 3rd Street Oswego 13126	Early hand tools and their development Products of modern industry	Museum in formation stage (By appointment)

Westchester-Rockland District

Westchester County

Bedford Historical Society Bedford 10506	Early hand tools and their development Early American industries Products of the craftsman	Examples of early architecture and building methods
Historical Society of the Tarrytowns, Inc. No. 1 Grove Street Tarrytown 10591	Early hand tools and their development	Historic house Early Dutch history Material on American Revolution
Ossining Historical Society 83 Croton Avenue Ossining 10562	Early hand tools and their development	Colonial utensils and artifacts Minerals
Rye Historical Society P.O. Box 155 Rye 10580	Early hand tools and their development Products of modern industry	Examples of colonial architecture and construction techniques

* * * * * * * * * *

Basic Reference

The guidelines and directory of selected centers incorporated in this publication were extracted from:

Ross, B. John, "Museum Resources and Their Utilization in Industrial Arts Education." Unpublished doctor's thesis, School of Education, New York University, New York, 1970.

VT 013 830
BENDER, RALPH E.
THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO.

OHIO STATE UNIV., COLUMBUS. DEPT. OF AGRICULTURAL EDUCATION.
MF AVAILABLE IN VT-ERIC SET.
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IDENTIFIERS - OHIO

ABSTRACT - THIS DOCUMENT PRESENTS THE FINDINGS OF A FOLLOWUP STUDY OF VOCATIONAL AGRICULTURE GRADUATES IN OHIO. PRESENTED IN TABLE FORMAT THE STUDY SHOWS THAT 31 PERCENT OF THE GRADUATES OUT OF SCHOOL ONE YEAR AND 34 PERCENT OF THOSE OUT OF SCHOOL FIVE YEARS WERE IN FARMING. THE PERCENT OF GRADUATES INVOLVED IN NON-AGRICULTURAL WORK THE FIRST YEAR OUT OF SCHOOL WAS 29 COMPARED TO 40 PERCENT FOR THOSE OUT OF SCHOOL FIVE YEARS. OF THE GRADUATES OUT OF SCHOOL ONE YEAR 25 PERCENT WERE IN COLLEGES OR TECHNICAL SCHOOLS WHERE OVER HALF WERE STUDYING AGRICULTURE. RESPONSES WERE SOUGHT TO QUESTIONS CONCERNING SOURCES OF PRESENT JOB, INCOME, AND JOB SATISFACTION. QUESTIONS WERE ALSO DIRECTED TO THE GRADUATES CONCERNING SATISFACTION WITH THE VOCATIONAL AGRICULTURE CLASSES AND SUGGESTIONS FOR IMPROVEMENT. (MU)

VT 013 830

Agdex 010/008

THE 1971 OCCUPATIONS OF RECENT GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO

Ralph E. Bender
Department of Agricultural Education
The Ohio State University
September, 1971

Fifty-four per cent of the graduates of vocational agriculture in Ohio out of school five years were engaged in farming and farm-related occupations. This finding was revealed in the most recent of a series of surveys in which the occupations of graduates out of school one and five years were identified as of March 1, 1971. The survey included 1312 students of 74 departments selected at random from the 14 supervisory districts of vocational agriculture in Ohio.

Data in Table 1 indicate that 31 per cent of the graduates out of school one year and 34 per cent of those out of school five years were in farming. Slightly more than 46 per cent of the farmers were farming on a full-time basis. Four of each five (81 per cent) graduates engaged in farming were doing so on the home farm.

The percentage of graduates involved in non-agricultural work the first year out of school was 29 compared to 40 per cent for those out of school five years. A large proportion of their occupations required aptitude and ability in mechanics; however, some of the common types of employment involved skills in working with people. This has been typical of the occupational opportunities for vocational agriculture graduates throughout the years.

Twenty-five per cent of the graduates out of school one year were in college or technical schools. Of this group, slightly more than 50 per cent were pursuing additional study in agriculture.

About 2.3 per cent of the graduates were unemployed. This is the largest percentage reported for any of the years since the survey was started. The increased unemployment undoubtedly is related to the general unemployment level of 5.1 per cent existing in Ohio as of March, 1971.

VT013830

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
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TABLE 1. VOCATIONS OF GRADUATES IN VOCATIONAL AGRICULTURE IN OHIO OUT OF SCHOOL ONE AND FIVE YEARS

Vocations as of March 1, 1971	Percentage of Graduates 1970 Class	1966 Class
Farming: Full Time	16	14
Part Time	15	20
Related to Farming	15	15
Attending College of Agriculture	10	3
Attending Agr. Technical School	3	2
Total in Agriculture	59	54
Non-Agricultural Work	29	40
College--Other Than Agriculture	7	4
Attending Non-Agr. Technical School	5	2
Total in Non-Agricultural	41	46
Number of graduates in above analysis	620	418
Other graduates not included in analysis:		
Military Service	99	82
Occupations Unknown	20	30
Unemployed	18	12
Deceased	4	9
Total Number of Graduates	761	551

Based upon responses from 74 schools.

TABLE 2. VOCATIONS OF GRADUATES IN VOCATIONAL AGRICULTURE OUT OF SCHOOL ONE YEAR FOR SELECTED YEARS

Vocational Groups	Percentage of Graduates by Classes										
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Farming: Full Time	33	30	30	27	21	20	15	15	12	15	16
Part Time	23	22	19	20	15	18	18	18	16	15	15
Related to Farming	9	8	11	9	11	14	18	16	12	13	15
Attending College of Agriculture	7	12	9	9	10	12	11	12	11	9	10
Attending Agr. Technical School	--	--	--	--	--	--	--	--	5	6	3
Total in Agriculture	71	71	69	65	57	63	62	61	56	58	59
Non-Agricultural Work	19	21	24	25	33	23	29	26	30	32	29
College-Other than Agriculture	10	8	7	10	10	13	9	13	8	5	7
Attending Non-Agr. Technical School	--	--	--	--	--	--	--	--	6	5	5
Total in Non-Agriculture	29	29	31	35	43	37	38	39	44	42	41
In addition to the above (based upon total number of graduates):											
In Military Service	12	14	14	11	10	20	18	19	17	18	13

Above analysis based upon:

Number	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Graduates	709	736	598	638	659	689	752	834	922	722	761
Departments	103	92	84	86	88	82	82	93	102	77	74

1906

TABLE 3. VOCATIONS OF GRADUATES IN VOCATIONAL AGRICULTURE OUT OF SCHOOL FIVE YEARS FOR SELECTED YEARS

Vocational Groups	Percentage of Graduates by Classes											
	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Farming: Full Time	25	25	24	23	24	23	21	17	22	16	19	14
Part Time	19	18	16	16	15	13	17	19	18	14	18	20
Related to Farming	11	14	12	16	16	18	15	17	13	15	12	15
College of Agriculture	4	3	2	4	4	6	5	7	6	6	6	3
Agr. Technical School	--	--	--	--	--	--	--	--	--	--**	--**	2
Total in Agriculture	59	60	54	59	59	60	58	60	59	51	55	54
Non-Agriculture Work	35	36	39	36	37	34	36	35	37	44	39	40
College--Other Than Agriculture	6	4	7	5	4	6	6	5	4	3	4	4
Non-Agr. Tech. School	--	--	--	--	--	--	--	--	--	2	2	2
Total in Non-Agriculture	41	40	46	41	41	40	42	40	41	49	45	46

**Only one student.

In addition to the above (based upon total number of graduates):

In Military Service	13	10	17	16	17	13	18	19	19	17	14	15

Above analysis based upon:

Number	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Graduates	615	653	568	588	621	656	615	576	648	750	677	551
Departments	108	108	92	84	86	88	82	82	93	102	77	74

Occupations Related to Farming

Fifteen per cent of the graduates in vocational agriculture out of school one to five years were engaged in farm-related occupations. Fourteen of the teachers from 74 departments indicated that one or more of their graduates worked in machinery sales and service business. Other common types of work were that of working in a grain elevator, feed or fertilizer business and being involved in building and construction. Many other kinds of employment were listed varying from teaching vocational agriculture to working with heavy equipment. The complete list with the number of teachers reporting one or more graduates includes:

14 Machinery sales and service	3 Truck driver
13 Grain elevator or feed mill	3 Florist shop
11 Fertilizer or lime business	2 Food store
10 Building and construction	2 Heavy equipment
6 Greenhouse or nursery	2 Drainage and tile business
4 Meat cutter	1 Pulp wood
4 Food processing	1 Forestry
4 Voc. agr. teacher	1 County Extension Agent, 4-H
4 Lumber yard	1 Agr. Missionary
4 Stockyards	1 Wildlife, fish and game
3 Welding	1 O.A.R.D.C.

Occupations in Non-Agricultural Work

Twenty-nine to forty per cent of the graduates in vocational agriculture became engaged in non-agricultural occupations during the first five years out of high school. Forty-four of the teachers from 77 departments reported that one or more of their graduates were working in industry or in a factory. The number reporting employment in building construction, welding, service stations, and mechanics indicates the importance of the development and use of mechanical skills. Another general type of work reported was that which included abilities in working with people such as selling and teaching. The complete list with the number of teachers reporting one or more graduates includes:

44 Factory or industry
16 Mechanic
11 Building construction
10 Service station or garage
6 Salesman
6 Telephone company
5 Welding
4 Truck driver
4 Highway construction
3 Teacher
3 Carpentry
3 Mines
2 Office and clerical
2 Railroad
2 Pottery
2 Auto parts department
2 Preacher
2 City maintenance
1 Barber
1 IBM computer operator
1 County Engineers office
1 Professional baseball
1 Printing firm
1 Plumber
1 Hospital attendant
1 Prison guard
1 Bookkeeper
1 Draftsman

SELECTED INFORMATION CONCERNING GRADUATES EMPLOYED IN NON-AGRICULTURAL WORK

Teachers of vocational agriculture were asked to provide the names of one or two of their graduates who were employed in non-agricultural work. Responses were received from 22 students graduating in 1966 and 30 who were graduates of the 1970 class. As may be noted in Table 4, the 1966 graduates completed an average of 3.82 years of vocational agriculture and the 1970 graduates completed 3.57 years.

TABLE 4. NUMBER OF YEARS OF VOCATIONAL AGRICULTURE COMPLETED AS INDICATED BY GRADUATE RESPONDENTS

Year Graduated	Total No. of Graduates	Average No. of Years Completed	Graduates by Number of Years Completed			
			1	2	3	4
1966	22	3.82	1	-	1	20
1970	30	3.57	-	4	5	21
Both Groups	52	3.67	1	4	6	41

An observation of Table 5 reveals that the most common type of course completed during the junior and senior years was production agriculture. Thirty-eight of the 52 respondents had had some training in agricultural business and 33 completed work in agricultural mechanics. Eighteen were in horticulture courses.

It is of some interest to note that parents, a friend or relative, and an application at the personnel office were the major sources for locating and securing the present job as revealed in Table 6. For some reason or another, only three graduates indicated the teacher of vocational agriculture as a source for securing his present job. Likewise only three indicated that they received help from the guidance counselor.

TABLE 5. VOCATIONAL AGRICULTURE COURSES COMPLETED AS INDICATED BY GRADUATES

Year Graduated	Year in School	Number of Graduates According to Courses Completed*				
		Farm Production	Agri-Business	Agr. Mechanics	Horti-culture	Other
1966	Junior	11	4	4	4	2
	Senior	17	8	8	3	1
1970	Junior	15	12	7	5	0
	Senior	19	14	14	6	3
Both Groups	Junior	26	16	11	9	2
	Senior	36	22	22	9	4

*Totals may exceed number of respondents due to students' taking more than one course.

TABLE 6. SOURCE OF PRESENT JOB AS REPORTED BY VOCATIONAL AGRICULTURE GRADUATES*

Source of Job	1966	1970	Both Groups
Parents, a friend or relative	7	16	23
Application at personnel office	6	9	15
Vocational agriculture teacher	1	2	3
Guidance counselor	2	1	3
Newspaper ad	2	1	3
Employment service	--	1	1
Heard on radio or TV	--	--	--
Other	5	3	8

*Total may exceed number of respondents due to some students' having more than one source of job.

The monthly income reported by the 1966 graduates averaged $560 ranging from $390 to $800 as may be noted in Table 7. Graduates in 1970 who were less than a year out of high school received an average of $473 ranging from $208 to $760 per month.

TABLE 7. MONTHLY INCOME REPORTED BY VOCATIONAL AGRICULTURE GRADUATES

Year Graduated	Total No. of Graduates	Mean Months on Present Job	Income Per Month		
			Mean	Range	
1966	22	29.4	$560.00	$390.00	$800.00
1970	30	17.8	$473.00	$208.00	$760.00

Table 8 reveals that there was considerable difference with reference to the level of satisfaction in their present employment. Generally speaking, the graduates were satisfied with their fellow workers, the work assignment and supervisors. They were less satisfied with the pay received and the promotions available. The 1966 graduates were much better satisfied with their work than were the 1970 graduates.

TABLE 8. JOB SATISFACTION AS REPORTED BY VOCATIONAL AGRICULTURE GRADUATES

Job Conditions	Graduate Group	Level of Satisfaction			
		Well Satisfied	Generally Satisfied	Somewhat Dissatisfied	Dissatisfied
Fellow Workers	1966	17	4	1	-
	1970	14	13	2	-
Supervision	1966	13	7	1	1
	1970	11	12	4	1
Work Assignment	1966	12	9	-	1
	1970	16	10	3	-
Promotions Available	1966	13	6	2	1
	1970	6	12	6	3
Pay Received	1966	8	9	3	2
	1970	6	15	6	1

Forty-five of 52 graduates replying indicated that they would like to move into agricultural work if opportunities were available as reported in Table 9. A number of them indicated by special notes on the questionnaire that they would like to farm; however, the cost of getting established in farming was prohibitive.

TABLE 9. DESIRE TO WORK IN AGRICULTURE AS REPORTED BY VOCATIONAL AGRICULTURE GRADUATES

Year Graduated	Number of Graduates	
	Yes	No
1966	19	3
1970	26	4
Both Groups	45	7

The graduates were asked to rate the various phases of the program of vocational agriculture. As indicated in Table 10, FFA was rated highest followed by occupational experience programs. In their class work, management and mechanics were rated higher than crops or livestock production. This was generally true for both the 1966 and 1970 graduates. For some unknown reason the 1966 graduates rated each of the phases of the program higher than the 1970 graduates.

TABLE 10. GRADUATE RATINGS OF VARIOUS PHASES OF VOCATIONAL AGRICULTURE TRAINING

Vocational Agriculture Program Phases	Year Group Graduated	Weighted Rating*	Number Rating			
			Excellent	Good	Fair	Poor
FFA	1966	3.44	10	3	3	-
	1970	3.15	11	9	5	1
Occupational Experience	1966	3.33	12	5	3	1
	1970	3.27	15	10	3	2
Record Keeping	1966	3.19	9	8	3	1
	1970	2.97	10	12	5	3
Classwork in Management	1966	3.29	9	10	1	1
	1970	3.00	8	13	6	1
Classwork in Mechanics	1966	3.11	10	4	2	3
	1970	2.73	6	10	7	3
Classwork in Livestock	1966	3.00	5	11	3	1
	1970	2.62	4	13	9	3
Classwork in Crops	1966	3.00	7	7	5	1
	1970	2.55	6	9	9	5

*Scale: Excellent 4, Good 3, Fair 2, Poor 1

1913

Why Aren't You Working in the Field of Agriculture?

In response to this question, the following were typical:

"Waiting on the draft, then I want to get in conservation."

"Not enough opportunities available."

"You don't just jump into agriculture (production) it takes some planning."

"Not enough pay."

"Could not possibly come up with enough capital."

"Not enough money, tied down too much."

"I desire to help people relate Christ to personal and world problems."

"I'm waiting until I get through school and then I'll go into ag."

"Not enough prestige, hard to find a higher paying job."

"No opening in my special interest."

What Changes Should Be Made in Vocational Agriculture To Make It More Appropriate?

The following are typical responses in answer to the question:

"Break it down into separate courses such as management, mechanics, etc. instead of lumping everything together."

"We need a complete new vo-ag system."

"More equipment to use."

"There should be more emphasis on ag-related businesses."

"We need more realistic shop work."

"Keep it up to date, some of the material we used was so outdated it wasn't funny."

Approximately one-fifth of the students indicated that no changes should be made--the program was satisfactory.

What Changes Should Be Made in the FFA
To Make It More Appropriate?

Approximately one-third of the respondents indicated that the FFA programs were very good and that no change should be made. Of those indicating changes, the following were typical:

"More stress on student responsibility and leadership through better use of committees."

"Even if a person does not work in an agricultural job, he should still belong to the FFA."

"Update the FFA! Anymore farmers are almost a minority in FFA."

"Have more team work."

"There should be more work on leadership."

"Update the activities with the rest of the school and faculty."

"Show more interest in the community so that the FFA can grow and develop better citizens for the future."

If You Had It To Do Over Again, Would
You Take Vocational Agriculture?

Of the 52 graduates answering this question, 51 indicated that they would take vocational agriculture again. Typical of their reasons were:

"You get so much different training in one subject."

"The leadership training and public speaking has proven to be an invaluable asset to me."

"Vo-ag gave me interest, motivation, along with an education in agriculture. I wouldn't have made it through college without this training."

"Because they teach you what you should know and don't beat around the bush."

"Because of my love of 'the good earth' and to understand everything that grows on it."

"It gave me the interest to look for higher goals."

"A lot of things you learn in agriculture helps you in life no matter what field you are in."

"Because I think you learn a lot. As far as I'm concerned it benefits you more when you are out of school in learning to get along with other people."

"Because it was a rewarding experience and qualified me for my present job."

The respondent who indicated that he would not take vocational agriculture again if he had it to do over reported:

"I was stuck working in hardware putting boxes away--nothing to do with farming."

VT 013 843
GEARHART, J. WALTER, AND OTHERS
AN ANALYSIS OF THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS.

WASHINGTON STATE DEPT. OF INSTITUTIONS, OLYMPIA. OFFICE OF PROGRAM EVALUATION AND ANALYSIS.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - MAY67 72P.

DESCRIPTORS - *PRISONERS; *VOCATIONAL REHABILITATION; *CORRECTIVE INSTITUTIONS; *PROGRAM EVALUATION; CORRECTIONAL REHABILITATION; PROGRAM DESCRIPTIONS; JOB PLACEMENT; EMPLOYMENT EXPERIENCE

ABSTRACT - THIS REPORT IS AN EVALUATION OF A STATE VOCATIONAL TRAINING PROGRAM FOR PRISON INMATES BASED ON THEIR SUBSEQUENT EMPLOYMENT SUCCESS. PROGRAM GRADUATES WERE COMPARED WITH PROGRAM DROPOUTS AND A CONTROL GROUP OF NONPARTICIPANTS WITH SIMILAR CHARACTERISTICS. DESPITE EXCELLENT TEACHERS, CURRICULUM, AND FACILITIES, ONLY 36 OF 102 MEN TRAINED AND RELEASED DURING THE 1963 FISCAL YEAR FOUND EMPLOYMENT IN THEIR TRADE. ENTRY INTO THE LABOR MARKET AND JOB TENURE WERE NOT IMPROVED BY PROGRAM COMPLETION. THE MOST SUCCESS IN FINDING EMPLOYMENT IN THE FIELD OF TRAINING WAS EXPERIENCED BY THOSE IN OFFICE MACHINE REPAIR AND BARBERING. THE STUDY RECOMMENDS IMPROVEMENTS IN SCREENING OF APPLICANTS, ALLEVIATING COMPETITION OF OTHER PROGRAMS, ADJUSTING LENGTH OF STAY, MAINTAINING HIGH STANDARDS, AND PLACING TRAINEES IN RELATED EMPLOYMENT. (BH)

VT 013 843

RESEARCH REVIEW

DEPARTMENT OF INSTITUTIONS

An Analysis of
THE VOCATIONAL TRAINING PROGRAM IN THE
WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS

PRE-INSTITUTIONAL EXPERIENCE

VOCATIONAL TRAINING DURING INSTITUTIONALIZATION

POST-INSTITUTIONAL BEHAVIOR

CONCLUSION AND RECOMMENDATIONS

May, 1967 No. XXIII

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STATE OF WASHINGTON

SECTION OF RESEARCH AND PROGRAM ANALYSIS

1918

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Supervisor, Office of Program Evaluation and Analysis

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DEPARTMENT OF INSTITUTIONS

OFFICE OF PROGRAM EVALUATION AND ANALYSIS

An Analysis of

THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS

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In Cooperation With The

DIVISION OF ADULT CORRECTIONS

Mr. Lawrence Delmore, Supervisor

The assistance provided by the personnel of the Adult Correctional Institutions and the Data Processing Section is gratefully acknowledged.

May, 1967

1920

P R E F A C E

Within the field of corrections, as in many other areas, those persons having responsibility for the operation of the programs seek to ascertain what results are derived from their efforts and to find ways in which established programs can be improved. This study was prepared in cooperation with the personnel of the correctional agencies to answer some of the numerous planning, administrative, and evaluative questions concerning the vocational rehabilitation program at the Washington State Penitentiary and at the Reformatory. When this study was undertaken the Washington State Corrections Center, which specializes in providing training for the young offender, had not been in operation sufficiently long to permit us to undertake the same type of evaluations at that institution as was possible at the two older facilities. Hence, continuing research must be undertaken to evaluate training programs in light of administrative changes which have occurred since this study was completed.

It is always as important to emphasize what a study does not purport to suggest as are the findings concerning the specific areas being examined. The need for vocational training in adult correctional institutions is obvious to anyone who is familiar with the employment problems of offenders placed in state institutions. The needs of the total individual are quite different for any established program. This study seeks to evaluate the vocational training program as one phase of the total effort and indirectly to emphasize some of the needs the offenders have which are in no way related to training provided by the facilities. Unfortunately the adult correctional institutions have been very

seriously limited in their ability to meet the total needs of the offender because of inadequate resources.

Any vocational training program can only be effective if procedures and attitudes exist which will permit the placement of the offender in appropriate positions. Community attitudes regarding the discharged offender are such that the road toward rehabilitation is a very difficult one, indeed, and any evaluation can only reflect what happens to inmates during and after their release from the institutions. Community attitudes are not a part of the study, but inevitably must be considered by the reader if this evaluation of an extremely important program is to be meaningful.

Evan A. Iverson, Supervisor
Office of Program Evaluation
and Analysis

TABLE OF CONTENTS

	Page
THE VOCATIONAL TRAINING PROGRAM IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS	1
Procedures	2
Background	3
PRE-INSTITUTIONAL EXPERIENCE	7
Prior Occupation	7
Occupational Stability	9
Age at Commitment	11
Marital Status	12
Mental Level	13
Educational Level	14
Achievement Test Scores	15
Ethnic Origin	17
Juvenile Record	18
Type of Offense	19
Prior Institutional History	20
Prior Escape	21
VOCATIONAL TRAINING DURING INSTITUTIONALIZATION	23
Length of Time in Program	23
Lack of Ability and Motivation	27
Academic Achievement and the Dropout	30
Competition of Other Programs with Vocational Training	33
POST-INSTITUTIONAL EXPERIENCE	35
Subsequent Employment in the Area of Training	36
Length of Employment on Job in Area of Training	38
Avenues Used to Seek Employment	42

TABLE OF CONTENTS

	Page
CONCLUSION	43
APPENDIX A	
Detailed Course Description	47
Vocational Teachers	56
Program Organization	58
Vocational Training Costs	60

1924

LIST OF TABLES

Table		Page
I	Average Number of Inmates Under Vocational Training Instruction Per Month by Institution--	4
II	Prior Occupation of Study Group Compared to Failure Group, Comparison Group and All Inmates Released in Fiscal Year 1963----------	9
III	Occupational Stability of Study Group Compared to Failure Group and All Inmates Released in Fiscal Year 1963----------	10
IV	Age at Commitment, Study Group Compared to Failure Group, Comparison Group, and All Inmates Released in Fiscal Year 1963----------	11
V	Marital Status of Study Group Compared to Failure Group, Comparison Group and All Inmates Released in Fiscal Year 1963----------	12
VI	Mental Level of Study Group Compared to Failure Group, Comparison Group and All Inmates Released in Fiscal Year 1963----------	13
VII	Educational Level of Study Group Compared to Failure Group, Comparison Group and All Inmates Released in Fiscal Year 1963----------	15
VIII	Achievement Test Scores for Study Group Compared to Failure Group, Comparison Group and All Inmates Released in Fiscal Year 1963----------	16
IX	Grade Level by Achievement Test Scores for the Study Group----------	17
X	Ethnic Origin of Study Group Compared to Failure Group, Comparison Group, and All Inmates Released in Fiscal Year 1963----------	18
XI	Juvenile Court Record of Study Group Compared to Failure Group, Comparison Group, and All Inmates Released in Fiscal Year 1963----------	19
XII	Type of Offense for Study Group Compared to Failure Group, Comparison Group and All Inmates Released in Fiscal Year 1963----------	20
XIII	Number of Prior Felony Commitments for Study Group Compared to Failure Group, Comparison Group and All Inmates Released in Fiscal Year 1963----------	21

LIST OF TABLES

Table		Page
XIV	Prior Escape Record of Study Group Compared to Failure Group and Comparison Group----------	21
XV	Number of Months in Vocational Program by Type of Vocational Training for Study Group---------	24
XVI	Length of Stay of Study Group Compared to Control Group, Failure Group, and All Inmates Released in Fiscal Year 1963----------	25
XVII	Length of Stay by Institution by Type of Vocational Training in Study Group----------	26
XVIII	Number of Months in Vocational Program by Type of Vocational Training for Failure Group-------	28
XIX	Grade in Vocational Training by Mental Level, Study Group Compared to Failure Group----------	29
XX	Grade in Vocational Training by Achievement Test Score, Study Group Compared to Failure Group----------	31
XXI	Educational Level Achieved in Institution for Study Group Compared to Control Group and Failure Group----------	33
XXII	Parole Outcome of Study Group Compared to Control Group----------	36
XXIII	Employment in Area of Training, Study Group----	37
XXIV	Job Success by Parole Outcome, Study Group Compared to Control Group----------	39
XXV	Length of Time Until First Job, Study Group Compared to Control Group----------	40
XXVI	Number of Months Employed in Area of Training, Study Group----------	41
XXVII	Costs of Vocational Training in Adult Correctional Institutions, 1965 Fiscal Year----------	61

THE VOCATIONAL TRAINING PROGRAM
IN THE WASHINGTON STATE ADULT CORRECTIONAL INSTITUTIONS

The Washington State adult correctional institutions have implemented broad programs of correctional education designed to improve inmate attitudes and social adjustment through the acquisition of skills, knowledge and attitudes. Vocational training plays an important role in the correctional education program to assist those individuals with limited job training and experience to become better equipped to meet the problems of semi-skilled workers in a technological age. The need for adequate training is demonstrated by the fact that almost 50 per cent of all court commitments to Washington correctional institutions have no established occupation or are unskilled and only 10 per cent were continuously employed during the two years prior to confinement.[1] The American Correctional Association has emphasized the importance of correctional education in their operating principles: *"To assure the eventual restoration of the offender as an economically self-sustaining member in the community, the correctional program must make available to each inmate every opportunity to raise his educational level, improve his vocational competence and skills, and add to his information meaningful knowledge about the world and society in which we must live."*[2]

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[1]State of Washington, Department of Institutions, Office of Program Evaluation and Analysis, *Reference Report I*, September, 1966, page 29.

[2]American Correctional Association, *Manual of Correctional Standards*, Third Edition, 1966, page xxiii.

The success of vocational training programs is dependent on the acquisition of trade skills and knowledge which can be utilized by the participant after his return to the community. The general purpose of this study is to review the vocational training programs of the adult correctional institutions to determine the extent to which the acquired skills are actually utilized after release, the relationship of program involvement to success on parole and the determination of characteristics which are related to success within the vocational training program.

Procedures

For analytical purposes, four groups of inmates were examined for this study. These were: (1) a Study Group of inmates released in the 1963 fiscal year who had participated in and completed a vocational training program; (2) a Comparison Group of inmates released in the 1962 fiscal year who had participated in and completed a vocational training program; (3) a Failure Group of inmates released in the 1963 fiscal year who had undertaken but who had not completed the vocational training program; (4) a Control Group of inmates released in the 1963 fiscal year matched on the basis of age, education, prior criminal record, marital status, race, institution of release, offense, and prior occupation, who had never participated in a vocational training program. The Failure and Comparison Groups were used in all phases of this study for comparisons with the Study Group while the Control Group was used in comparing post-institutional experience only. The Study and Failure Groups included all inmates released during 1963 fiscal year who had participated in vocational

training programs. Other inmates who participated in these programs during the same period but were not released during 1963 fiscal year are not included in this study.

The data collection procedures used in the development of this study were threefold. Information concerning pre-institutional and institutional variables was drawn from routinely collected information stored in data processing files. Secondly, information concerning post-institutional experience was collected through search of individual parolee file maintained by the Board of Prison Terms and Paroles. Finally, consultation with institutional personnel provided information concerning vocational training programs, procedures, staffing, and costs. The Data Processing Section, Department of Institutions, provided support in the compilation of data displayed in many of the tables found in this report.

Appendix A contains further information concerning course description, vocational teachers, program organization, and program costs.

The opening of the Washington Corrections Center at Shelton on February 1, 1965, was another step in the trend of offering expanded school and vocational training to the young adult offender. However, this study concerns only those individuals who were released in 1963 in as much as a time lapse is necessary to analyze behavior on parole. Therefore, the Corrections Center Vocational Program is not discussed in this study.

Background

American prisons, especially those for youthful inmates, are distinctive for the extent of their investment in educational

and vocational training programs. This dates from the "reformatory movement" of the late nineteenth century. The reformatories established expanded school and vocational training programs. As the trend developed, education programs were expanded in most prisons both to contribute to inmate rehabilitation and simply to help fill the prisoners' time. As time passed, the differences between the reformatories and penitentiaries diminished. However, nation-wide, reformatories still have the highest ratio of paid teachers to inmates, the penitentiaries more often employing selected inmates as teachers.

The Washington correctional system has developed along the national trend. Education and vocational programs are presently offered at both the Penitentiary and Reformatory. Table I shows the vocational training programs which are offered at each institution, the average number of inmates under instruction per month at each institution during 1963 fiscal year, and the average number under instruction during January 1965.

TABLE I
AVERAGE NUMBER OF INMATES UNDER VOCATIONAL TRAINING INSTRUCTION PER MONTH BY INSTITUTION

	WASHINGTON STATE PENITENTIARY		WASHINGTON STATE REFORMATORY	
	AVERAGE NUMBER OF STUDENTS PER MONTH UNDER INSTRUCTION			
	FISCAL 1963	JANUARY, 1965	FISCAL 1963	JANUARY, 1965
BODY AND FENDER	10	10	7	12
BARBER	9	11	12	12
OFFICE MACHINE REPAIR	12	13		
MACHINIST	10	10	7	15
AUTO MECHANICS	10	10	12	16
CARPENTRY			6	11
DRAFTING			17	20
DRY CLEANING			4	12
ELECTRONICS			8	15
SHEET METAL			5	NOT IN OPERATION
SHOE REBUILDING			7	14
TOTAL	51	54	85	127

The vocational training programs are designed to equip the inmate with trade skills which will enable him to pursue a skilled occupation upon his return to the community. In pursuit of this goal, the vocational training programs are geared to meet the standards of apprenticeships in industry throughout the state. The purpose of these standards is to encourage careful selection of young men entering the trade field, to relate the supply of skilled workers to employment demand and to provide the necessary training for apprenticeships so that the public may be better served by skilled tradesmen.

The professional qualifications for the vocational teachers in the two institutions are quite rigorous. All the vocational training courses at the Penitentiary are taught by teachers employed by the Walla Walla School District and the inmate who completes a vocational training course is issued a diploma which is certified by the Walla Walla School District. The teachers at the Reformatory are state employed but are certified by the Division of Vocational Education in the Office of the Superintendent of Public Instruction. However, there is no affiliation with the local school district and inmates do not receive official school credit upon completion of a vocational course. The total cost of the combined vocational training course for fiscal 1965 was $177,122.44 resulting in an average cost of $81.55 per student per month.

This cost includes the expenditures of both the Reformatory and the Walla Walla School District, and excludes those institutional costs not associated with the program as such.

Courses offered at the Penitentiary are: Office Machine Repair, Auto Mechanics, Barbering, Body and Fender Work, and training for Machinists. At the Reformatory, courses are offered in Body and Fender Work, Barbering, Auto Mechanics, Carpentry, Drafting, Dry Cleaning, Electronics, Shoe Building, and Machine Skills.

PRE-INSTITUTIONAL EXPERIENCE

As outlined previously, the Study Group consists of 102 inmates who successfully completed a vocational training program, were certified, and were released in the 1963 fiscal year. The Failure Group is composed of the 90 inmates who began but did not complete a vocational training program and were released in the 1963 fiscal year. The Comparison Group is composed of the 93 inmates released in the 1962 fiscal year who successfully completed a vocational training program and were certified by the institution. The utility of this group is seen as facilitating the determination of any trends among inmates trained in the vocational program. The Control Group is composed of 102 inmates released in the 1963 fiscal year who had never participated in the vocational training program. This group has no analytical usefulness in this section because it was matched with the Study Group on the basis of the pre-institutional variables considered in this section. Consequently, because the Control Group is essentially like the Study Group in terms of pre-institutional variables, its usefulness lies in the comparison of post-institutional experiences.

The first requirement of a study such as this is to establish the characteristics of the group being studied. The variables chosen for review were selected on the basis of relevance to success in completing training programs.

Prior Occupation

Thirty per cent of all inmates released in the 1963 fiscal year had a history of unstable employment at jobs requiring

little or no skills or had had no established occupation. Since there were many cases in which the employment record was not known, the statistics listed above may not reflect the total extent of unemployment or unstable job history. A previous study has indicated that nearly two-thirds of all inmates in the adult correctional institutions may fall in this category.[1] It is interesting to note the similarity of these statistics to those reported concerning the federal prison system. Glaser reports that 52 per cent of all inmates released in 1956 from the federal prison system had a previous work record limited to unskilled labor while an additional 8.5 per cent had never been employed.[2]

The necessity of the vocational training program is further illustrated by a comparison of unemployment rates. The unemployment among the male civilian population of Washington over 14 years of age was 6 per cent during 1961-1962.[3] During the same period, the proportion of inmates who were not employed at the time of imprisonment in the Washington State adult correctional institutions was seventeen per cent.[4]

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[1]State of Washington, Department of Institutions, Office of Program Evaluation and Analysis, *Research Review, No. XIV*, September, 1964, Table XVIII, p. 32.

[2]Glaser, Daniel, *The Effectiveness of a Prison and Parole System* (Kansas City, the Bobbs-Merrill Co., Inc., 1964), p. 233. (Per cent deduced from figures given in Table 11.3).

[3]U. S. Bureau of the Census, *U. S. Census of Population 1960. General Social and Economic Characteristics*, U. S. Summary. Final Report PC(1)-1C, U. S. Government Printing Office, Washington, D. C., 1962, pp. 1-213.

[4]State of Washington, Department of Institutions, Office of Program Evaluation and Analysis, *Research Review, No. XIV*, September, 1964, Table XIX, p. 33.

TABLE II
PRIOR OCCUPATION OF STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP AND ALL INMATES RELEASED IN Fiscal Year 1963

OCCUPATIONAL CATEGORY	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES RELEASED IN FISCAL YEAR 1963	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
PROFESSIONAL-MANAGERIAL[A]	2	3.0	3	5.4	6	7.4	25	2.9
CLERICAL AND SALES	4	6.1	1	1.8	6	7.4	64	7.3
SERVICE	2	3.0	1	1.8	10	12.3	107	12.2
AGRICULTURAL OCCUPATIONS[B]	2	3.0	3	5.4	10	12.3	91	10.4
SKILLED	10	15.2	4	7.1	11	13.6	127	14.5
SEMI-SKILLED	13	19.7	6	10.7	19	23.5	196	22.4
UNSKILLED AND NO ESTABLISHED OCCUPATION[C]	33	50.0	38	67.8	19	23.5	264	30.3
UNKNOWN	36	-	34	-	12	-	415	-
TOTAL KNOWN	66		56		81		874	
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

[A] INCLUDES "PROFESSIONAL, SEMI-PROFESSIONAL, MANAGERIAL, OFFICIAL, AND TECHNICAL."

[B] INCLUDES "AGRICULTURAL WORKERS, FISHERY OCCUPATIONS, AND FORESTRY OCCUPATIONS."

[C] "NO ESTABLISHED OCCUPATION" MEANS THAT THE WORK EXPERIENCE OF THE INDIVIDUAL HAS BEEN VARIED AND HAS FOLLOWED NO OCCUPATIONAL PATTERN. THUS, THIS CATEGORY WOULD INCLUDE THOSE WHO HAVE NOT ATTEMPTED TO ESTABLISH AN OCCUPATION IN ADDITION TO THOSE WHO HAVE FOLLOWED TRANSIENT AND MIGRATORY FORM OF WORK. IT WOULD BE MEANINGFUL, THEREFORE, TO INCLUDE THIS GROUPING IN THE UNSKILLED CATEGORY SINCE THERE IS UNDOUBTEDLY A LARGE DEGREE OF OVERLAP. STUDENTS ARE ALSO INCLUDED IN THIS CATEGORY.

Occupational Stability

Analysis of occupational stability indicates a lack of good work habits and presumably occupational training among the inmate population. Table III indicates that only about one inmate in eight experienced some job stability prior to incarceration. Three-fourths had been employed less than 50 per cent of the time. It must be cautioned that these data include a high number of "unknowns" which can result in errors by omissions in reporting.

Nevertheless, an extreme lack of occupational stability among adult felons has been reported by various researchers in the field. Glaser reports that only a quarter of the federal prisoners he studied were employed during 75 per cent or more of their last two years of civilian life in the free community. He further reported that: "Thirty-eight per cent were employed 25 to 74 per cent of the time, 27 per cent had worked less than 25 per cent of the time, 6 per cent had never had any legitimate employment, and 4 per cent had been full time students during 75 or more per cent of their last two years of freedom."[1] Glaser concluded that: "Regular work during imprisonment, for even as little as one year would be the longest and most continuous experience that most prisoners and especially the younger prisoners have ever had."[2]

TABLE III
OCCUPATIONAL STABILITY OF STUDY GROUP COMPARED TO FAILURE GROUP AND ALL INMATES RELEASED IN Fiscal Year 1963[A]

CATEGORY	STUDY GROUP		FAILURE GROUP	
	NUMBER	PER CENT	NUMBER	PER CENT
EMPLOYED 50 PER CENT OF TIME OR MORE	4	12.5	6	14.6
EMPLOYED LESS THAN 50 PER CENT OF TIME	23	71.8	15	36.6
ARMED FORCES	2	6.3	2	4.9
STUDENT	3	9.4	7	17.1
UNEMPLOYED	0	-	11	26.8
UNKNOWN	70	-	49	-
TOTAL KNOWN	32		41	
TOTAL	102	100.0	90	100.0

[A]INSUFFICIENT DATA ARE AVAILABLE FOR COMPARISON GROUP AND FOR ALL INMATES RELEASED IN FISCAL YEAR 1963.

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[1]Daniel Glaser, *The Effectiveness of a Prison and Parole System* (Kansas City, The Bobbs-Merrill Co., Inc., 1964), p. 230.

[2]Ibid., p. 232.

Thus, the work experience of a Washington State inmate while institutionalized, whether it be in the form of a vocational training program or some other work program, can be the longest and most noticeable effort he has ever made along these lines.

Age at Commitment

Approximately two-thirds of those inmates who completed vocational training (the Study Group) were under the age of 25 compared to only one-third of all inmates released in fiscal year 1963. (See Table IV.) Eighty per cent of the Failure Group was also under the age of twenty-five. Thus, while the younger inmate is more likely to participate in the vocational training program, he is also more likely to fail. For all intents and purposes, the median ages of the Study Groups and Comparison Groups do not differ significantly.

TABLE IV
AGE AT COMMITMENT
STUDY GROUP COMPARED TO FAILURE GROUP,
COMPARISON GROUP, AND ALL INMATES RELEASED IN
Fiscal Year 1963

	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES FISCAL YEAR 1963	
AGE RANGE	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
15 - 19	20	19.6	30	33.3	13	14.0	55	4.3
20 - 24	50	49.0	42	46.7	39	41.9	355	27.5
25 - 29	19	18.6	15	16.7	19	20.4	233	18.1
30 - 34	6	5.9	2	2.2	15	16.1	191	14.8
35 - 39	6	5.9	1	1.1	5	5.4	149	11.6
40 - 44	1	1.0	0	-	2	2.2	115	8.9
45 AND OVER	0	-	0	-	0	-	191	14.8
UNKNOWN	0	-	0	-	0	-	-	-
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0
MEDIAN AGE	23.10		21.79		24.29		30.04	

Marital Status

The inmate who undertakes vocational training tends not only to be younger than the average inmate in the general population, but he is also more likely to be unmarried. Approximately one half of the inmates who successfully completed the vocational training programs were single, but this was true of only 39 per cent of all inmates released during the 1963 fiscal year. However, like younger students in vocational training, the single inmates were also more likely not to complete their vocational training in the institution. Unmarried men comprised sixty one (61.2) per cent of the Failure Group during the 1963 fiscal year. (See Table V.) The married men who had vocational training were much more likely to complete their course than those who were not married. This may have been due to the fact that married men are usually older and more mature than the single inmates and probably more cognizant of the responsibilities to be faced upon release.

TABLE V
MARITAL STATUS OF STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP AND ALL INMATES RELEASED IN Fiscal Year 1963

	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES RELEASED FISCAL YEAR 1963	
CATEGORY	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
SINGLE	53	52.0	55	61.2	46	49.4	503	39.0
MARRIED	30	29.3	13	14.4	22	23.7	254	19.7
SEPARATED	6	5.9	10	11.1	4	4.3	120	9.3
DIVORCED	12	11.8	12	13.3	19	20.4	266	20.6
WIDOWED	1	1.0	0	-	2	2.2	20	1.6
UNKNOWN	0	-	0	-	0	-	126	9.8
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

Mental Level

A much higher proportion of inmates having a mental level above average are found among those participating in the vocational rehabilitation programs. Only 11 per cent in the Study Group scored below the average category in mental level while 32 per cent scored above average. (See Table VI.) A similar result was found with the Comparison Group. However, this finding was not true of the Failure Group. Almost the same number of inmates scored below average in mental level as scored above average. Two-thirds of all vocational training participants who had a mental level above average were released as trained in the area of their study while the same was true of only 44 per cent of those with a mental level below average. Mental level and its relationship to success in the vocational training program is discussed further in the section of this report: "Vocational Training During Institutionalization."

TABLE VI
MENTAL LEVEL OF STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP AND ALL INMATES RELEASED IN Fiscal Year 1963

	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES RELEASED FISCAL YEAR 1963	
MENTAL LEVEL	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
INFERIOR	1	1.0	1	1.1	0	-	41	3.2
LOW	10	9.8	13	14.4	9	9.7	207	16.1
AVERAGE	55	53.9	60	66.8	45	48.3	639	49.4
HIGH	28	27.5	13	14.4	32	34.4	257	20.0
SUPERIOR	5	4.9	3	3.3	5	5.4	38	3.0
NOT TESTED	0	-	0	-	0	-	12	1.0
UNKNOWN	3	2.9	0	-	2	2.2	95	7.3
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

Educational Level

In addition to learning potential, some degree of formal educational background is necessary for an inmate to successfully undertake a vocational training course. A comprehension of the fundamentals of mathematics, for example, is necessary for almost any of the vocational trades offered, but is especially essential in drafting, the machinist trade, office machine repair, and radio and television repair. One must be able to grasp abstractions and apply them to concrete problems. Thus, a certain degree of educational competency is mandatory if one is to meaningfully undertake a vocational training program. Consequently, the institutions have included as one of the prerequisites, the ability to function academically at the ninth grade level.[1] If the inmate fails to meet this requirement and is nevertheless interested in pursuing a vocational program, he is given the opportunity to first attend the academic school in order to make up his deficiency.

As a result of the academic prerequisite mentioned above, the majority of inmates entering the vocational training program have completed at least the ninth grade of school. Those inmates who had less than a ninth grade education were required to take academic courses in the institution. Of the 192 inmates released in the 1963 fiscal year who began a vocational training course, 54 had less than a ninth grade education. Of these 54, 35 failed to complete their vocational training. Thus, even though a man may make up his academic deficiencies in the institution, he

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[1]As indicated in the conclusion of this report, the Washington Corrections Center does not use the ninth grade achievement level as a cutting point.

nevertheless is more likely to fail in the completion of the vocational training program than the inmate who enters the program without this deficiency. Only 19 per cent of the Study Group entered the institution with less than a ninth grade education whereas this was true of 39 per cent of the Failure Group. (See Table VII.) At the same time, inmates who enter the vocational training program with a high school or near high school education are much more likely to complete the program than those who do not have this level of education.

TABLE VII
EDUCATIONAL LEVEL OF STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP AND ALL INMATES RELEASED IN Fiscal Year 1963

GRADE LEVEL	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES RELEASED FISCAL YEAR 1963	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
DID NOT ATTEND SCHOOL	0	-	0	-	0	-	7	0.6
1 - 6	2	2.0	2	2.2	3	3.2	121	10.1
7 - 8	17	16.7	33	36.7	21	22.6	441	36.8
9 - 10	52	51.0	46	51.1	44	47.3	398	33.1
11 - 12	27	26.4	8	8.9	21	22.6	199	16.6
OVER 12	4	3.9	1	1.1	4	4.3	33	2.8
UNKNOWN	0	-	0	-	0	-	90	-
TOTAL KNOWN	102		90		93		1199	
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

Achievement Test Scores

Previous studies have shown that the achievement test scores of inmates tend to lag about two years behind their actual number of school years completed.[1] This is also true for the

[1]State of Washington, Department of Institutions, Office of Program Evaluation and Analysis, *Research Review, No. XIV*, September 1964, p. 29.

groups in this study as seen by comparing Tables VII and VIII. In the Study Group, nineteen (18.7) per cent had less than a ninth grade level in formal education whereas thirty-eight (38.2) per cent achieved below the ninth grade level. Similarly, twenty-six (25.8) per cent of the Comparison Group had less than a ninth grade level of formal education whereas forty-two (42.0) per cent achieved below the ninth grade level. Finally, thirty-nine (38.9) per cent of the Failure Group had less than a ninth grade education whereas fifty-one (51.1) per cent achieved below the ninth grade. Similar to the findings in Table VII, the proportion of inmates achieving below the ninth grade, as indicated in Table VIII, is higher for those who fail to complete their vocational training program than for those who complete it.

TABLE VIII
ACHIEVEMENT TEST SCORES FOR STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP AND ALL INMATES RELEASED IN Fiscal Year 1963

ACHIEVEMENT GRADE LEVEL	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES RELEASED FISCAL YEAR 1963	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
0.0 - 6.9	10	9.8	18	20.0	17	18.3	345	32.3
7.0 - 8.9	29	28.4	28	31.1	22	23.7	337	31.6
9.0 - 10.9	40	39.2	30	33.3	25	26.8	279	26.2
11.0 - 12.9	15	14.7	8	8.9	10	10.8	95	8.9
OVER 12.9	1	1.0	0	-	7	7.5	11	1.0
UNKNOWN	7	6.9	6	6.7	12	12.9	222	-
TOTAL KNOWN	95		84		81		1007	
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

Forty-seven inmates out of 95 for whom achievement test scores were available achieved below their academic grade level. Only ten inmates of the 95 achieved above the grade level they

had attained. (See Table IX.) It then becomes obvious that the academic prerequisite for placement in the vocational training program must necessarily be based on academic achievement rather than on the number of formal school grades completed. The achievement test scores give a more realistic picture of the academic competence of the inmates.

TABLE IX
GRADE LEVEL BY ACHIEVEMENT TEST SCORES
FOR THE STUDY GROUP

GRADE LEVEL	ACHIEVEMENT TEST SCORES				TOTAL
	BELOW GRADE LEVEL	SAME AS GRADE LEVEL	ABOVE GRADE LEVEL	UNKNOWN	
1 - 6	-	-	1	1	2
7 - 8	4	6	4	3	17
9 - 10	24	22	4	2	52
11 - 12	15	10	1	1	27
OVER 12	4	0	0	0	4
TOTAL	47	38	10	7	102

Ethnic Origin

The ethnic origins of inmates in the Study Group do not appear to differ significantly from either the Failure Group, the Comparison Group, or the total population of inmates released in the 1963 fiscal year. (See Table X.) Thus, there appears to be no bias in the selection of inmates for vocational training on the basis of ethnic origin.

TABLE X
ETHNIC ORIGIN OF STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP, AND ALL INMATES RELEASED IN Fiscal Year 1963

	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES FISCAL YEAR 1963	
ETHNIC GROUP	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
WHITE	84	82.3	75	83.3	80	86.0	968	75.1
NEGRO	7	6.9	5	5.6	7	7.5	117	9.1
INDIAN	7	6.9	6	6.7	2	2.2	72	5.6
ALL OTHERS	4	3.9	4	4.4	4	4.3	27	2.1
UNKNOWN	0	-	0	-	0	-	105	8.1
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

Juvenile Record

The inmates included in this study are not new to the correctional process as shown by the data in Table XI. This data shows that seventy-six (75.5) per cent of the Study Group has had contacts with and was known by juvenile court authorities. An even higher proportion--eighty six (85.6) per cent--of the Failure Group inmates were known to juvenile court. Again, it might be concluded that an individual who is more likely to complete and become certified in a vocational training course will more than likely not be known to juvenile court, not be single, have no prior adult felony commitments, and not be under the age of twenty-five. One other interesting fact is reflected in the data in Table XI which indicates that the vocational training programs tend to include considerably more of the inmates who have had previous contact and who were known to juvenile court than was true of all inmates released during the 1963 fiscal year.

TABLE XI
JUVENILE COURT RECORD OF STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP, AND ALL INMATES RELEASED IN Fiscal Year 1963

COURT RECORD	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES RELEASED IN FISCAL YEAR 1963	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
KNOWN TO JUVENILE COURT	77	75.5	77	85.6	57	61.3	645	54.0
NO CONTACT WITH JUVENILE COURT	25	24.5	13	14.4	36	38.7	549	46.0
NOT REPORTED	0	-	0	-	0	-	95	-
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

Type of Offense

About the only important conclusion that can be reached in analyzing type of felony committed is that there was no significant variation in types of offenses committed when comparing either the total inmates released in fiscal year 1963 to the Study Group or in comparing the Failure and Comparison Groups to the Study Group. With only slight variation, the proportion of inmates committing crimes against property and crimes against the person is nearly the same with every group. (See Table XII.) About the same thing can be said when considering the number of prior felony commitments the inmates have had.

TABLE XII
TYPE OF OFFENSE FOR STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP AND ALL INMATES RELEASED IN Fiscal Year 1963

TYPE OF OFFENSE	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES RELEASED IN FISCAL YEAR 1963	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
CRIMES AGAINST THE PERSON	15	14.7	8	8.9	12	12.9	157	12.3
MURDER	2	2.0	1	1.1	0	-	20	1.6
MANSLAUGHTER	4	3.9	2	2.2	3	3.2	22	1.7
ASSAULT	4	3.9	1	1.1	4	4.3	47	3.7
SEX OFFENSE	5	4.9	4	4.4	5	5.4	68	5.3
CRIMES AGAINST PROPERTY	86	84.3	78	86.7	75	80.6	1064	83.4
ROBBERY	5	4.9	1	1.1	10	10.8	82	6.4
BURGLARY	31	30.4	35	38.9	24	25.8	361	28.3
THEFT	22	21.6	13	14.5	21	22.6	270	21.2
AUTO THEFT	18	17.6	17	18.9	11	11.8	138	10.8
FORGERY	10	9.8	12	13.4	9	9.7	213	16.7
ALL OTHERS	1	1.0	4	4.4	6	6.5	55	4.3
UNKNOWN	0	-	0	-	0	-	13	-
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

Prior Institutional History

The only discernable trend when considering the inmate's prior institutional history is that a slightly greater proportion of first offenders tend to become involved in the vocational training program than is true of the total inmate population. Of the total inmates released in the 1963 fiscal year, 54 per cent had had no prior commitments to an adult correctional institution while the same was true of 60 per cent of the Study Group, 74 per cent of the Failure Group, and 62 per cent of the Comparison Group. (See Table XIII.)

TABLE XIII
NUMBER OF PRIOR FELONY COMMITMENTS FOR STUDY GROUP COMPARED TO FAILURE GROUP, COMPARISON GROUP AND ALL INMATES RELEASED IN Fiscal Year 1963

NUMBER OF PRIOR COMMITMENTS	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP		ALL INMATES RELEASED IN FISCAL YEAR 1963	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
NONE	61	59.9	67	74.5	58	62.3	641	53.6
ONE	24	23.5	18	20.0	21	22.6	272	22.7
TWO	13	12.7	4	4.4	9	9.7	137	11.5
THREE OR MORE	4	3.9	1	1.1	5	5.4	146	12.2
UNKNOWN	0	-	0	-	0	-	93	-
TOTAL	102	100.0	90	100.0	93	100.0	1289	100.0

Prior Escape

Escape record is an additional variable to consider in reviewing the vocational trainee's prior criminal history. The data in Table XIV indicates that approximately two inmates in five have had a prior escape record irrespective of the particular group considered. Comparable data for all inmates released in fiscal year 1963 were not available.

TABLE XIV
PRIOR ESCAPE RECORD OF STUDY GROUP COMPARED TO FAILURE GROUP AND COMPARISON GROUP[A]

ESCAPE RECORD[B]	STUDY GROUP		FAILURE GROUP		COMPARISON GROUP	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
YES	20	19.6	18	20.0	22	23.7
NO	82	80.4	72	80.0	71	76.3
UNKNOWN	0	-	0	-	0	-
TOTAL	102	100.0	90	100.0	93	100.0

[A]DATA FOR ALL INMATES RELEASED IN FISCAL YEAR 1963 NOT AVAILABLE.

[B]ESCAPE FROM AN ADULT CORRECTIONAL INSTITUTION, JAIL, AND/OR AWOL FROM ARMED FORCES.

In summary, the need for vocational training is demonstrated by the high proportion of the inmate population which has been employed only sporadically, if at all, or has had no established occupation. The unemployment rate of these individuals when sentenced was much higher than for the average population and a lack of job stability was found to be typical. However, comparison of the Study and Failure Groups revealed a high rate of dropouts in the program. Comparison of these groups showed that the relatively young, immature first offender who is yet to be married is more likely to fail when placed in a vocational program than the older, more mature individual. Two-thirds of all vocational training participants who had a mental level above average were released as trained in their area of study while the same was true of only 44 per cent of those with a mental level below average. As expected, inmates who have a high school or near high school education are much more likely to complete the program than those who do not. There was no significant difference between the Study and Failure Groups when compared on the basis of ethnic differences, type of offense, or prior escape record.

VOCATIONAL TRAINING DURING INSTITUTIONALIZATION

In the following paragraphs the Study Group and Failure Groups will be compared on a basis of length of time in the vocational training program; length of time in the institution; ability and motivation; academic achievement and competing programs.

Length of Time in Program

A limiting factor for assignment to the vocational training program is the length of time served in the institution. Except for barber training, all vocational programs require approximately 18 months for completion. One previous report has indicated that the average length of stay for all inmates is 17.4 months.[1] This means that the average inmate has little time to spare if he is to undertake and successfully complete a vocational training course. By the time he is processed through the Reception and Guidance Unit and placed in a program, he may have not had a very long period of time to serve since processing and orientation consume about two months.

This low average length of stay may explain in part that nearly one half (48 per cent) of all inmates in the Study Group completed their vocational training within a year's time. (See Table XV.) Admittedly, the number of inmates within each course is too small to lend much meaning to the medians; nevertheless, even when considering the Study Group as a whole, the median number of months in vocational training is only 12.4.

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[1]State of Washington, Department of Institutions, Office of Program Evaluation and Analysis, *Research Review, No. XIV*, September, 1964. Table VII, page 13.

TABLE XV
NUMBER OF MONTHS IN VOCATIONAL PROGRAM
BY TYPE OF VOCATIONAL TRAINING FOR STUDY GROUP

NUMBER OF MONTHS	AUTO MECHANICS		BARBER		CARPENTRY		DRAFTING		MACHINE		OFFICE MACHINE REPAIR		RADIO AND TV REPAIR		SHEET METAL		SHOE RE-BUILDING		DRY CLEANING		BODY AND FENDER		OTHER		TOTAL	
	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT
1- 3	0		0		0		0		0		0		1	10.0	0		0		0		0		0		1	1.0
4- 6	0		1	6.3	0		0		0		0		0		0		1	25.0	0		0		1	16.7	3	2.9
7- 9	1	7.7	3	18.8	0		5	31.3	0		0		0		2	40.0	0		2	28.6	1	20.0	3	50.0	17	16.7
10-12	5	38.5	6	37.4	2	33.3	4	25.0	1	11.1	0		4	40.0	1	20.0	1	25.0	3	42.8	1	20.0	0		28	27.5
13-18	7	53.8	5	31.2	4	66.7	7	43.7	7	77.8	4	80.0	5	50.0	1	20.0	1	25.0	2	28.6	0		1	16.7	44	43.0
19-24	0		1	6.3	0		0		1	11.1	0		0		0		1	25.0	0		3	60.0	0		6	5.9
25-30	0		0		0		0		0		1	20.0	0		1	20.0	0		0		0		0		2	2.0
31-36	0		0		0		0		0		0		0		0		0		0		0		1	16.7	1	1.0
TOTAL	13	100.0	16	100.0	6	100.0	16	100.0	9	100.0	5	100.0	10	100.0	5	100.0	4	100.0	7	100.0	5	100.0	6	100.0	102	100.0
MEDIAN	12.60		11.11		13.68		11.38		15.20		15.96		12.00		10.58		12.00		10.58		19.25		8.00		12.44	

It is recognized that a man may complete a program in a short period of time if he has received previous training in the institution, was released on parole, was returned to the institution, and then placed again in the program. However, these results also indicate some relaxation of training standards if the definition of a trained individual includes that he meet at least the specified hours of training centering around 18 months per course (except barbering).

The median length of stay for vocational training participants was longer than for non-participants. (See Table XVI.) Thus, an inmate's suspicions may be somewhat confirmed that he would leave the institution sooner if he stays out of vocational training, even though he subsequently drops out. Another explanation is that only those individuals with longer minimum sentences are placed in the vocational training programs.

TABLE XVI
LENGTH OF STAY OF STUDY GROUP COMPARED TO CONTROL GROUP, FAILURE GROUP, AND ALL INMATES RELEASED IN Fiscal Year 1963

	STUDY GROUP		CONTROL GROUP		FAILURE GROUP		ALL INMATES RELEASED IN FISCAL YEAR 1963	
LENGTH OF STAY	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
6 MONTHS OR LESS	1	1.0	1	1.0	1	1.1	53	4.1
7 - 12 MONTHS	5	4.9	12	11.8	8	8.9	213	16.5
13 - 18 MONTHS	43	42.1	43	42.0	26	28.9	449	34.8
19 - 24 MONTHS	29	28.4	28	27.5	40	44.4	331	25.8
2 - 3 YEARS	17	16.7	12	11.8	8	8.9	123	9.5
3 - 4 YEARS	4	3.9	4	3.9	5	5.6	43	3.3
4 - 5 YEARS	1	1.0	1	1.0	0	-	32	2.5
OVER 5 YEARS	2	2.0	1	1.0	2	2.2	45	3.5
TOTAL	102	100.0	102	100.0	90	100.0	1289	100.0
MEDIAN	18.65		17.53		19.75		17.28	

Table XVII shows the length of stay in the institution by type of vocational training for the Study Group.

TABLE XVII
LENGTH OF STAY BY INSTITUTION
BY TYPE OF VOCATIONAL TRAINING IN STUDY GROUP

LENGTH OF STAY	AUTO MECHANICS		BARBER		CARPENTRY		DRAFTING		MACHINE		OFFICE MACHINE REPAIR		RADIO AND TV REPAIR		SHEET METAL		SHOE RE-BUILDING		DRY CLEANING		BODY AND FENDER		OTHER		TOTAL	
	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT
6 MONTHS OR LESS	0		0		0		0		0		0		0		0		0		0		0		0		0	
7-12 MONTHS	1	8.0	0		1	17.0	2	12.0	0		0		0		0		0		0		0		1	17.0	5	5.0
13-18 MONTHS	6	45.9	3	19.0	3	50.0	8	50.0	4	44.0	2	40.0	5	50.0	4	80.0	1	25.0	5	71.0	2	40.0	0		43	42.0
19-24 MONTHS	4	30.1	9	56.0	0		6	38.0	2	22.0	0		3	30.0	0		2	50.0	2	29.0	0		2	33.0	30	29.0
2-3 YEARS	1	8.0	3	19.0	2	33.0	0		3	34.0	1	20.0	2	20.0	1	20.0	0		0		2	40.0	2	33.0	17	17.0
3-4 YEARS	1	8.0	1	6.0	0		0		0		0		0		0		0		0		1	20.0	1	17.0	4	4.0
4-5 YEARS	0		0		0		0		0		1	20.0	0		0		0		0		0		0		1	1.0
OVER 5 YEARS	0		0		0		0		0		1	20.0	0		0		1	25.0	0		0		0		2	2.0
TOTAL	13	100.0	16	100.0	6	100.0	16	100.0	9	100.0	5	100.0	10	100.0	5	100.0	4	100.0	7	100.0	5	100.0	6	100.0	102	100.0

1952

Lack of Ability and Motivation

An important problem faced by the vocational training program at the adult correctional institutions is that of the vocational training "dropout". Only 53 per cent of the inmates released in this period of time who had participated in vocational training eventually graduated. Inmates who drop out of vocational training programs do so at a relatively early date. About 40 per cent of these individuals dropped out within the first three months and 70 per cent within the first six months. (See Table XVIII.) Only three of the 90 dropouts in the Failure Group stayed in the vocational program for more than a year. The median number of months in vocational training for all the dropouts was only four (3.9) months. Evidently, if an inmate can get by the first few months, his chances of completing the program are statistically very good.

Personnel at both the Reformatory and the Penitentiary agree that inmates drop out of vocational training primarily because of lack of "training proficiency," meaning lack of ability and/or motivation. This assertion is supported by the fact that the performance of all inmates in the Study Group was graded average or above whereas 38 per cent of those in the Failure Group received a grade below average. Conceivably, the 38 per cent represents the proportion of those who lack ability while the balance would represent the proportion of those who lack motivation. This point is substantiated somewhat by the data in Table XIX. Only seven of the 51 (or 14 per cent) in the Failure Group who received average or above grades had a below average mental level while six of 34 (or 18 per cent) of those in the Failure Group who received below average grades had a mental level of below average.

TABLE XVIII
NUMBER OF MONTHS IN VOCATIONAL PROGRAM BY TYPE OF VOCATIONAL TRAINING
FOR FAILURE GROUP

NUMBER OF MONTHS	AUTO MECHANICS		BARBER		CARPENTRY		DRAFTING		MACHINE		OFFICE MACHINE REPAIR		RADIO AND TV REPAIR		SHEET METAL		SHOE RE-BUILDING		DRY CLEANING		BODY AND FENDER		OTHER		TOTAL	
	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT
1- 3	3	33.3	1	16.7	3	30.0	8	44.4	4	44.5	0		3	37.5	6	60.0	2	28.6	1	50.0	4	57.1	2	100.0	37	41.1
4- 6	1	11.1	2	33.3	5	50.0	5	27.8	1	11.1	2	100.0	3	37.5	3	30.0	3	42.8	0		1	14.3	0		26	28.9
7- 9	5	55.6	2	33.3	2	20.0	4	22.2	1	11.1	0		1	12.5	1	10.0	2	28.6	1	50.0	2	28.6	0		21	23.4
10-12	0		0		0		1	5.6	2	22.2	0		0		0		0		0		0		0		3	3.3
13-18	0		1	16.7	0		0		1	11.1	0		1	12.5	0		0		0		0		0		3	3.3
TOTAL	9	100.0	6	100.0	10	100.0	18	100.0	9	100.0	2	100.0	8	100.0	10	100.0	7	100.0	2	100.0	7	100.0	2	100.0	90	100.0
MEDIAN	6.30		6.00		4.30		3.60		4.50		4.50		4.00		2.47		4.50		3.00		2.60		1.50		3.92	

1954

TABLE XIX
GRADE IN VOCATIONAL TRAINING BY MENTAL LEVEL
STUDY GROUP COMPARED TO FAILURE GROUP

GRADE IN VOCATIONAL TRAINING	STUDY GROUP														FAILURE GROUP													
	MENTAL LEVEL														MENTAL LEVEL													
	INFERIOR		LOW		AVERAGE		HIGH		SUPERIOR		UNKNOWN		TOTAL		INFERIOR		LOW		AVERAGE		HIGH		SUPERIOR		UNKNOWN		TOTAL	
	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT
ABOVE AVERAGE	0		7	11.3	29	46.8	21	33.9	3	4.8	2	3.2	62	100.0	0		1	9.1	12	85.8	1	7.1	0		0		14	100.0
AVERAGE	1	2.6	3	7.9	25	65.8	6	15.8	2	5.3	1	2.6	38	100.0	0		6	16.2	21	56.8	7	18.9	3	8.1	0		37	100.0
BELOW AVERAGE	0		0		0		0		0		0		0		1	2.9	5	14.7	23	67.6	5	14.7	0		0		34	100.0
UNKNOWN	0		0		1	50.0	1	50.0	0		0		2	100.0	0		1	20.0	4	80.0	0		0		0		5	100.0
TOTAL	1	1.0	10	9.8	55	53.9	28	27.5	5	4.9	3	2.9	102	100.0	1	1.1	13	14.4	60	66.7	13	14.4	3	3.3	0		90	100.0

Academic Achievement and the Dropout

The grade received in vocational training is related to academic achievement as well as to mental level. Academic achievement is measured by the California and the Stanford Achievement Tests. Data in Table XX show that the higher the achievement test score, the higher the grade received in vocational training. In the Study Group, those who received above average grades in vocational training had a median achievement level of 9.5 and those who received an average grade had an achievement test score of 9.0. In the Failure Group, the relationship between grade in vocational training and achievement test scores becomes clearer. Those who received a grade of above average had a median achievement test score of 9.5, those who received an average grade had a median achievement test score of 9.0, and those who received a below average grade in vocational training had a median achievement test score of 7.8. In comparing the Study Group to the Failure Group, it should be noted that, as expected, those who successfully completed their vocational training course had a higher median achievement test score than those who did not (9.3 compared to 8.6). The difference, however, is accounted for by the low achievement level of those inmates in the Failure Group who received below average grades. When comparing those in both groups who received average or above average grades the differences between the medians are negligible.

One of the institutional requirements for admission to the vocational training program is that the inmate must have the ability to function academically on the ninth grade level. Thus, if this prerequisite were rigorously followed, no inmate could

TABLE XX
GRADE IN VOCATIONAL TRAINING BY ACHIEVEMENT TEST SCORE
STUDY GROUP COMPARED TO FAILURE GROUP

ACHIEVEMENT TEST SCORE	STUDY GROUP										FAILURE GROUP									
	GRADE IN VOCATIONAL TRAINING										GRADE IN VOCATIONAL TRAINING									
	ABOVE AVERAGE		AVERAGE		BELOW AVERAGE		UNKNOWN		TOTAL		ABOVE AVERAGE		AVERAGE		BELOW AVERAGE		UNKNOWN		TOTAL	
	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT	NO.	PER CENT
03 - 03.9	1	1.6	0		0		0		1	1.0	0		0		0		0		0	
04 - 04.9	1	1.6	0		0		0		1	1.0	1	7.1	2	5.4	1	2.9	0		4	4.4
05 - 05.9	2	3.2	1	2.6	0		0		3	2.9	0		1	2.7	1	2.9	0		2	2.2
06 - 06.9	3	4.8	2	5.3	0		0		5	4.9	2	14.3	3	8.1	6	17.6	1	20.0	12	13.3
07 - 07.9	7	11.3	3	7.9	0		0		10	9.8	2	14.3	3	8.1	11	32.4	2	40.0	18	20.0
08 - 08.9	8	12.9	11	28.9	0		0		19	18.6	0		7	18.9	3	8.8	0		10	11.1
09 - 09.9	16	25.8	9	23.7	0		0		25	24.5	3	21.4	10	27.0	5	14.7	1	20.0	19	21.1
10 - 10.9	9	14.5	4	10.5	0		2	100.0	15	14.7	3	21.4	2	5.4	5	14.7	1	20.0	11	12.2
11 - 11.9	7	11.3	3	7.9	0		0		10	9.8	2	14.3	3	8.1	1	2.9	0		6	6.7
12 - 12.9	5	8.1	0		0		0		5	4.9	0		2	5.4	0		0		2	2.2
OVER 12.9	0		1	2.6	0		0		1	1.0	0		0		0		0		0	
UNKNOWN	3	4.8	4	10.5	0		0		7	6.9	1	7.1	4	10.8	1	2.9	0		6	6.7
TOTAL	62	100.0	38	100.0	0		2	100.0	102	100.0	14	100.0	37	100.0	34	100.0	5	100.0	90	100.0
MEDIAN	9.47		9.00		-		10.50		9.34		9.50		9.05		7.77		7.75		8.60	

enter the program with an achievement test score below this level. The data in Table XX belie the rigorous application of this prerequisite. Of the 192 inmates released in the 1963 fiscal year who enrolled in the vocational training course, 85, or 44 per cent, scored below the ninth grade level on the achievement test.

When inmates cannot demonstrate their ability to function academically on the ninth grade level, they are given the opportunity to raise their achievement level by attending academic classes in the institution. If they can pass their academic courses at the appropriate level and show that they raised their achievement scores to the required level, then they may enter the vocational program. Table XXI shows that 34 students in the Study Group (presumably the 34 of the 39 who scored below the ninth grade level) attended academic classes in the institution. Two of the 34 inmates in the Study Group who attended academic classes preparatory to taking vocational training still failed to achieve a ninth grade educational level. They nevertheless, were permitted to undertake a vocational training course for reasons peculiar to the individual cases involved. An even higher proportion of inmates in the Failure Group who failed to achieve the ninth grade level were later admitted to a vocational training program (12 inmates or 13 per cent). A comparison of the Study Group with the Control Group shows that approximately the same proportion of inmates in these two groups attempted to benefit from the academic program in the institution.

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TABLE XXI
EDUCATIONAL LEVEL ACHIEVED IN INSTITUTION FOR
STUDY GROUP COMPARED TO CONTROL GROUP AND FAILURE GROUP

EDUCATIONAL LEVEL ACHIEVED IN INSTITUTION	STUDY GROUP		CONTROL GROUP		FAILURE GROUP	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
GRADES 5 - 6	1	1.0	1	1.0	4	4.4
7 - 8	1	1.0	4	3.9	8	8.9
9 - 10	8	7.8	10	9.8	21	23.3
11 - 12	24	23.5	22	21.6	11	12.2
OVER GRADE 12	0	-	1	1.0	0	-
NOT APPLICABLE	68	66.7	64	62.7	46	51.2
TOTAL	102	100.0	102	100.0	90	100.0

Competition of Other Programs with Vocational Training

The second basic cause of vocational program dropouts is transfer to Institutional Industries or to a forestry camp. The motivation for this transfer appears to be in part to receive pay within the program assignment. Among the releases from the adult correctional institutions in the 1964 fiscal year, 23 per cent had at one time or another worked in Institutional Industries. However, only 11 per cent of the Study Group had at one time or another worked in this program. Inmates who undertake and successfully complete a vocational training course have insufficient time to undertake other programs such as Institutional Industries. However, 21 per cent of the Failure Group, those who did not complete a vocational training program, worked in Institutional Industries. In fact, six of the eight inmates at the Penitentiary

who dropped out of vocational training subsequently worked in Institutional Industries. Twenty-four of the 82 vocational program dropouts at the Reformatory similarly undertook employment in Institutional Industries. The latter proportion, which might be interpreted as rather low, nevertheless demonstrates that inmates leave vocational training for Institutional Industries. The remaining inmates who dropped out of vocational training at the Penitentiary subsequently were transferred to a forestry camp while the same was true of 14 inmates at the Reformatory.

Other reasons for program dropout include parole, transfer to the honor farm and transfer from one institution to another.

POST-INSTITUTIONAL EXPERIENCE

It is difficult to determine the effects of prison experience on the offender. Diverse data all suggest that much reformation of criminals does occur with imprisonment[1] but it is a mistake to maintain that any single correctional program is sufficient in itself to manifestly affect parole outcome. If one is to use parole behavior as the criterion for evaluation of a correctional program, the effects of every program in which the inmate participates must be considered as well as numerous other environmental, situational, and personality problems. Each program works together in the rehabilitative effort; each is necessary but not in itself sufficient to success on parole. Also, it is difficult to measure the impact of various aspects within a particular program.

Further, individual needs are different and there are a wide range of different causal conditions which lead to criminal behavior. Therefore, in the search for the elusive cause of change in behavior it is difficult to determine whether any one program or a set of programs was the reason for a particular inmate overcoming the emotional and environmental pressures he faced upon return to the community.

Thus, it might be expected that there would be little difference between parole success between the Study and Failure Groups. Indeed, Table XXII indicates that inmates who undertook

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[1]Glaser, Daniel, *The Effectiveness of a Prison and Parole System* (Kansas City, the Bobbs-Merrill Co., Inc., 1964), p. 89.

vocational training became parole violators in the same proportion as those who had no vocational training. A more meaningful evaluation of the vocational training program is (1) the determination of subsequent employment in the area of training and (2) the length of employment in the area of training. The following paragraphs will discuss these two variables. Also, the various avenues the trainees used to seek employment will be discussed.

TABLE XXII
PAROLE OUTCOME OF
STUDY GROUP COMPARED TO CONTROL GROUP

PAROLE OUTCOME	STUDY GROUP		CONTROL GROUP	
	NUMBER	PER CENT	NUMBER	PER CENT
PAROLE VIOLATORS[A]	44	43.1	40	39.2
NON-VIOLATORS	58	56.9	58	56.9
UNKNOWN AT TIME OF PUBLICATION	-		4	3.9
TOTAL	102	100.0	102	100.0

[A]A PAROLE VIOLATOR IS DEFINED AS A PAROLEE WHO HAS ABSCONDED PAROLE, HAS BEEN REINSTITUTIONALIZED OR HAS HAD A CUSTODY WARRANT ISSUED AGAINST HIM.

Subsequent Employment in the Area of Training

Although vocational training in itself is not a sufficient prerequisite to parole success, adequate vocational preparation is necessary if one of the objectives of the institution is to assist the inmates to become employable. That this goal is achieved in some degree is reflected in the data in Table XXIII which show that 36 of the 102 men trained in one of the vocational areas subsequently obtained employment in their trade. Good success was experienced among the barbers inasmuch as 11 of the 16 trained obtained employment in barbering upon parole. The course of office machine repair offered at the Penitentiary trained five men and four subsequently found work. Informal discussions with the instructor of the office machine repair class, as well as the

TABLE XXIII
EMPLOYMENT IN AREA OF TRAINING
STUDY GROUP

TYPE OF VOCATIONAL TRAINING	VIOLATORS				NON-VIOLATORS				TOTAL	
	WASHINGTON STATE PENITENTIARY		WASHINGTON STATE REFORMATORY		WASHINGTON STATE PENITENTIARY		WASHINGTON STATE REFORMATORY			
	TOTAL TRAINED	OBTAINED EMPLOYMENT	TOTAL TRAINED	OBTAINED EMPLOYMENT	TOTAL TRAINED	OBTAINED EMPLOYMENT	TOTAL TRAINED	OBTAINED EMPLOYMENT	TOTAL TRAINED	OBTAINED EMPLOYMENT
AUTO MECHANICS	1	0	2	0	5	1	5	0	13	1
BARBERING	4	3	6	3	0	0	6	5	16	11
CARPENTRY	-	-	3	1	-	-	3	2	6	3
DRAFTING	-	-	6	1	-	-	11	4	17	5
MACHINIST	1	0	1	0	2	2	4	1	8	3
OFFICE MACHINE REPAIR	2	1	-	-	3	3	-	-	5	4
RADIO AND T.V. REPAIR	-	-	4	0	-	-	6	2	10	2
SHEET METAL	-	-	1	0	-	-	4	0	5	0
SHOE SHOP	-	-	2	0	-	-	2	1	4	1
DRY CLEANING	-	-	6	1	-	-	1	0	7	1
BODY AND FENDER REPAIR	2	1	1	1	2	2	1	0	6	4
OTHER	2	1	0	0	0	0	3	0	5	1
TOTAL	12	6	32	7	12	8	46	15	102	36

1963

principal and vice-principal of vocational training, indicated this high rate of success has been typical since the initiation of this course. Other vocational trades in which half or more of the inmates subsequently obtained employment were carpentry, and body and fender repair. Less success was experienced in the areas of drafting, machinist trade, and radio and television repair inasmuch as less than one half of those trained subsequently obtained employment in their area of training. Poor results were experienced in the areas of automotive mechanics, the sheet metal trade, the shoe repair trade, dry cleaning, and the residual category of "other" inasmuch as either no one or only one man of those trained found employment in the specific area of training.

As one might expect, considerably more of the non-violators obtained employment in their area of training than did the violators. Twenty-three of the 36 who succeeded in obtaining employment were non-violators while 13 were violators.

Men paroled from the Penitentiary had a higher success rate than did men from the Reformatory. Of the 24 men who were trained at the Penitentiary, 14 or 58 per cent found jobs in their area of training after their release. At the Reformatory, however, only 22 men of the 78 trained (or 28 per cent) subsequently found employment in their area of training.

Length of Employment on Job in Area of Training

Vocational training at the correctional institutions purports to teach good work habits in addition to a specific trade and one measure of good work habits is job success in terms of stability. Table XXIV shows that only one man released from the Washington State Penitentiary trained in the vocational program

and only six at the Washington State Reformatory obtained and held a job for six months or more. In fact, vocational trainees had much less success in staying on a job for any period of time than did inmates who had not taken vocational training. Why this was the case is unknown at the present time. This outcome was not due, however, to the fact that the vocational trainees are trained in areas with a higher competition for jobs than those who had not taken vocational training. The exact same proportion (38 per cent) of both the Study and Control Groups obtained employment immediately upon release from the institution. (See Table XXV.) Moreover, similar proportions (28 per cent for the Study Group and 24 per cent for the Control Group) of both groups were employed within the first two months after release. In the Study Group, about 13 per cent did not obtain employment of any kind during the parole follow-up period while the same was true of about 16 per cent of the Control Group. Thus, approximately the same proportion in both the study and the control groups did not obtain employment.

TABLE XXIV
JOB SUCCESS[A] BY PAROLE OUTCOME
STUDY GROUP COMPARED TO CONTROL GROUP

PAROLE OUTCOME	STUDY GROUP		CONTROL GROUP	
	WASHINGTON STATE PENITENTIARY	WASHINGTON STATE REFORMATORY	WASHINGTON STATE PENITENTIARY	WASHINGTON STATE REFORMATORY
VIOLATORS	1	2	0	7
NON-VIOLATORS	0	4	13	26
TOTAL	1	6	13	33

[A]JOB SUCCESS IS DEFINED, IN THIS TABLE, AS OBTAINING EMPLOYMENT OF ONE OR MORE JOBS IN ANY AREA FOR A PERIOD OF SIX OR MORE MONTHS.

TABLE XXV
LENGTH OF TIME UNTIL FIRST JOB
STUDY GROUP COMPARED TO CONTROL GROUP

	STUDY GROUP						CONTROL GROUP					
	VIOLATORS		NON-VIOLATORS		TOTAL		VIOLATORS		NON-VIOLATORS		TOTAL	
NUMBER OF MONTHS	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
IMMEDIATELY EMPLOYED	17	38.6	22	38.0	39	38.2	13	32.5	26	41.9	39	38.3
EMPLOYED WITHIN TWO MONTHS	9	20.5	19	32.8	28	27.5	11	27.5	13	21.0	24	23.5
EMPLOYED WITHIN THREE TO SIX MONTHS	7	15.9	6	10.3	13	12.7	3	7.5	15	24.2	18	17.6
NOT EMPLOYED WITHIN FIRST SIX MONTHS	2	4.5	5	8.6	7	6.9	0	0.0	5	8.1	5	4.9
NEVER EMPLOYED	8	18.2	5	8.6	13	12.7	13	32.5	3	4.8	16	15.7
UNKNOWN	1	2.3	1	1.7	2	2.0	0	0.0	0	0.0	0	0.0
TOTAL	44	100.0	58	100.0	102	100.0	40	100.0	62	100.0	102	100.0

1966

Within the Study Group, two-thirds (67 per cent) of the vocational training participants worked in their area of training for a period of longer than six months. (See Table XXVI.) This result seems to contradict the point made above that very few trainees stay with a job for a period of longer than six months. This apparent contradiction is due to the fact that vocational trainees experienced a higher degree of turnover in the number of jobs they held after parole. Of the 24 trainees, the two-thirds proportion represents those who were employed in their area of training for longer than six months although only seven of them held jobs for periods equal to or exceeding six months at any one time.

TABLE XXVI
NUMBER OF MONTHS EMPLOYED IN AREA OF TRAINING
STUDY GROUP

NUMBER OF MONTHS	VIOLATORS		NON-VIOLATORS		TOTAL	
	WASHINGTON STATE PENITENTIARY	WASHINGTON STATE REFORMATORY	WASHINGTON STATE PENITENTIARY	WASHINGTON STATE REFORMATORY	NUMBER	PER CENT
LESS THAN 3 MONTHS	2	1	1	1	5	14.0
3 - 6 MONTHS	3	2	1	1	7	19.4
7 - 9 MONTHS	1	2	0	4	7	19.4
10 - 12 MONTHS	0	1	1	2	4	11.1
MORE THAN 12 MONTHS	0	1	5	7	13	36.1
TOTAL	6	7	8	15	36	100.0

Avenues Used to Seek Employment

It is interesting to note the various avenues parolees used to seek employment. The various resources an inmate may utilize to obtain employment are explained to him in his pre-release or pre-parole experience at the institution. However, very few men used these resources. Among the 102 inmates included in the Study Group, only one man found employment through a union, only two men utilized the parole officer, five men used relatives and friends, only one man used the state employment service, and no one attempted to find employment through a private employment service. The remaining individuals either relied solely upon their own efforts or made no effort at all. As mentioned above, eight vocational trainees were never able to find employment during the follow-up period. The man who tried to use the union was unsuccessful. However, every man who used relatives and friends and the state employment service to find a job subsequently became employed.

Information available reveals employers were aware of the status of 24 of the 102 men included in the Study Group while an additional three men were self-employed. Presumably, the balance of the trainees did not inform their employer of their parole status. Fifteen men in the Control Group informed their employer of their parole status while an additional four men were self-employed. Thus, while most of these job seekers with a criminal background did not inform their employer of their status, it appears that knowledge of the criminal background by employer does not preclude employment.

CONCLUSION

In Washington State the vocational training programs in the adult correctional institutions are attempting to equip the inmate with trade skills which will enable him to pursue a skilled occupation upon return to the community. In pursuit of this goal the vocational training programs are geared to meet the standards of apprenticeships in industry throughout the state. The classes are small, the professional qualifications for the vocational teachers are quite rigorous, the program curriculum is very satisfactory, and equipment available is adequate. Thus, the emphasis in the program is towards contribution to inmate rehabilitation rather than simply to help fill the prisoner's time. Because of these factors a high expectation exists that the inmate completing the program will use his training upon release. However, it is difficult to determine whether any one program or set of programs for a particular inmate can overcome the emotional and environmental pressures he faces upon his return to the community.

Only 36 of the 102 men trained and released during the 1963 fiscal year subsequently obtained employment in their trade, thus showing some failure of individuals to carry through with their vocational training. Comparison of the Study and Control Groups showed that the general population of released offenders who had never been exposed to vocational training in the institution entered the labor market in the same proportions as those who undertook vocational training. Vocational trainees did not stay on a job for any longer period of time than did inmates who had not taken vocational training. The best success was experienced

in obtaining employment in the field of training by those completing the courses in office machine repair and barbering. One-half or more of the inmates trained in body and fender repair and carpentry were subsequently employed in their trades. Limited to poor success was experienced in finding employment in the area of training in the remaining trades. Within the Study Group considerably more of the non-violators obtained employment in their area of training than the violators.

The data reported in this study suggest certain modifications of the vocational program to increase its effectiveness. These suggested modifications center around greater screening of applicants, alleviating competition of other programs, adjusting length of stay, maintaining high standards, and improving assistance to the certified trainees in finding work in their area of training.

In discussing the screening of applicants, it is seen that almost one-half of the inmates entering the vocational training program did not finish the program due, primarily, to a lack of ability and/or motivation. The classification committee, in screening applicants for vocational training program, must judge motivation and ability. Further, consideration must be given to previous work record and future plans. The problem for institutional personnel is to devise more appropriate means by which aptitude, ability, and sincere interest can be ascertained. For example, all inmates expressing an interest in vocational training might be given appropriate performance, mechanical and motor tests to determine their eligibility. The results showed that the relatively young, immature, first offenders who are yet to be

married are more likely to fail when placed in a vocational training program than are the more mature individuals. The basic qualifications of mental level and achievement level are shown to be a necessity inasmuch as inmates who enter the vocational program with a high school or near high school education are much more likely to complete the program than those who do not have such backgrounds. Even though a man may make up his academic deficiencies in the institution, he nevertheless is more likely to fail in the completion of the program than the man who enters the program without this deficiency.

The second basic cause after lack of ability and/or motivation of vocational program dropouts was seen as transfer to Institutional Industries or a forestry camp where the inmate receives pay for his efforts. This transfer to other programs or a forestry camp could possibly be minimized if more counseling could be provided inmates, thereby increasing the motivation to remain in the Vocational Training Program since the inmate cannot transfer from the Vocational Training Program without the permission of the Classification Committee. It may be possible to also minimize this problem by making it very difficult to leave a training program once the inmate had committed himself to such a degree that acceptance was possible. In short, the commitment by the inmate to follow through with his vocational training program could perhaps be encouraged by the staff by both positive and negative measures. Remuneration for vocational training participants, similar to that provided for those in other programs, may have a stabilizing effect.

The median length of stay in the institution was longer for vocational training participants than for non-participants. Thus, an otherwise susceptive inmate might hesitate to involve himself in a vocational training program. This problem clearly deserves close attention by the Board of Prison Terms and Paroles and the institutional staff.

The median length of stay for those completing a program and receiving certification was 12.4 months, which indicates minor relaxation of training standards if the definition of a trained individual includes that he meet at least the specified hours of training centering around 18 months per course (except barbering). Care should be taken to insure that the quality of training is not jeopardized by turning out men as trained before they have actually completed the specified hours for the course. Industry measures the adequacy of a training program by the competency of its graduates.

The discussion concerning various avenues parolees used to seek employment revealed that few men utilized the state employment services, private employment services, unions, or their parole officer for help in finding employment. Another method of strengthening the vocational training program would be to place more emphasis in placing the certified trainee on a job he is trained to do. If special arrangements could be developed between the Board of Prison Terms and Paroles, Division of Vocational Rehabilitation, and Washington State Employment Service to make a greater effort to place the individual who has completed a vocational training program within an adult correctional institution, it may be possible to realize more results from training funds expended.

APPENDIX A

I. DETAILED COURSE DESCRIPTION

II. VOCATIONAL TEACHERS

III. PROGRAM ORGANIZATION

IV. PROGRAM COSTS

1973

Detailed Course Description

The Washington State Penitentiary has five vocational programs which are designed to teach the inmates skills and enable them to obtain employment upon release from the institution. Vocational training programs are offered in the area of office machine repair, machine shop, automotive mechanics, automotive body building and fender repair, and barber school.

The office machine repair course at Washington State Penitentiary consists of typewriter repair and electric typewriter-adding machine repair. The typewriter repair portion is designed to develop the following in each student: (1) A knowledge of the construction, functions and the principles of operation of standard and portable typewriters; (2) the ability to systematically diagnose malfunctions and plan for their correction; (3) the ability to replace worn parts and make adjustments necessary to correct the malfunctions in the operation of the machines; and (4) the ability to correctly use the common and special tools which are used in the repair of typewriters. The typewriter repair course runs for 40 weeks of 30 hours each plus an additional 12 weeks refresher course just prior to the student's release. The course material consists of training in basic typewriter theory, standard typewriter--both late and early models--portables, and rebuilding machines. The electric typewriter-adding machine repair portion of office machine repair is designed to develop in the student: (1) Knowledge of the construction, functions and principles of operation of adding machines and electric typewriters; (2) the ability to systematically determine malfunctions and plan for their correction; (3) the ability to use the common and special

tools used in the repair of adding machines and electric typewriters; and (4) the ability to replace worn parts and make adjustments which may cause malfunction of these machines. Students must have completed the typewriter repair course prior to entering the electric typewriter-adding machine course. The electric typewriter-adding machine repair course is a 39 week, 30 hours per week course. Instruction is given through an integrated series of lectures and shop jobs on the machines. Proper procedures and techniques of each operation are explained and/or demonstrated to the class as a group or as individuals. The class progresses through the course work as a unit. Nevertheless, special attention and instruction are given to those students who perform at a slower pace than the class. This procedure is also followed for a student who enrolls at a time later than the regular starting date.

The objective of the machine shop course is to start the student on an apprenticeship in the machine trade and make him better qualified to perform the basic machine operations he will be called on to perform in industry. Until recently, the Washington State Penitentiary was the only place in this state where an individual might acquire this training.

The machine shop program at Washington State Penitentiary is an 18 month course comprising a total of 2,200 hours of instruction, 15 per cent of which is trade related theory. This theory consists of shop mechanics, drafting, machine theory, heat treating, welding theory, grinding theory, and gear theory. The remaining 1,890 hours of shop time is spent in measuring instruments, hand tooling, drill press, lathe, shaping, milling, machine grinding, arc welding, gas welding, and heat treating. 1975

The generalized objective of the automotive mechanics course is to prepare men for employment in this trade. This course is planned to provide instruction on the basis of 30 hours a week, five days a week for a total of 2,250 hours. There are three theory classes each week. Every phase of automobile repair including welding and soldering are studied in both theory and practice. The course consists of training in power equipment, engine cooling systems, transmissions, brakes, suspensions, wheel alignment, carburation, electrical systems, and engine tuneup.

The automotive body rebuilding and fender repair course at the Washington State Penitentiary is designed to train the student in the proper procedure of repairs and refinishing and correct use of tools, equipment, and materials as well as a complete understanding of them. Also, the understanding of theory pertaining to the trade is taught along with the practical skills. This course is designed to fit the inmate in the Washington State apprenticeship training program. This course is designed to run for 2,000 hours which is equivalent to 18 months of program participation. All phases of theory will be covered in the first 12 months of the course. The school day is six hours, Monday through Friday. A portion of all phases of this course such as theory of metals, paints, proper procedures and techniques of operation as well as the complete understanding of the materials and tools used will be conducted by lectures. Much of the learning comes from classroom discussions as well as help given through visual aids, blackboard use in reference automotive text books, manuals, and trade journals. Because it is not always possible to have students on the same type of work or project at the same

time, a course outline is furnished to each one. This outline shows the needed time to complete each phase of the course as well as a place provided for the instructor to write in the student's accummulated time at each phase. With this outline, it is a simple matter to check a student's progress at any time. Trade related theory is covered in the first twelve months and is taught to each class in the order the subject matter appears during the ensuing development of course work. Approximately 15 per cent of the time is spent with study of theory. The balance of the time is spent in the shops on projects such as panels and various stock as well as live work on actual automobiles and trucks. The training also consists of instruction in the use of acetylene welding, arc welding, metal forming, body servicing, glass installation, chassis wiring, automotive trim, damage estimating, and painting and automotive finishing. Some students extend their training time to two years and in such cases, the student spends the last six months of this period specializing in one or more phases of the trade.

The barbering course at the Washington State Penitentiary is operated under the rules and regulations set up by the Washington State Barber Board. This course is organized on a five-day week for six hours each day. Five hours each week are utilized for practical aspects of barbering and six hours used for classroom study on the science and theory of barbering. The period of training is approximately one year or a minimum of 1,000 hours. Upon satisfactorily completing the barbering course, the student is allowed to take the state barber examination. Successful passing of this examination enables the student to obtain a barber apprentice permit upon release from the institution.

While the aims remain the same, the organization of the vocational program at the Reformatory is considerably different from that at the Penitentiary. At the Penitentiary, specific trade skills and trade-related data are taught concomitantly by the same instructor as the inmate progresses through the program. At the Reformatory, the specific vocational training is taught by one instructor and trade-related material is taught by another, thus using the team approach. For example, a trainee is taught fundamentals in mathematics for several weeks by one instructor in the vocational program and then he is subsequently taught the specific trade skills for which these mathematical functions are necessary by another instructor. The vocational training program at the Reformatory is set up on a 52 week a year basis geared to the quarter system. As each inmate progresses from quarter to quarter satisfactorily, he is promoted one step in four graded steps of professional competency. Thus, an inmate may enter the course in automotive mechanics as a beginning student in grade level one and if he successfully completes the program, he graduates in automotive mechanics as grade level four.

The level of program instruction is planned for study in the 10th, 11th, and 12th grades. The program was planned for six consecutive hours divided into four hours of shop practice and two hours of trade-related training five days a week for one school year or three consecutive hours divided into two hours of shop practice and one hour of trade theory and no related training five days a week in a two year period. The total time spent on each unit in ratio to the total time allowed for the program is one indication of the proficiency of the trainee. The trade-

related technical information pertinent to the specific vocation is integrated with the manipulative skills taught as part of the regular shop instruction.

One credit is given for each one hundred hours of the program completed successfully. Completion of the program makes it possible for an inmate to enter into the second year of a junior college trade program or to enter employment as apprentice or helper in a specific trade.

The student devotes at least one-half of the school day --not less than three consecutive hours per day and 15 hours per week--throughout the school year to practical work on a useful or productive basis in the shop or laboratory. A minimum of one additional hour per day is devoted to related shop theory and technical information. Trade-related classes are held for two hours each day where it meets the needs of those who qualify for the training. Trade theory classes in each area are held for not less than 144 hours per year.

The Reformatory offers a much wider range of vocational trade areas than does the Penitentiary although some of the areas are offered at both institutions. The Reformatory offers vocational courses in automotive mechanics, automotive body and fender repair, barbering, carpentry, drafting, dry cleaning, radio and television repair, the machinist trade, sheet metal, and shoe rebuilding.[1]

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[1]In addition to these courses, vocational instruction is available for the printing trade. However, this particular shop is located in Institutional Industries and is reported as an institutional industry on the data collection instrument. Thus, although a bon-a-fide vocational instructor is employed teaching inmates the skills required in the printing trade, these courses, unfortunately, cannot be included in this study.

The automotive mechanics program at the Reformatory begins with training in bench work and then proceeds to engine repair, electrical systems analysis and repair, clutch and transmission, brakes, chassis and axles, and power plant. Trade-related instruction is given in basic mathematics, basic science including the basic properties of solids, liquids, and gases, and theory in mechanics and machines. Theory in mechanics and machines includes study in such areas as forces and their effects, balance, equilibrium, parallel and angular movement, gravitation, motion and mechanical movement, simple and compound gear threads, mechanical power transmission friction and lubrication, mechanics of fluids at rest and in motion, and the principles and application of atmospheric pressures. Some instruction is given in the area of blueprint reading and drafting as applicable to automotive mechanics.

Trade instruction in automotive body and fender repair includes analysis of basic metal repair, basic painting, minor metal repair, advanced painting, and advanced metal repair. Trade-related instruction is given in basic mathematics (especially pertinent here is the ability to give honest and realistic estimates of cost and estimates), basic science including the basic properties of solids, and instruction in blueprint reading and drafting as applicable to body and fender repair.

Basic instruction in the barbering trade includes cutting hair, shaving, facial treatment, shampooing, cosmetic preparations and care of tools. Trade-related instruction is given in the principles of basic mathematics, health and hygiene, physiology, and anatomy. These latter two areas of study are required by the State Board of Barber Examiners as part of the barber curriculum.

The philosophy behind this requirement, presumably, is that a detailed knowledge of all the muscles and bones of the head is necessary if one is to give competent facial massage.

The carpentry course offers instruction in model construction, concrete form construction, framing, interior and exterior trim, roofing, and cabinet and staris. The trade-related instruction that is especially pertinent to the carpentry trade is that of basic mathematics. Here, attention is given to the learning of whole numbers, common fractions, decimal fractions, measurement (including the principles of linear measure, principles of angular and solular measure, and principles of surface measure), finance, graphics and statistics, and basic algebra. In addition, trade-related instruction is given in basic science and mechanics and machines. Blueprint reading is another trade-related skill which is necessary to the carpentry trade along with drafting.

Vocational instruction in drafting begins with the basic drafting and proceeds through successive steps to engineering drafting, architectural drafting and slide rule and surveying. Trade-related instruction includes basic mathematics and basic science, mechanics of machines, and blueprint reading. Specific instruction in trade drafting includes the use of tools and equipment, lettering, work drawing-two views, work drawing-three views, geometric constructions, isometric drawing, oblique drawing, perspective drawing, and sketching.

The vocational curriculum for the dry cleaning trade includes very little trade-related study. Some knowledge is necessary in the chemistry of solvents and spot remover. Basic dry cleaning instruction is given in marking and sorting, sewing machine, layout work, pressing, spotting, and general dry cleaning.

Instruction in radio and television repair is given in basic electricity, basic radio and radio receiver, basic television theroy, pre-FCC testing and basic transmitter theory. Trade-related instruction of particular pertinence is basic mathematics, basic science, blueprint reading, and drafting.

The machinist trade includes instruction in floor and bench work, engine lathe, milling machine, shaper machine, drill press machine, welding, and layout. The related instruction includes basic mathematics, basic science, blueprint reading, and drafting. Particular emphasis is given to the theory of mechanics and machines. Included here is instruction in forces and their effects, balance, equilibrium-parallel and angular movement, gravitation, motion and mechanical movement, simple machines-levers, simple machines-inclined plane and wedge, simple machines-wheel and axle, simple machines-screw thread, simple and compound gear thread, mechanical power transmission, friction and lubrication, simple and compound machines, mechanics of fluids at rest and in motion, and the principles and applications of atmospheric pressure.

The sheet metal trade includes similar trade-related instruction as in the machinist trade. Specific trade training is given in the operation of hand and machine tools, heating and air condition work, roofing, spouting, and guttering, soldering and brazing, layout and other special work projects.

Shoe rebuilding includes trade related training in principles of mathematics and principles of science. Specific vocational training is given in the use of equipment and tools, bench and cement work, fitting, lasting and reshaping, orthopedic

work, re-dye work, and finishing and cleaning. Additional trade-related training is given in the anatomy of the foot.

In addition to the former vocational courses specified above, a program of "on-the-job training" exists at both institutions. Inmates in this program are not given formal classroom training; rather, they receive their vocational training by first-hand experience. Approximately one year is required for a man to complete his "on-the-job training". The instruction is performed by a shop foreman rather than a vocational instructor. "On-the-job training" is carried on in such areas as cooking, baking, carpentry, and plumbing as well as in other areas.

Vocational Teachers

Important considerations in any teaching situation are the qualifications and morale of the teachers. The professional qualifications for vocational teachers in the two penal institutions are quite rigorous. Each teacher must meet certification by the Department of Public Instruction in addition to having journeyman level trade experience. When a vocational teacher meets these qualifications, a vocational trade certificate is awarded by the State Board of Public Instruction as an indication of his competency in his area of training. Each teacher must have three years of vocational work experience beyond his learning period.[1] In addition, each teacher must attend summer school every year for three years. Each teacher is expected to take courses in subsequent summers in the areas of elements of teaching,

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[1]The learning period is recognized by the profession as a period of apprenticeship.

occupational analysis, and course organization. A vocational teacher must complete his first summer by the end of his first year of employment, his second summer by the end of his third year of employment, and the third summer by the end of his fifth year of employment. Each teacher must have four years of journeyman experience in addition to a total of seven years in the field. Most teachers are working toward their Bachelor of Arts degrees.

At the present time[1], the pay scale for vocational teachers at the Washington State Reformatory starts at $685 per month and reaches a maximum of $815 per month. The salaries at the Penitentiary range from $8,000 to over $9,000 annually and represent contractual payment for 11 months of instruction based on an initial contract covering 184 teaching days and a second contract covering 40 teaching days. These contracts are issued to the teachers by Walla Walla School District No. 140.

Teacher turnover has been a problem at the Washington State Reformatory. This may be due, in large part, to the fact that the Reformatory has in the past had the lowest paying wages in the state and the teachers tended to leave for better wages. Those who stay frequently work at other part time positions to obtain funds. However, sometimes this extra employment also serves the dual purpose of maintaining contact within their area of interest. Some instructors have to keep up with their certification and since they are not in a school district, they have to leave the job in order to go to school for maintaining certification requirements. At the Reformatory, five instructors have been employed for one year or less, three between one and two years, one for four years, one for six years, and one for eight

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[1]January 1, 1966.

years. Turnover seems to be less of a problem at the Penitentiary. Since 1958, there has been a turnover of one teacher in the area of automobile mechanics, one in body and fender repair, one in the machine shop, and one in office machine repair.

Program Organization

The vocational training program is organized differently at each institution. All the vocational training courses at the Washington State Penitentiary are taught by teachers who are employed by the Walla Walla School District. These teachers are certified by the Division of Vocational Education in the Office of the Superintendent of Public Instruction. Upon completion of the vocational training programs, the inmate is issued a diploma which is certified by the Walla Walla School District. The inmate is thereby given school credit for completion of a given number of hours in each vocational training program. The state-employed vocational teachers at the Washington State Reformatory are also certified by the Division of Vocational Education in the Office of the Superintendent of Public Instruction. The program of vocational training at the Reformatory, however, is not affiliated with the local school district. Consequently, inmates do not receive official school credit upon the completion of a vocational course. The barbering course at both institutions is approved by the Washington State Department of Licenses. This course meets the minimum state requirements for obtaining the barbering permit as set by the Department of Licenses and the Washington State Board of Barber Examiners. The inmate who undertakes a barbering course is examined by the Board of Barber

Examiners upon completion of that course. Successfully passing this examination qualifies the inmate for barbering employment when he is released from the institution.

Orders for placing inmates in the program are established each quarter by the Education Department. Those to be trained are selected in order of qualifications by the classification committee. Inmates who are the best qualified for the program are placed at the top of the list and vacancies are filled as they arise.

There is normally a waiting list for all vocational courses. When a new class is established, the inmate is automatically called over for screening with all men on the list and a selection is then made. If a man is not selected at that time, his name will remain on the list until the next selection is made. The length of time a man is on the waiting list depends on the course and the amount of time he has to serve. Most inmates are put in the vocational course toward the end of their sentence so that trade skills acquired might more readily be utilized. It is the intention of the institutional staff that a man complete his vocational training within three to six months of the time he leaves the institution.

Once an inmate is placed in a vocational program, he is promoted through the various steps of the program in accordance with his attitude, grades, and display of interest for the trade in which he is training. Inmates are not promoted unless they are considered to have progressed satisfactorily. As he progresses in the vocational training program, the inmate receives instruction and experience in all branches of the trade including both theory and practice. Upon satisfactory completion of the year's training

in a vocational program, each inmate receives a certificate which indicates the course and the number of hours spent in learning a particular trade.

The Reformatory has a more diversified program and a greater proportion of inmate participation in its vocational training than the Penitentiary. Although the Penitentiary has a narrower vocational curriculum, it appears to offer a much more intensified program in terms of hours of instruction per inmate. The Penitentiary offers approximately 2,800 hours per inmate in each shop and trade-related course while the Reformatory offers 1,620 hours. The barbering course does not follow this pattern, however, in that both institutions offer a seven month course in barber training.

The Education Departments at both institutions have set up certain basic prerequisites for vocational training--the inmate must be 16 years of age or older, must have satisfactorily completed the ninth grade or passed an achievement test indicating the ninth grade achievement. This means that an inmate must be able to pass a standard achievement test with a grade point of at least 9.0 with minimums of 8.7 in the reading and spelling areas. Appropriate diplomas are offered in each field of study upon satisfactory completion of course work. He must have an interest in the trade in which he is to be placed and he must have a mechanical aptitude supported by a well-rounded knowledge of basic mathematics. Requirements may vary slightly for each specific vocational program.

Vocational Training Costs

The costs of the vocational training program during fiscal 1963 are not presently available. However, costs for

fiscal year 1965 are displayed in Table XXVII. These costs include the salaries of the vocational instructors at the Penitentiary. These salaries represent contractual payments for 11 months of instruction based on an initial contract covering 184 teaching days and a second contract covering 40 teaching days. These contracts are issued to the instructors by Walla Walla School District No. 140.

TABLE XXVII
COSTS OF VOCATIONAL TRAINING IN
ADULT CORRECTIONAL INSTITUTIONS
1965 Fiscal Year

	TOTAL		WASHINGTON STATE PENITENTIARY		SALARIES (PAID BY WALLA WALLA SCHOOL DIST. NO. 140)	WASHINGTON STATE REFORMATORY
	TOTAL[A]	TOTAL	TOTAL[A]	TOTAL		
TOTAL VOCATIONAL TRAINING COSTS	$177,122.44	$134,362.44	$53,779.50	$11,019.50	$42,760.00	$123,342.94
SALARIES AND WAGES	151,308.63	108,548,63	43,310.00	550.00	42,760.00	107,998.63
RETIREMENT AND PENSIONS	5,057.90	5,057.90	56.44	56.44		5,001.46
TOTAL SALARY COST	156,366.53	113,606.53	43,366.44	606.44		113,000.09
CONTRACT PERSONAL SERVICES		330.25		274.00		56.75
OTHER CONTRACTUAL SERVICES		1,089.08		399.56		689.52
TRAVEL		18.00		18.00		-0-
SUPPLIES AND MATERIAL		16,789.67		7,539.11		9,250.56
EQUIPMENT		2,528.91		2,182.39		346.52

[A] INCLUDES SALARIES PAID BY WALLA WALLA SCHOOL DISTRICT NO. 140.

The total cost for operation of the vocational programs at both institutions was $177,122.44 or $14,760.20 per month. The average number of inmates in the combined program per month was 181. Thus, the cost per student per month was $81.55. If the median number of months for all dropouts is 3.9 (see page 28), then it costs on the average $318 to handle the inmate who does not complete the vocational training course. These costs do not include institutional care such as food and housing and should, therefore, reflect actual program expenditures. The median number of months in program for those inmates receiving certification is 12.4 months (see page 24) which indicates a cost of approximately $1,000 per student completing a vocational training course.

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AEROMEDICAL EVACUATION TECHNICIAN GUIDE.
AEROMEDICAL EVACUATION.

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IDENTIFIERS - *AIR FORCE

ABSTRACT - THIS PAMPHLET ESTABLISHES THE POLICIES, PROCEDURES, AND STANDARDS FOR THE FUNCTION OF THE AEROMEDICAL EVACUATION TECHNICIAN AS A MEMBER OF AN AEROMEDICAL EVACUATION CREW. IT EXPLAINS THE CONFIGURATION OF AIRCRAFT USED IN AEROMEDICAL EVACUATION, THE AEROMEDICAL EVACUATION PROCESS, AND PROCEDURES IN ADMITTING AND LOADING PATIENTS. THE INFLIGHT CONSIDERATIONS NECESSARY FOR HEALTH AND COMFORT, PREFLIGHT, INFLIGHT, AND IMMEDIATE POSTFLIGHT DUTIES OF THE AEROMEDICAL EVACUATION TECHNICIAN, SUPPLIES, EQUIPMENT, AND SPECIAL MEDICAL EQUIPMENT AVAILABLE IN AEROMEDICAL EVACUATION AIRCRAFT, AND ACTIVITIES PERTINENT TO SURVIVAL WHEN EMERGENCIES OCCUR ARE DETAILED. THIS INFORMATION APPLIES TO ALL AIR FORCE AEROMEDICAL EVACUATION TECHNICIANS AND TO ALL PERSONNEL ENGAGED IN THE AEROMEDICAL EVACUATION PROCESS. (AUTHOR)

VT 013 844

AFP 164-1

AIR FORCE PAMPHLET

AEROMEDICAL EVACUATION

AEROMEDICAL EVACUATION

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DEPARTMENT OF THE AIR FORCE

DEPARTMENT OF THE AIR FORCE
Headquarters US Air Force
Washington DC 20330

AF PAMPHLET 164-1

21 April 1971

Aeromedical Evacuation

AEROMEDICAL EVACUATION TECHNICIAN GUIDE

This pamphlet establishes the policies, procedures, and standards for the function of the aeromedical evacuation technician as a member of an aeromedical evacuation crew. It explains the configuration of aircraft used in aeromedical evacuation; the aeromedical evacuation process; admitting and loading patients, and the inflight considerations necessary for their health and comfort, preflight, inflight, and immediate postflight duties of the aeromedical evacuation technician, supplies, equipment, and special medical equipment available on aeromedical evacuation aircraft; and activities pertinent to survival when emergencies occur. It applies to all Air Force aeromedical evacuation technicians and to all personnel engaged in the aeromedical evacuation process.

Contents

	Paragraph	Page
Chapter 1—The Aeromedical Evacuation Crew		
Section A—Nonmedical Crew		
Aircraft Commander	1-1	1-1
Flight Engineer (AFSC 435X0)	1-2	1-1
Aircraft Loadmaster (AFSC 60750)	1-3	1-1
Section B—The Medical Crew		
The Flight Surgeon	1-4	1-2
The Flight Nurse	1-5	1-2
The Aeromedical Evacuation Technician	1-6	1-2
Section C—Interpersonel Relations		
Good Interpersonal Relations	1-7	1-3
Deterrents to Good Interpersonal Relations	1-8	1-3
Individual Responsibility	1-9	1-3
Relations With Noncrew Members	1-10	1-3
Chapter 2—Aircraft Orientation		
Section A—Aircraft Used in Aeromedical Evacuation		
Aircraft Configuration for Aeromedical Evacuation	2-1	2-1
Seating Arrangement	2-2	2-16
Litter Arrangement	2-3	2-16
Configuration Equipment	2-4	2-16
Loading Devices	2-5	2-32
Weight and Balance Problems of Transport Aircraft	2-6	2-45
Pressure Check and Wing Scan Inspection	2-7	2-50
Section B—Aircraft Pressurization and Oxygen Equipment		
Aircraft Pressurization	2-8	2-50
Aircraft Oxygen Systems	2-9	2-51

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DISTRIBUTION: F (As AFM 161-11, ID only)

	Paragraph	Page
Chapter 3—The Aeromedical Evacuation System		
Section A—The Military Airlift Command (MAC) Aeromedical Airlift System		
Domestic Systems	3–1	3–1
Pacific System	3–2	3–2
European System	3–3	3–2
Aeromedical Evacuation Control Centers (AECC)	3–4	3–2
Aeromedical Evacuation Operations Officer (AEOO)	3–5	3–2
Status and Management Boards	3–6	3–2
Aeromedical Staging Unit	3–7	3–3
Medical Reserve Force Program	3–8	3–3
Section B—Other Aeromedical Evacuation Organizations and Considerations		
Tactical Air Command (TAC) Aeromedical Evacuation	3–9	3–3
Pacific Air Force (PACAF) Intra-Theater Aeromedical Evacuation	3–10	3–5
Armed Services Medical Regulating Office (ASMRO)	3–11	3–6
Special Considerations for Oversea Operations	3–12	3–6
Chapter 4—Admitting Patients to the Aeromedical Evacuation System		
Section A—Medical and Administrative Screening for Aeromedical Evacuation		
Persons Authorized Travel in Aeromedical Evacuation	4–1	4–1
Clinical Acceptances Criteria	4–2	4–1
Patient Classification	4–3	4–2
Patient Movement Precedence	4–4	4–2
Procedure for Requesting Aeromedical Evacuation	4–5	4–2
Section B—AECC Coordination and Activity		
Processing Incoming Telephone Calls	4–6	4–3
Processing Requests for Patient Movement	4–7	4–3
Chapter 5—Preflight Procedures		
Section A—Preparation Before Enplaning Patients		
Preparation of Litter Patients	5–1	5–1
Preparation of Walking Patients	5–2	5–9
Records Preparation	5–3	5–9
Fleet Service	5–4	5–15
Medical Supplies and Equipment	5–5	5–15
Section B—Patient Enplaning		
Patient Positioning Plans	5–6	5–15
Boarding	5–7	5–16
Briefing	5–8	5–17
Aeromedical Evacuation Technician Checklist	5–9	5–18
Chapter 6—Inflight Procedures		
Section A—Special Inflight Considerations		
Patients Psychological Reaction to Flight	6–1	6–1
Physiological Considerations in Flight	6–2	6–1
Pediatric Patients	6–3	6–1
Inflight Feeding	6–4	6–2
Modesty Curtains	6–5	6–2

	Paragraph	Page
Patient Comfort	6-6	6-3
Positioning Litter Patients	6-7	6-3
Administration of Intravenous Fluids	6-8	6-6
Blood Pressure	6-9	6-6
Isolation Technique	6-10	6-6
Air Sickness	6-11	6-7
Section B—Unusual Occurences		
Death in Flight	6-12	6-7
Unscheduled Stops	6-13	6-7
Deterioration of Patient's Medical Condition in Flight	6-14	6-8
Restraining Patients in Flight	6-15	6-8
Patients Refusing to Complete Trip by Air	6-16	6-8
AWOL Patient	6-17	6-8
Section C—Patient Conditions Requiring Special Attention		
Patients With Seizures	6-18	6-11
Colostomy Care	6-19	6-11
Surgical Problems of the Chest	6-20	6-11
Hypoxia	6-21	6-12
Inflight Eye Care	6-22	6-12
Amputations	6-23	6-12
Burns	6-24	6-14
Surgical or Traumatic Abdominal Wounds	6-25	6-14
Head Injuries	6-26	6-14
Spinal Cord Injuries	6-27	6-14
Technique of Tracheostomy Care	6-28	6-15
Section D—Aeromedical Evacuation Technician's Inflight and Immediate Postflight Duties		
Responsibilities	6-29	6-17
Section E—Briefing Patients Prior to Landing		
Briefing at En Route Stations	6-30	6-18
Briefing on Arrival at RON Stop	6-31	6-18
Briefing on Arrival at Destination Airfield Stop	6-32	6-18
Chapter 7—Baggage, Supplies, and Equipment		
Section A—Patient Baggage Management		
Baggage Limitations	7-1	7-1
Handling	7-2	7-1
Section B—Supplies and Equipment		
Classes of Supply Items	7-3	7-4
Signing for Equipment	7-4	7-4
Routine Supplies and Equipment	7-5	7-5
Special Equipment	7-6	7-5
Section C—Special Medical Equipment		
AMBU Resuscitator	7-7	7-5
AMBU Suction Pump	7-8	7-7
Armstrong Incubator	7-9	7-7
Artificial Nose	7-10	7-10
Bird Respirator (Mark 7, Mark 8, and Mark 10)	7-11	7-11
Carmody Aspirator	7-12	7-23
Traction Appliance, Scale Type, for Stryker Frame	7-13	7-25

	Paragraph	Page
Collins Traction—Litter	7-14	7-25
Stryker Turning Frame	7-15	7-29
Medical Equipment Power Supply Aboard Aeromedical Evacuation Aircraft	7-16	7-30
Chapter 8—Survival		
Section A—Preparing for Emergencies		
Notification of Emergency	8-1	8-1
Preparing for Impact	8-2	8-2
Section B—Exit and Survival		
Exit Upon Crash Landing	8-3	8-3
Exit Upon Ditching	8-4	8-3
Survival	8-5	8-3

Figures

	Page
2-1. Exterior and Interior Views of the C-7A Aircraft	2-2
2-2. Exterior and Interior Views of the C-9A Aircraft	2-4
2-3. Exterior and Interior Views of the C-118A Aircraft	2-6
2-4. Exterior and Interior Views of the C-123 Aircraft	2-8
2-5. Exterior and Interior Views of the C-130E Aircraft	2-10
2-6. Exterior and Interior Views of the C-131A Aircraft	2-12
2-7. Exterior and Interior Views of the C-141A Aircraft	2-14
2-8. Fixed Securing Devices	2-17
2-9. Utilizing Securing Devices	2-19
2-10. Placing Litter Into Fixed Securing Devices	2-27
2-11. Preparing Adjustable Securing Devices	2-33
2-12. Locking and Securing the Suspension Strap	2-36
2-13. Installing and Locking the Litter Bracket	2-38
2-14. Adjusting Litter Brackets on the Suspension Strap	2-40
2-15. Placing Litter Into Adjustable Devices	2-43
2-16. Hydraulic Ramp	2-46
2-17. Fork Lift	2-47
2-18. Truck Bed Ramp Extension	2-48
2-19. Self-Contained Ramp	2-49
2-20. Therapeutic Oxygen Panels	2-53
5-1. Steps Involved in Making a Litter	5-2
5-2. Preparing the Ambulatory Litter	5-10
5-3. Patient Evacuation Tag	5-13
5-4. Patient Baggage Tag	5-14
6-1. Frozen Capsule	6-3
6-2. Modesty Curtains	6-4
6-3. Litter Backrest With Canvas Cover	6-5
6-4. Applying Restraints	6-9
6-5. Chest Drainage Valve	6-13
6-6. Alternate Use of Litter Straps	6-16
7-1. Types of Baggage	7-3
7-2. AMBU Resuscitator	7-6
7-3. AMBU Suction Pump	7-8
7-4. Armstrong Incubator	7-9
7-5. Artificial Nose	7-12
7-6. Bird Mark 7 Medical Respirator and Breathing Assembly	7-14
7-7. Adult Breathing Circle for Tracheotomy Patients	7-16
7-8. 500 cc Inline Nebulizer	7-18
7-9. Bird Carrier	7-19
7-10. Non-Rebreathing Valve	7-21
7-11. Breathing Head Assembly	7-22

Figures

Page

7-12. Carmody Aspirator ---- 7-24
7-13. Traction Appliance ---- 7-26
7-14. Stryker Frame With Traction Appliance ---- 7-27
7-15. Collins Traction With Head Halter ---- 7-28
7-16. Collins Traction for Leg Traction ---- 7-28
7-17. Stryker Turning Frame ---- 7-29
7-18. C-131A Aircraft Electrical Schematic ---- 7-31
7-19. C-118A Aircraft Electrical Schematic ---- 7-31

Table

2-1. Data on Aircraft Used in Aeromedical Evacuation ---- 2-1

1996

CHAPTER 1

THE AEROMEDICAL EVACUATION CREW

An aeromedical evacuation aircraft becomes a "flying" hospital ward in which the medical crew members apply and adapt the principles of aerospace medicine to the inflight nursing care of patients. Effective care of these patients is dependent upon close teamwork between the nurse and technician as well as among others concerned with the safe and efficient movement of patients by air.

This chapter discusses the roles of members of the aeromedical evacuation crew, with emphasis on the aeromedical evacuation technician. In addition, the importance of effective interpersonal relations is discussed.

SECTION A—NONMEDICAL CREW

To assure provision of good patient care, all crew members must function as a team capable of performing efficiently under a variety of circumstances. Close teamwork between medical and nonmedical crew members is essential to the success of the aeromedical evacuation mission. To insure such teamwork, all aircrew members should have a basic understanding of aeromedical evacuation mission requirements, and a working knowledge of medical support equipment.

1-1. Aircraft Commander. The Air Force has stated that the commander is the person listed as the first pilot or aircraft commander by the organization that controls the aircraft. This eliminates any misunderstanding or confusion concerning command of the aircraft. Regardless of his grade, the aircraft commander is responsible for the safe conduct of the mission. Additional responsibilities of an aircraft commander on an aeromedical evacuation mission are to:

a. Provide assistance in enplaning and deplaning patients if requested.

b. Before departures, coordinate with the senior medical crew member any flight instructions (altitude, rate of descent, etc.) necessary due to patient condition, acceptance of cargo, or nonmedical passengers; and brief the individual on the flight plan. The senior medical crew member will, in turn, brief patients.

c. During flight, advise the senior medical crew member of unplanned deviations caused by altitude changes, turbulence, change in destination, etc.

d. Transmit aeromedical evacuation messages at the request of the senior medical crew member.

1-2. Flight Engineer (AFSC 435X0). According to AFM 39-1, *Airman Classification Manual,* this airman has the following responsibilities.

a. Performs aircraft inspections and maintenance.

b. Computes and applies aircraft weight and balance and aircraft performance data.

c. Operates and monitors engine and aircraft systems controls.

d. Performs flight duties in accordance with flight manual checklists.

1-3. Aircraft Loadmaster (AFSC 60750). There is generally no loadmaster on flights within CONUS. On most C-141 flights, this airman performs the function of preparing meals. Other responsibilities include:

a. Plan, schedule, and direct loading and unloading aircraft.

b. Arrange for supplies and equipment and provide for passenger/troop needs.

c. Implement passenger/troop safety measures and border agency clearance procedures.

d. Conduct aerial cargo drops.

SECTION B—THE MEDICAL CREW

Normally, the medical crew is composed of one or more flight nurses and two or more medical technicians. Occasionally, there is a medical officer on the flight.

1-4. The Flight Surgeon. Flight Surgeons, assigned to organizations having an aeromedical evacuation mission, concern themselves primarily with the Aerospace Medicine program and supervision of the aeromedical evacuation mission of the organizations within their area of responsibility. In the event a Flight Surgeon is aboard an aircraft as a crew member, he is the senior medical person on board and, as such, has overall professional responsibility for the care of the patients on the aircraft.

1-5. The Flight Nurse. This officer is a professional nurse specially trained to provide general nursing care to all types of patients during aeromedical evacuation flights.

a. **Responsibilities.** The flight nurse, as the senior medical member aboard an aircraft, is responsible for total patient care inflight. Briefly, the responsibilities involved are:

(1) Providing nursing care for all patients during flight.

(2) Supervising enplaning and deplaning of all patients.

(3) Supervising all subordinate medical personnel assigned to flights and assisting in their on-the-job training.

b. **Relationship With Aeromedical Evacuation Technicians.** This is an extremely close-working relationship and good patient care is dependent upon effective rapport between the nurse and technician. An attitude of mutual respect and loyalty, coupled with coordinated striving for "the best" for patients, will be reflected in the rendering of a high caliber of nursing care. The nurse and technician must cooperate with each other to insure that the required care is given.

1-6. The Aeromedical Evacuation Technician. The technician is an invaluable member of the aeromedical evacuation nursing team. His contribution is essential to the safe and comfortable transport of patients. If he keeps the patient in mind, the aeromedical evacuation technician will perform all his duties with a high degree of enthusiasm and purpose.

a. **Identification.** The "A" prefix identifies aircrew positions in manning documents and the individuals qualified to perform duties in these positions. Details for award of this prefix are contained in AFM 39-1.

b. **Training.** Course AZY 902XO, presented by personnel of the Aerospace Nursing Branch at the USAF School of Aerospace Medicine at Brooks Air Force Base, Texas, is the formal training program for the aeromedical evacuation technician. Attendance at this course is desirable, but not mandatory, for functioning in the specialty. Course prerequisites and application procedures are listed in AFM 50-5, *USAF Formal School Catalog*.

c. **Duties and Responsibilities.** Each squadron will have its own task lists for aeromedical evacuation technicians. Each airman must familiarize himself with what is expected of him. Basically, the duties and responsibilities of the technician are to:

(1) Assist the flight nurse in the care and handling of patients.

(2) Perform nursing functions.

(3) Assist with emergency procedures.

(4) Operate and perform minor inflight maintenance of special medical equipment.

(5) Function effectively in a survival situation.

(6) Perform operational and administrative duties in an aeromedical evacuation control center.

(7) Assist in on-loading and off-loading patient's baggage.

d. **Independent Function.** The aeromedical evacuation technician must be knowledgeable about all aspects of patient care inflight. In the absence of a Flight Surgeon and Flight Nurse, he functions as the senior medical person aboard a patient-carrying aircraft and, in this capacity, has full responsibility for the care of all patients aboard that aircraft.

SECTION C—INTERPERSONAL RELATIONS

The term, interpersonal relations, covers the ability to do a better job of understanding and getting along with oneself and with other people. It encompasses a variety of human transactions which happen daily between individuals. In simple terms, it is the personal "give and take" required in dealing with others.

1-7. Good Interpersonal Relations. Essential to good interpersonal relations are unstanding, tact, and respect for the human dignity of all with whom one comes in contact. These attributes are especially important for those in the medical services, as patient care suffers from lack of them.

1-8. Deterrents to good Interpersonal Relations. The aeromedical technician who is abusive, rude, or intolerant with patients, passengers, or anyone else jeopardizes the effective accomplishment of the aeromedical evacuation mission. Display of anger or contempt prompts the same attitude from those toward whom it is directed. Ill feelings flow in a never ending circle, with the patient in the middle. Equally destructive is the habit of criticizing or complaining constantly. If it is impossible to change a situation for the better, silence is a more mature reaction to things that are annoying than steady griping.

1-9. Individual Responsibility. Each member of the aeromedical evacuation crew contributes to the tone of the mission. One individual working at odds with everyone else causes friction, resulting in less effective patient care. The crew member, who is consistently courteous and friendly while displaying high standards of integrity and devotion to duty, truly promotes sound interpersonal relations.

1-10. Relations with Noncrew Members. It is important to remember that many other groups at widely separated locations take an active role in the patient movement process. Such groups include aircraft ground and maintenance crews, fleet service, base operations, and hospital personnel. Hostility, discourtesy, or failure to recognize their problems jeopardizes the success of the aeromedical evacuation process. Here again, close teamwork among all involved insures successful completion of the mission.

CHAPTER 2

AIRCRAFT ORIENTATION

Cargo-type aircraft are used in the aeromedical evacuation system. In wartime and emergency situations, they can carry troops, supplies, and cargo into a combat or troubled area and carry a maximum load of sick or wounded out of the area.

This chapter describes the aircraft used as "flying hospitals' 'and discusses those details the aeromedical evacuation technician needs to know about the aircraft and its environment. Brief reference is made to operational areas and preventive medicine considerations.

SECTION A—AIRCRAFT USED IN AEROMEDICAL EVACUATION

Some of the aircraft in use, such as the C–131, C–118, and the C–9, are single purpose aircraft used only for aeromedical evacuation. The others are multimission and used to move troops and cargo as well as patients. There is a technical order (TO) publication on each aircraft which gives, in definitive detail, all the information about that particular aircraft. It should be carefully studied as it is the key to knowledgeable functioning in the airborne environment. To familiarize the aeromedical evacuation technician with aircraft currently used to transport patients, this section pictures exteriors and interiors of such aircraft and gives some of the more important facts about them. Figures 2–1 to 2–7 show exterior and interior views of aircraft used in aeromedical evacuation. Table 2–1 gives a brief overview of the aircraft characteristics.

TABLE 2–1. DATA ON AIRCRAFT USED IN AEROMEDICAL EVACUATION

			Configuration		
Type Aircraft	*Approx Cruising Speed (MPH)*	*Pressurized*	*Mixed Litter/ Ambulatory*	*All Litter Normal/ High Density*	*All Ambulatory*
C–7A	180	No	14/10	20/20	30
C–9	500+	Yes	18/20	30/40	40
C–118	370	Yes	18/25	45/60	61
C–123	230	No	46/5	46/50	56
C–130E	360	Yes	50/27	70/74	85
C–131A	300	Yes	9/14	21/27	32
C–141	500+	Yes	27/42	63/80	124

2–1. Aircraft Configuration for Aeromedical Evacuation. The remainder of this section describes how the interior of the aircraft is arranged or organized for patient care, i.e., the seating and litter arrangement for ambulatory and bed patients. The configuration depends on the individual aircraft and the patient load. The right side of the plane is the copilot's side and the left is the aircraft commander's side. "Outboard" refers to the side nearest the fuselage, and "inboard" to the section of the tier near the aisle.

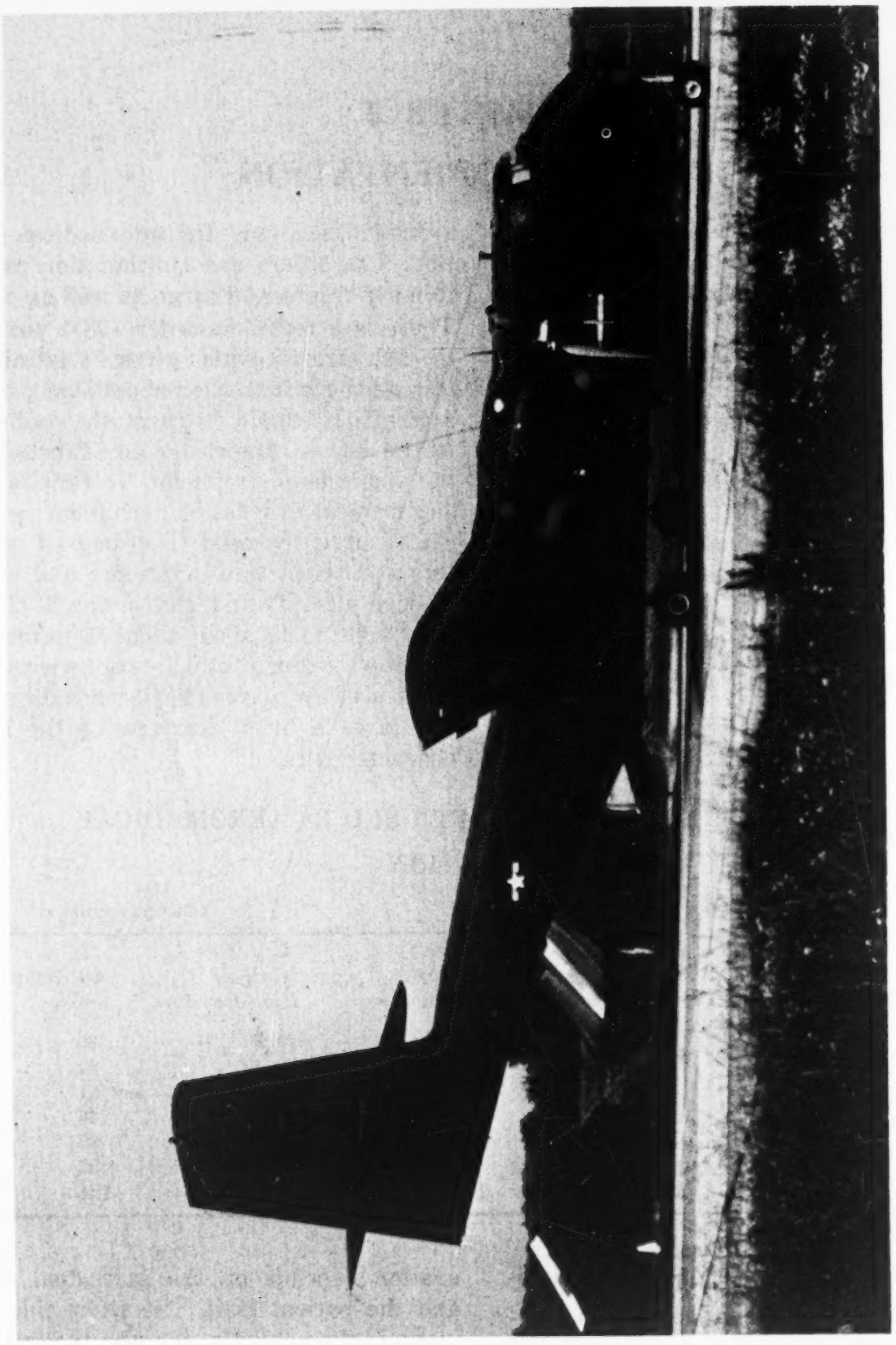

Figure 2-1. Exterior and Interior Views of the C-7A Aircraft.

2001

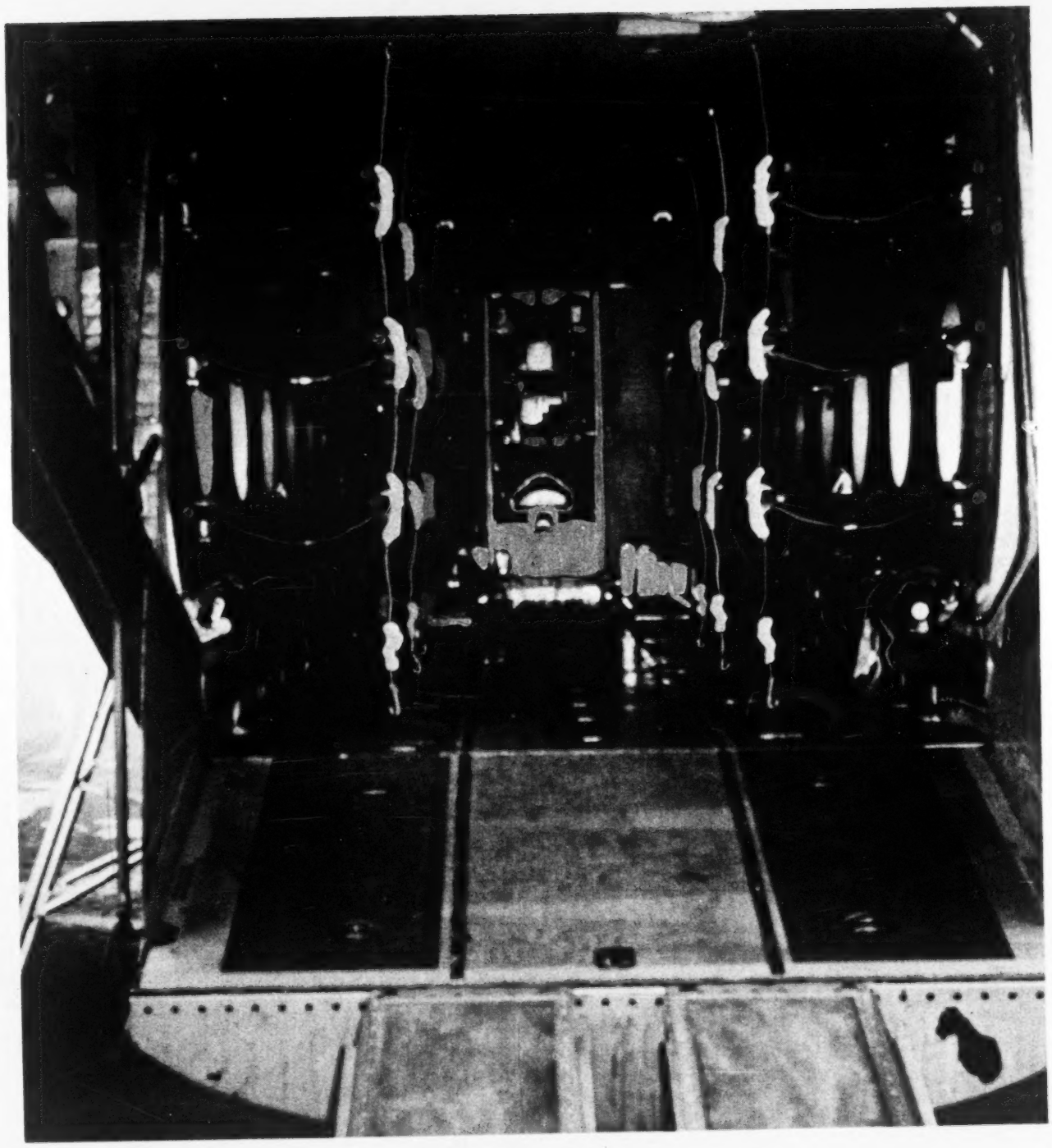

Figure 2-1. Exterior and Interior Views of the C-7A Aircraft. (Continued.)

Figure 2-2. Exterior and Interior Views of the C-9A Aircraft.

2003

Figure 2-2. Exterior and Interior Views of the C-9A Aircraft. (Continued.)

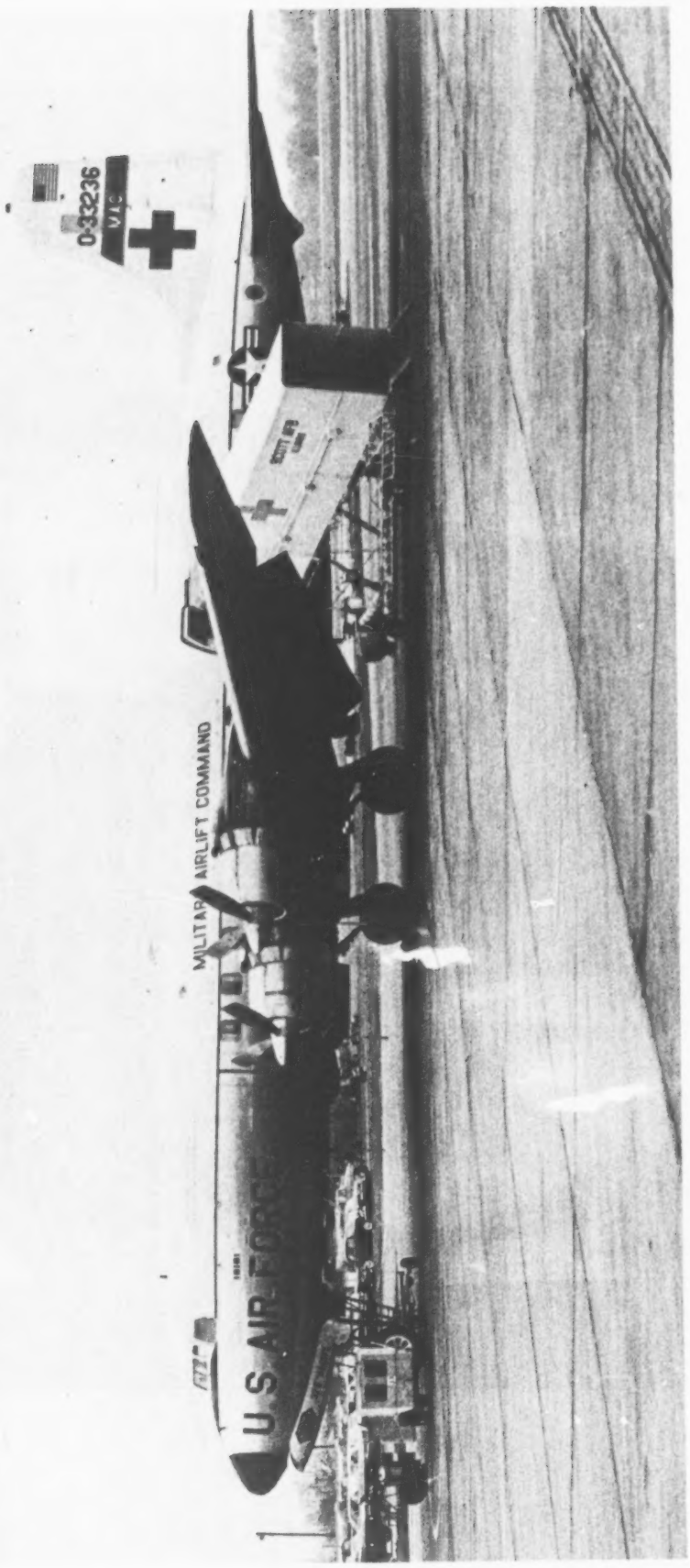

Figure 2-3. Exterior and Interior Views of the C-118A Aircraft.

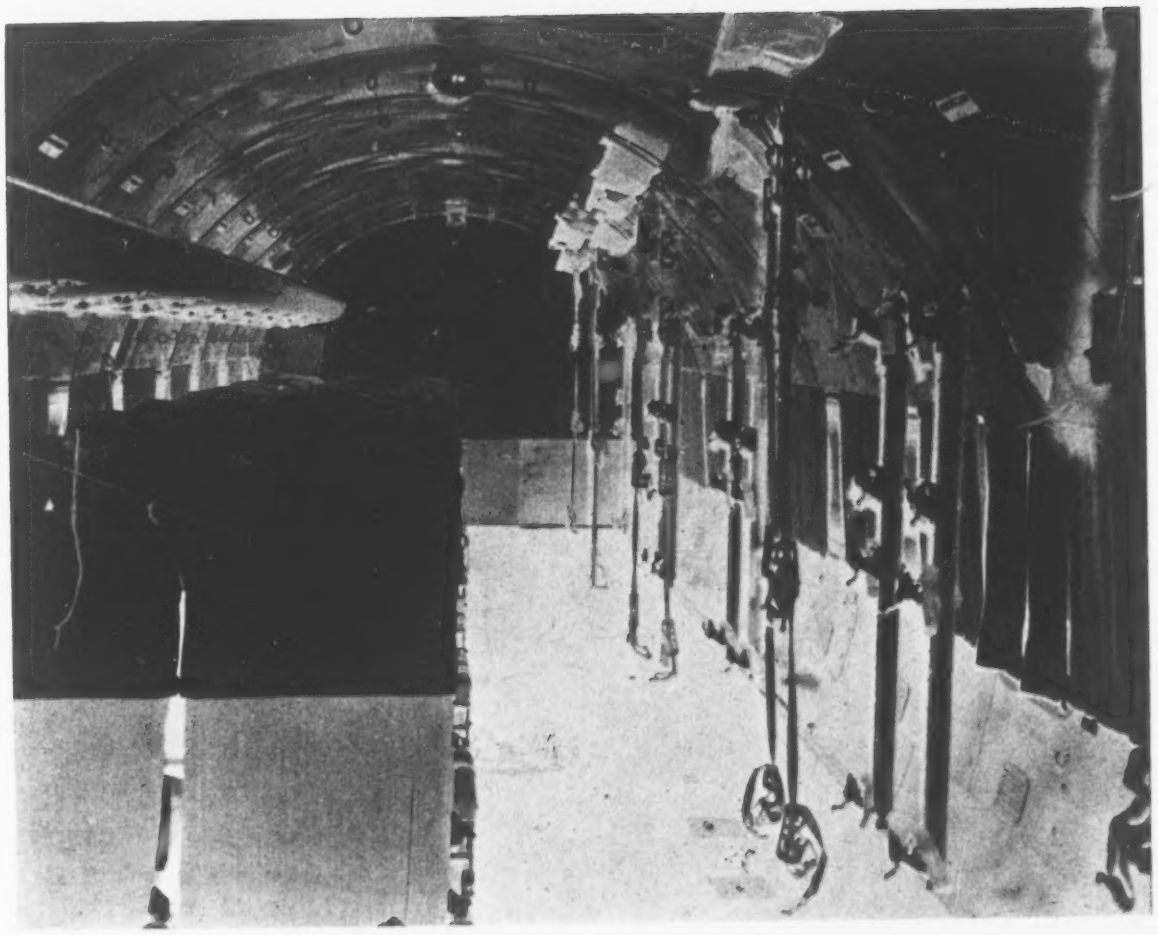

Figure 2-3. Exterior and Interior Views of the C-118A Aircraft. (Continued.)

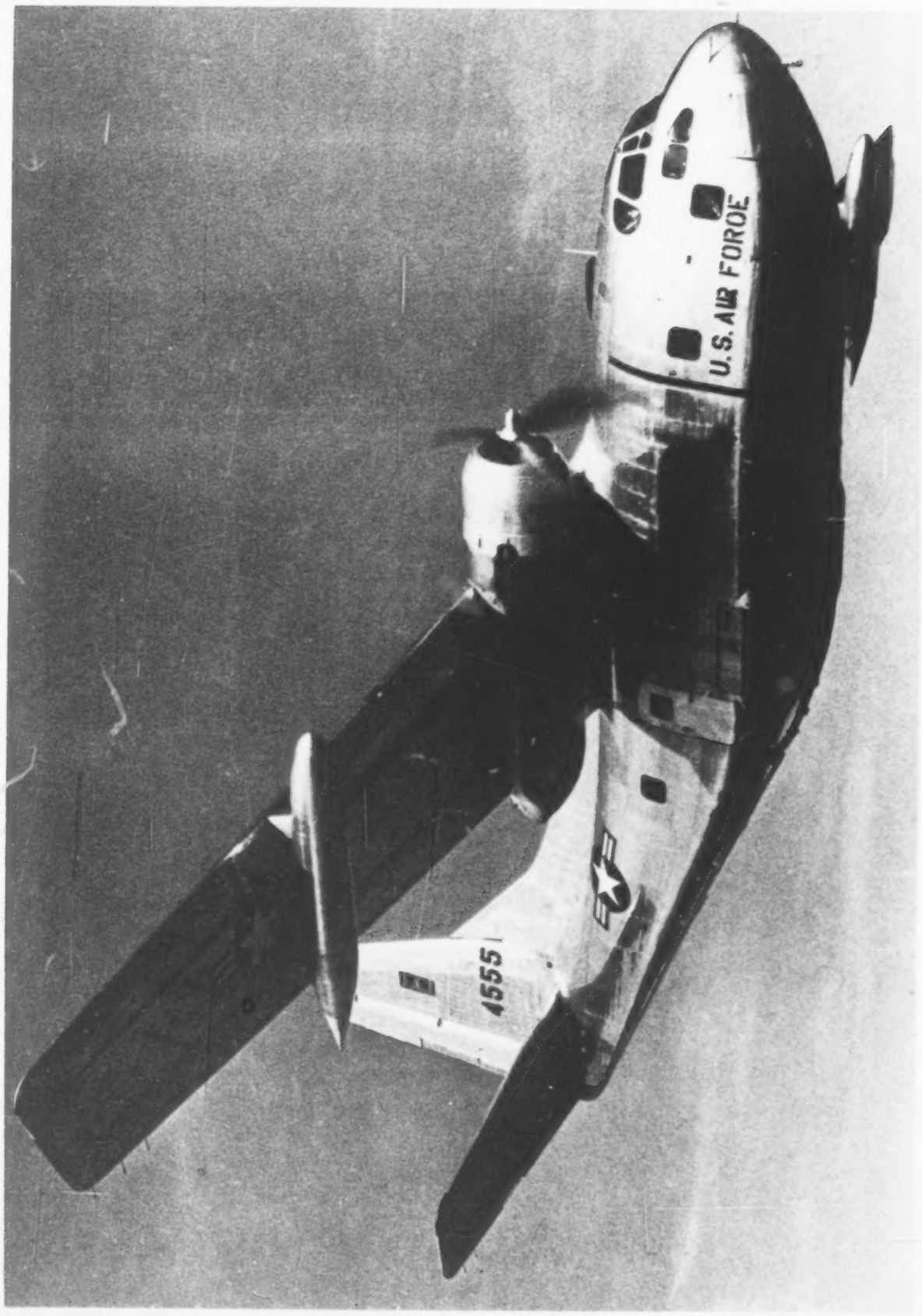

Figure 2-4. Exterior and Interior Views of the C-123 Aircraft.

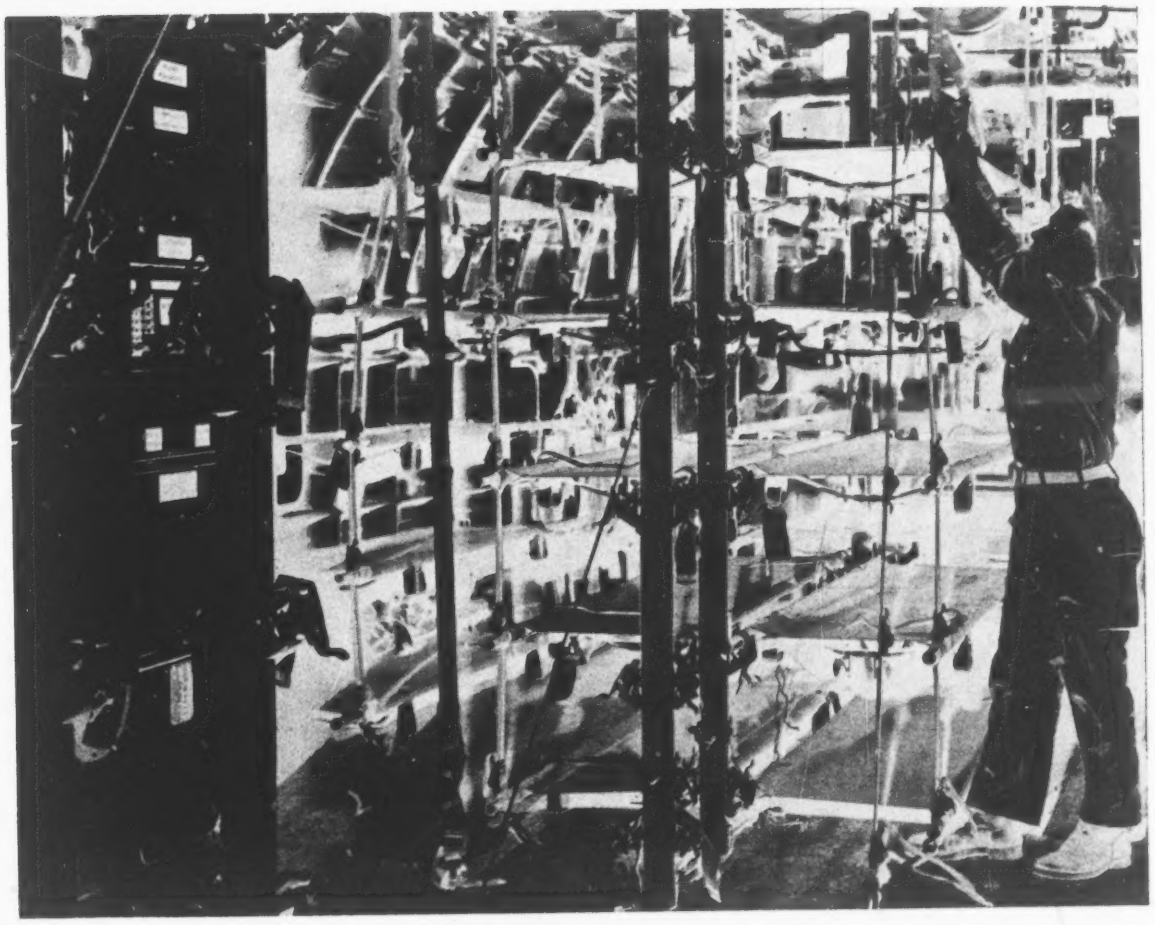

Figure 2-4. Exterior and Interior Views of the C-123 Aircraft. (Continued.)

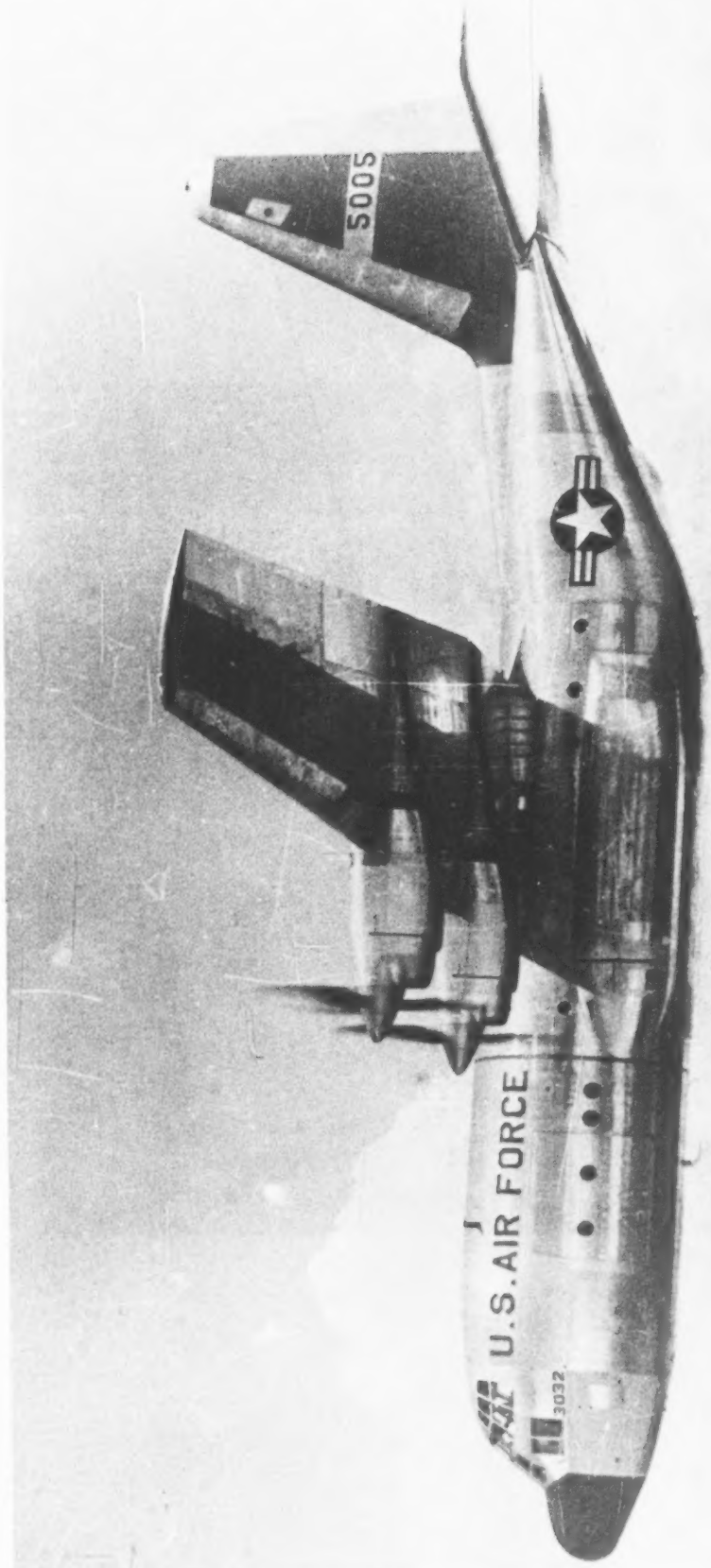

Figure 2-5. Exterior and Interior Views of the C-130E Aircraft.

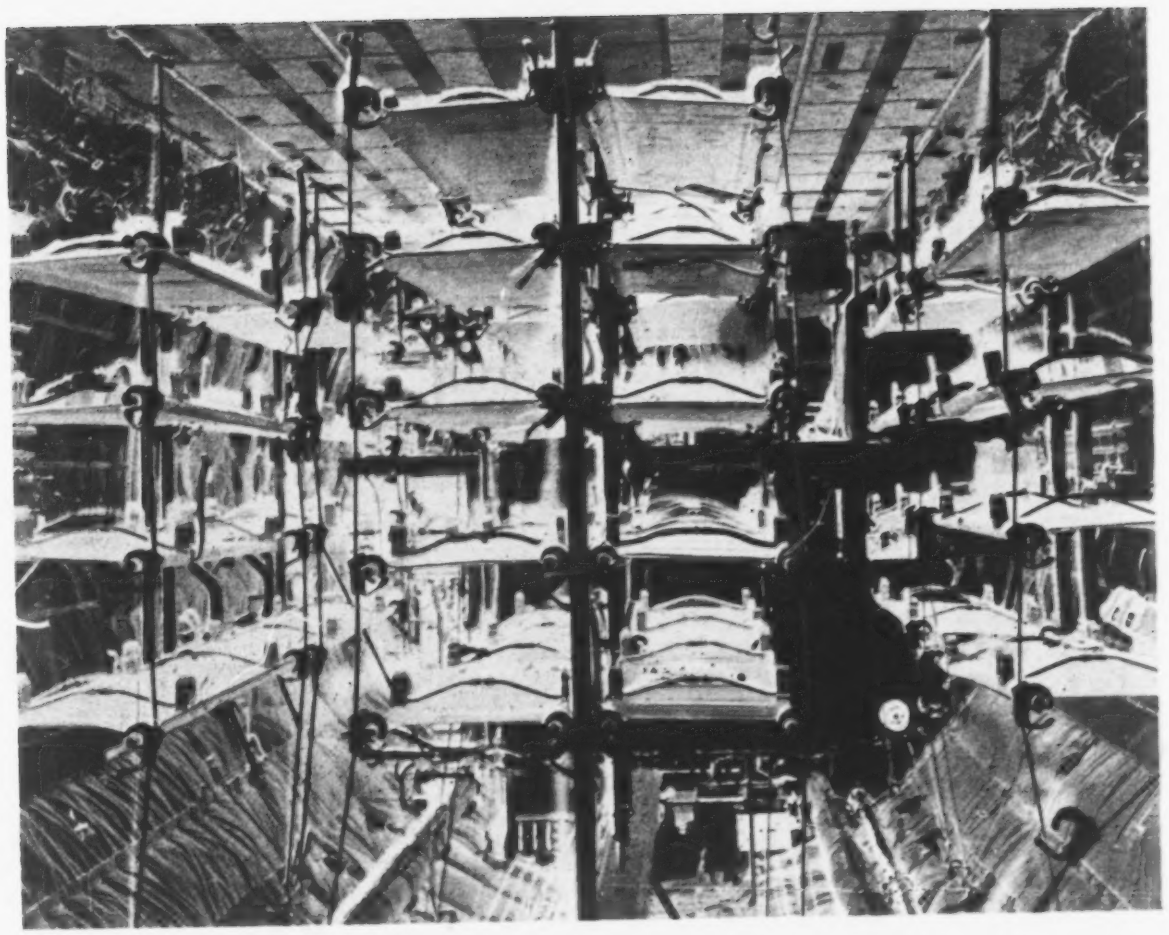

Figure 2-5. Exterior and Interior Views of the C-130E Aircraft. (Continued.)

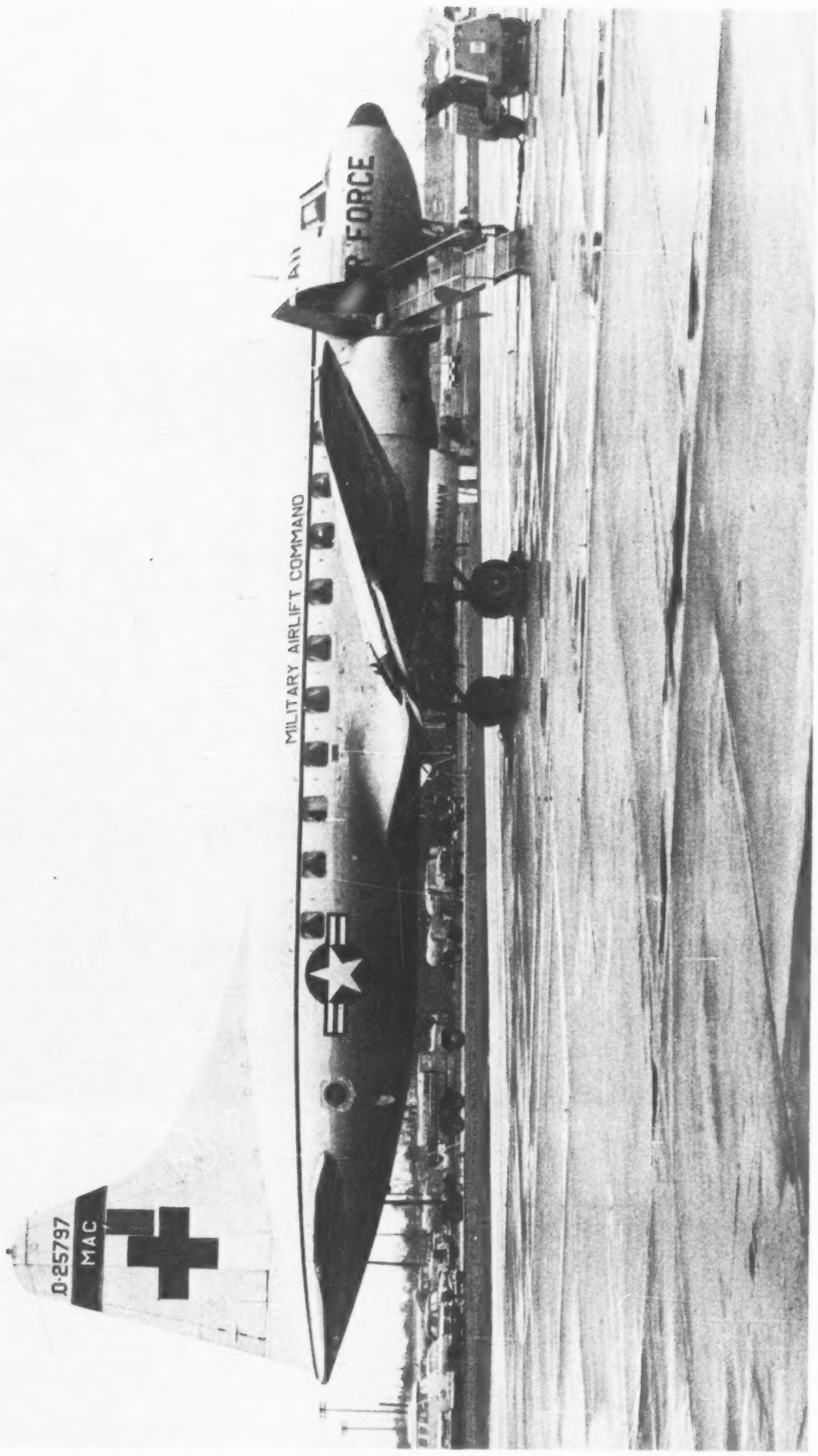

Figure 2-6. Exterior and Interior Views of the C-131A Aircraft.

Figure 2-6. Exterior and Interior Views of the C-131A Aircraft. (Continued.)

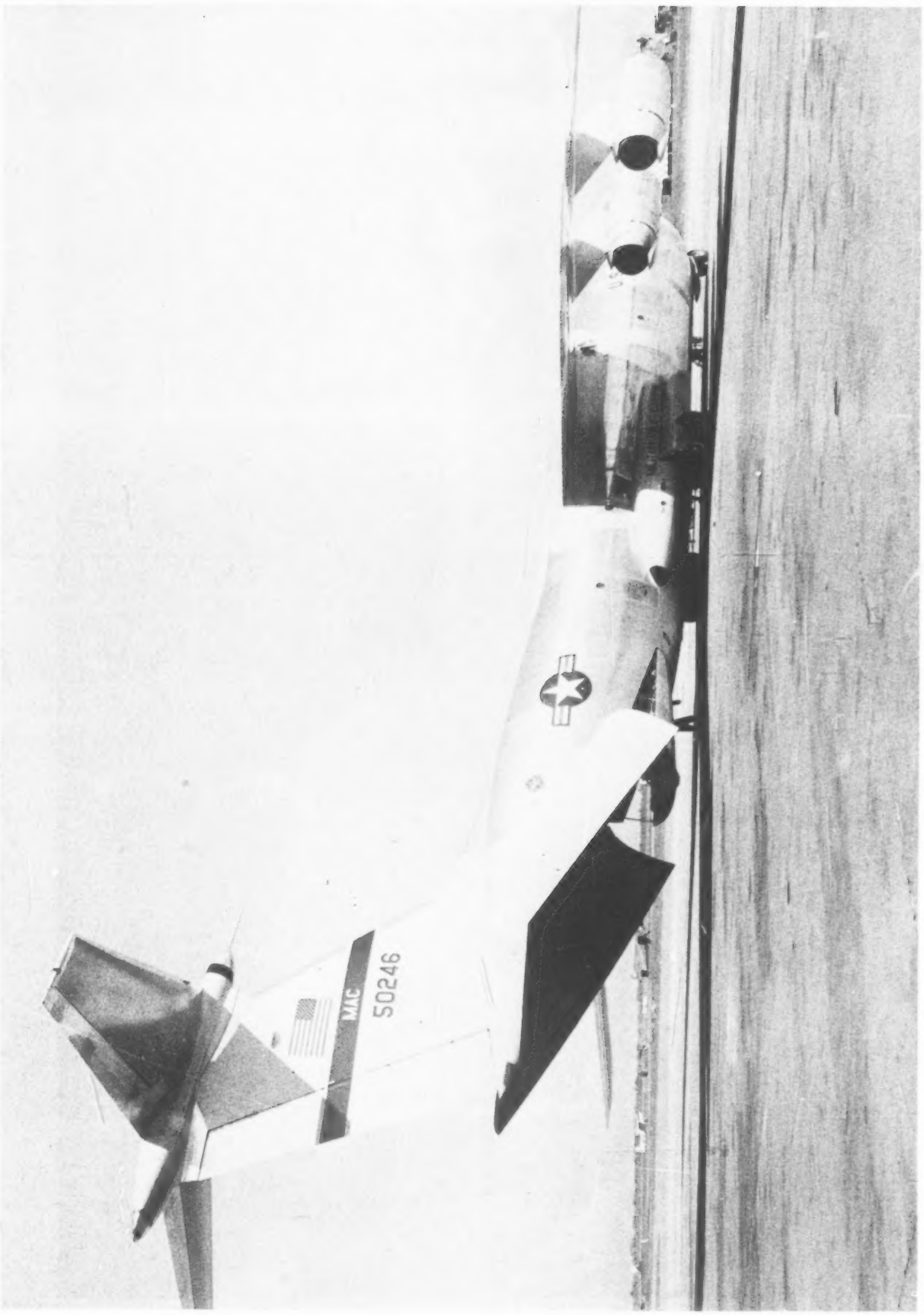

Figure 2-7. Exterior and Interior Views of the C-141A Aircraft.

Figure 2-7. Exterior and Interior Views of the C-141A Aircraft. (Continued.)

2-2. Seating Arrangement. Basically two types of seats are in use in the aircraft.

a. **Canvas Seats.** These run along the side of the aircraft facing the aisle. The seats are numbered starting from the front of the plane, with seat #1 being closest to the cockpit. These seats can be folded separately and stored along the side of the fuselage when not in use.

b. **Airline Seats.** These are rearward facing only and, when not in use, can be removed and stowed either in the cabin or belly of the aircraft. Numbering starts at the front of the aircraft. When there are two seats across, they are numbered with the odd number on the fuselage side and the even number on the aisle as:

1 - 2	Aisle	8 - 7
3 - 4		10 - 9
5 - 6		12 - 11

When there are three seats abreast, they are numbered as seat a, b, or c, with odd-numbered rows on the left and even-numbered rows on the right. For example:

1 - A B C	Aisle	2 - C B A
3 - A B C		4 - C B A
5 - A B C		6 - C B A

2-3. Litter Arrangement. A group of litters placed one above another is called a tier. The number of litters in a tier will vary with the type and modification of the aircraft or the particular squadron policy.

a. **Designation of Tiers.** Tiers have alphabetical or numerical designations which may differ in various units. Generally, the tier closest to the cockpit is tier #1 or A, the next is #2 or B. Tiers are further designated as right or left. Some aircraft, such as the C-118, have a single center tier referred to as Center. Other aircraft, such as the C-141, have a double tier of litters down the center designated as right center and left center.

b. **Numbering Litter Spaces.** The litter spaces in a tier are numbered from the top to the bottom. Space #1 is always the space nearest the ceiling of the aircraft. Though there are spaces for from three to five litters in some tiers, there will not always be a patient in every space and the spaces that are used retain their original numerical designation.

2-4. Configuration Equipment. Cargo-type aircraft are provided with fixed securing devices, consisting of litter support straps and wall brackets. Some aircraft specifically adapted for aeromedical evacuation have adjustable securing devices consisting of stanchions with suspension straps and adjustable brackets. All these devices are important factors in converting the aircraft into a "flying ward."

a. **Preparing Fixed Securing Devices.** The principal devices used in converting a fixed securing device to receive patients are litter support straps, tie-down straps, and wall brackets. All inboard litter support and tie-down straps are kept in canvas storage bags along the ceiling of the aircraft cabin (see figure 2-8). Wall brackets for the outboard poles are stationary and are attached on the sides of the cabin or on metal stanchions. Steps for utilizing these devices are:

(1) Fold and secure canvas seats against the aircraft fuselage. If there are airline seats, remove and store in belly of the aircraft.

(2) Open the wall brackets to receive outboard litter poles (figure 2-9a).

(3) Remove the litter-support straps from the storage bags, unroll them, and allow them to hang free from the aircraft ceiling. Position the clamps on the inboard litter straps about 5 to 6 inches above the corresponding inner loops (figure 2-9b), so they will be in a position for use when the litters are loaded.

(4) Adjust the height of the loops in the litter-support straps so that they are at the same level as the corresponding wall brackets. This adjustment is made at the adjusting buckle near the top of the strap. After obtaining the correct height for the loops, secure the strap by back-threading the strap through the buckle and tightening it (figure 2-9*c*). If the inner loop at the bottom of the litter suspension strap has been pulled out, it can quickly be re-formed by performing the steps listed below.

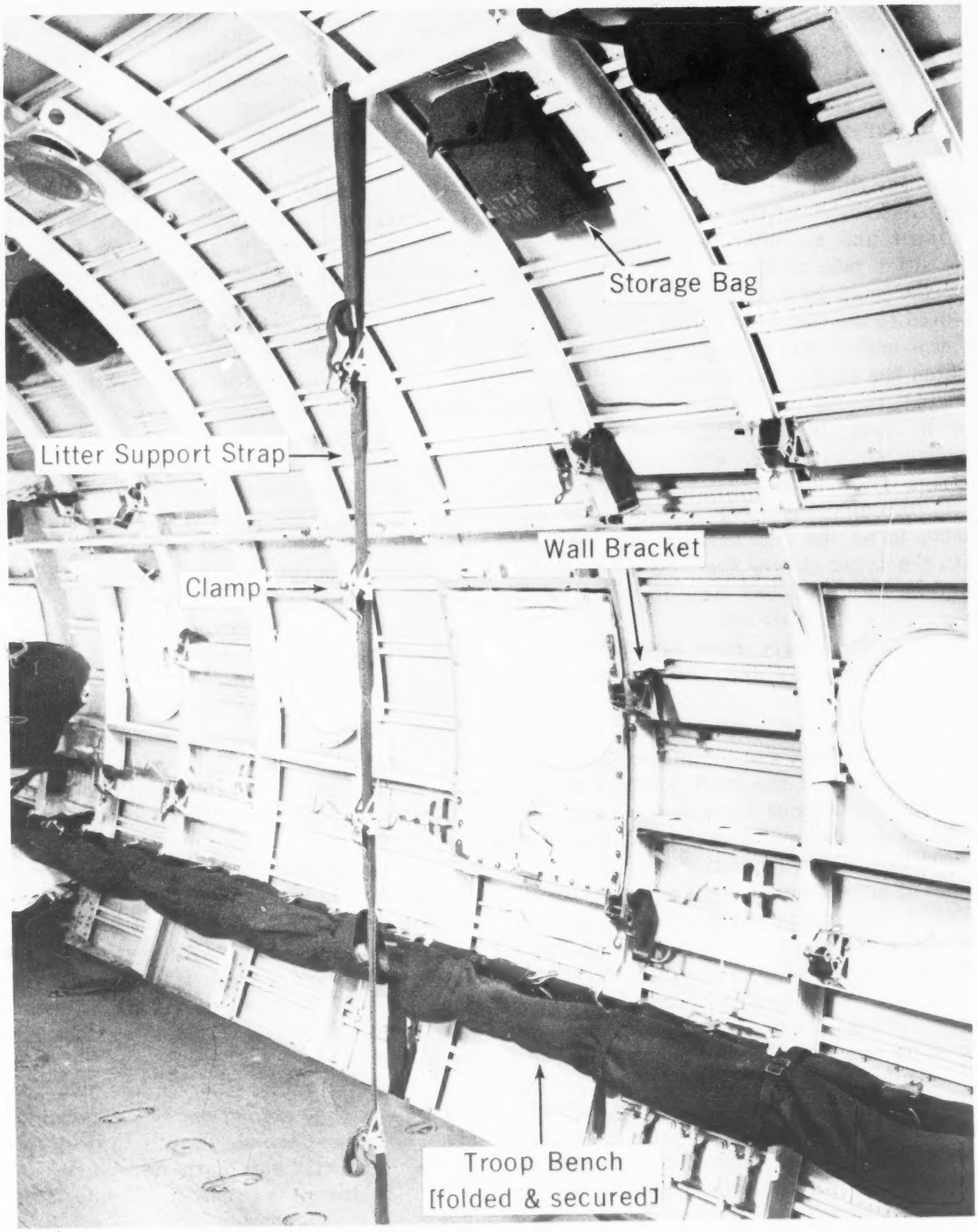

Figure 2-8. Fixed Securing Devices.

(a) Fasten the snap hook to the cargo tie-down ring near the inboard strap and slide the clamp all the way down to the snap lock (figure 2–9d).

(b) Grasp the double thickness of the lower strap and pull upwards until there are four thicknesses of strap (figures 2–9e and 2–9f).

(c) Slide the clamp upward over all four thicknesses of the strap. There is now an inner and an outer loop (figure 2–9g). The litter pole is placed in the inner loop and the snap lock on the outer loop is re-secured to the "D" ring on the floor. Pulling on the excess strap above the clamp will tighten the suspension strap.

(5) Thread the tie-down straps, which are in each litter support storage bag, through the outboard cargo tie-down rings for the floor litters. Thread the tie-down strap through the floor ring so that the buckle is on the fuselage side of the ring with the upper side of the buckle resting on the floor (figure 2–9h). The buckle can then be conveniently fastened.

b. **Placing Litters Into Fixed Securing Devices.** Steps (3) and (4) are for floor litters only.

(1) Place the outboard pole into the open wall brackets and the inboard pole into the inner loop of the litter support straps. Pull the loop clamps down to the litter pole as far as possible and fasten them. The inner loop should be placed around the metal part of the litter pole near the edge of the canvas.

(2) Secure the outboard litter pole in the wall bracket. Bring the strap of the wall bracket over the litter pole and thread it through the clamp behind the roller guide. (figure 2–10a). Secure the litter pole by pulling down on the threaded strap with one hand while pressing upward and outward on the litter pole with the other hand. Maintain the pressure on the litter pole to remove slack from the strap. Close the clamp securely by maintaining the pull on the wall bracket strap (figure 2–10b). All litters except floor litters are secured in this manner.

(3) To prepare floor litters, insert the inboard pole of the floor litter through the inner loop of the litter support strap. Secure the outboard pole firmly with the tie-down strap which has already been threaded through the cargo tie-down ring. Wind the buckle end of the tie-down strap around the litter pole twice to obtain a better grip (figure 2–10c).

(4) Fasten the snap hook to the cargo tie-down ring of the inboard strap. Tighten the strap around the pole by pressing downward on the litter pole with one foot and firmly pulling the loop above the clamp (figure 2–10d). Maintain tautness while pushing down and closing the clamp as near the litter pole as possible.

(5) Figure 2–10e shows two litters loaded in a fixed securing device.

c. **Preparing the Adjustable Securing Devices.** There are many different types of adjustable devices used. These all involve some type of stanchion pole with litter brackets that are movable and a suspension strap with litter brackets. The devices in the C–141 are explained in this manual. If this equipment is not in place, obtain it from the storage area. These devices are prepared as follows:

(1) *Center Stanchions:*

(a) Insert the ball fitting at the top of one stanchion into the receptacle on the upper stanchion support (see figure 2–11a).

(b) Push up on the stanchion so that the spring-loaded rod at the top retracts into the stanchion.

(c) Position the bottom of the stanchion over the floor receptacle (see figure 2–11b).

(d) Allow the studs on the bottom of the stanchion to drop into the two forward holes of the receptacle. This will cause the spring-loaded shear pin to retract into the stanchion.

(e) With the studs in the two forward holes, slide the bottom of the stanchion aft. This causes the shear pins to drop into forward and aft holes of the receptacle.

(f) Install the remaining center stanchions in this manner.

(g) Place one restraining cable by the forward stanchion in each pair of centerline tiers to support the tier of litters.

2017

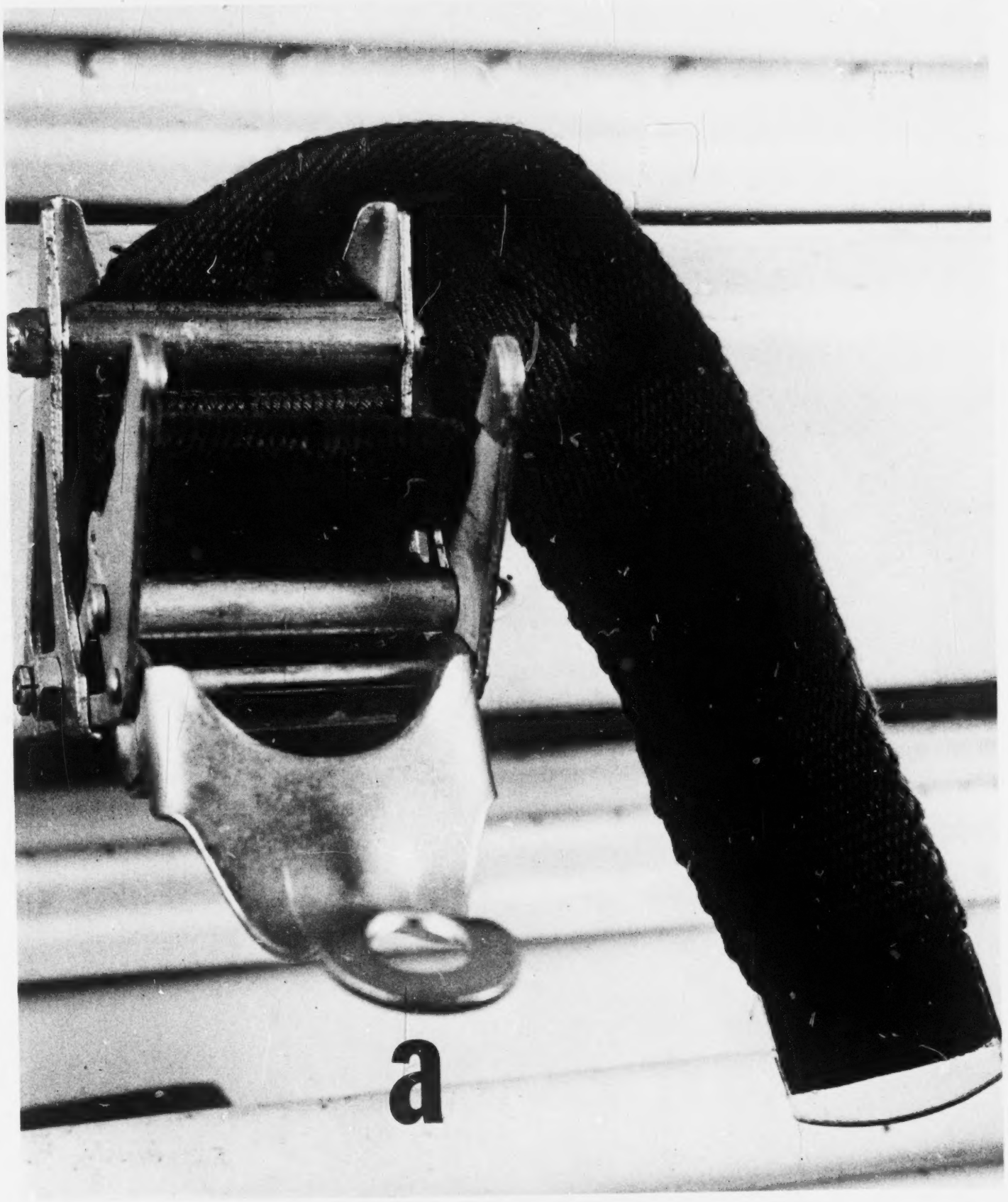

Figure 2-9. Utilizing Securing Devices.

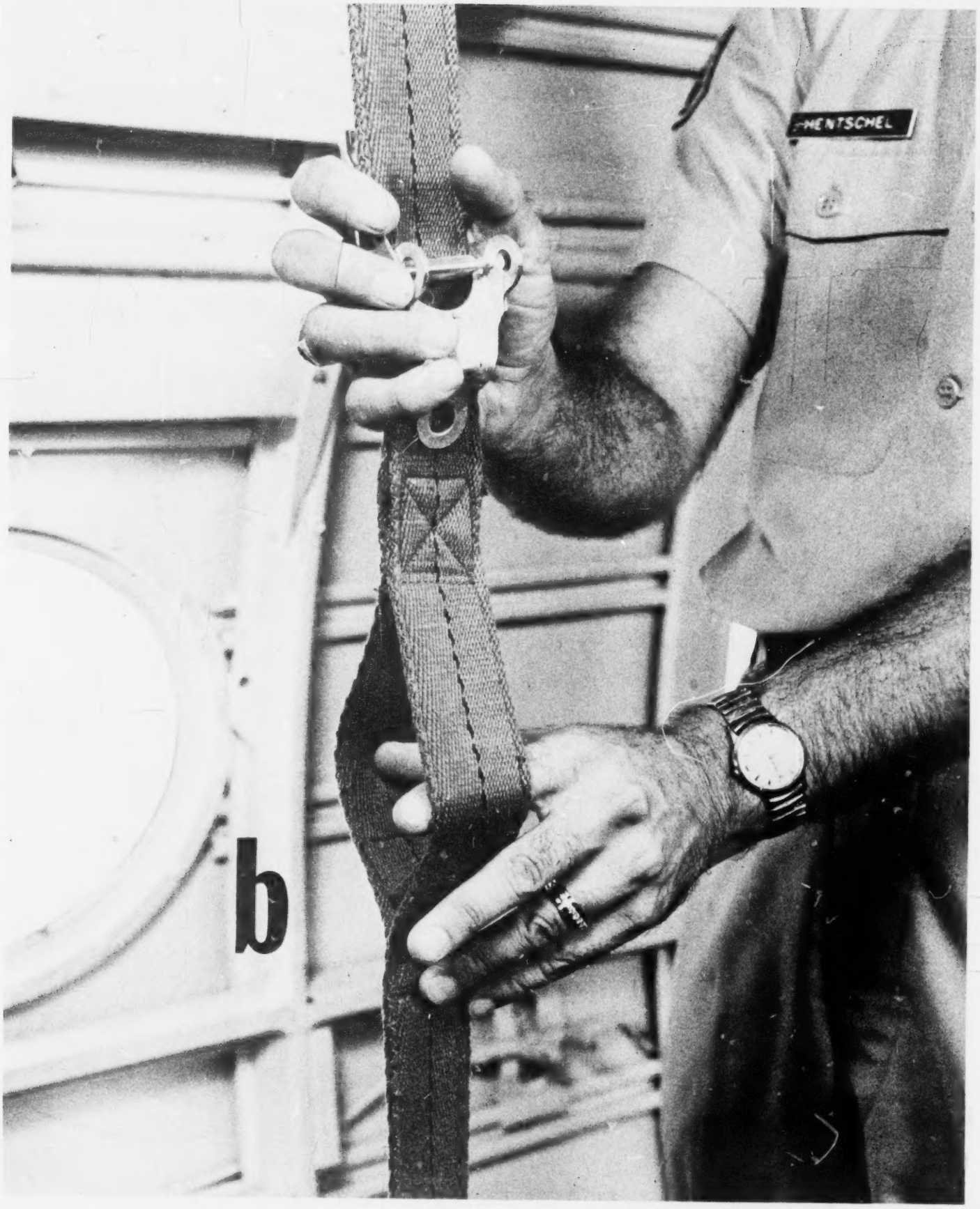

Figure 2-9. Utilizing Securing Devices. (Continued.)

2019

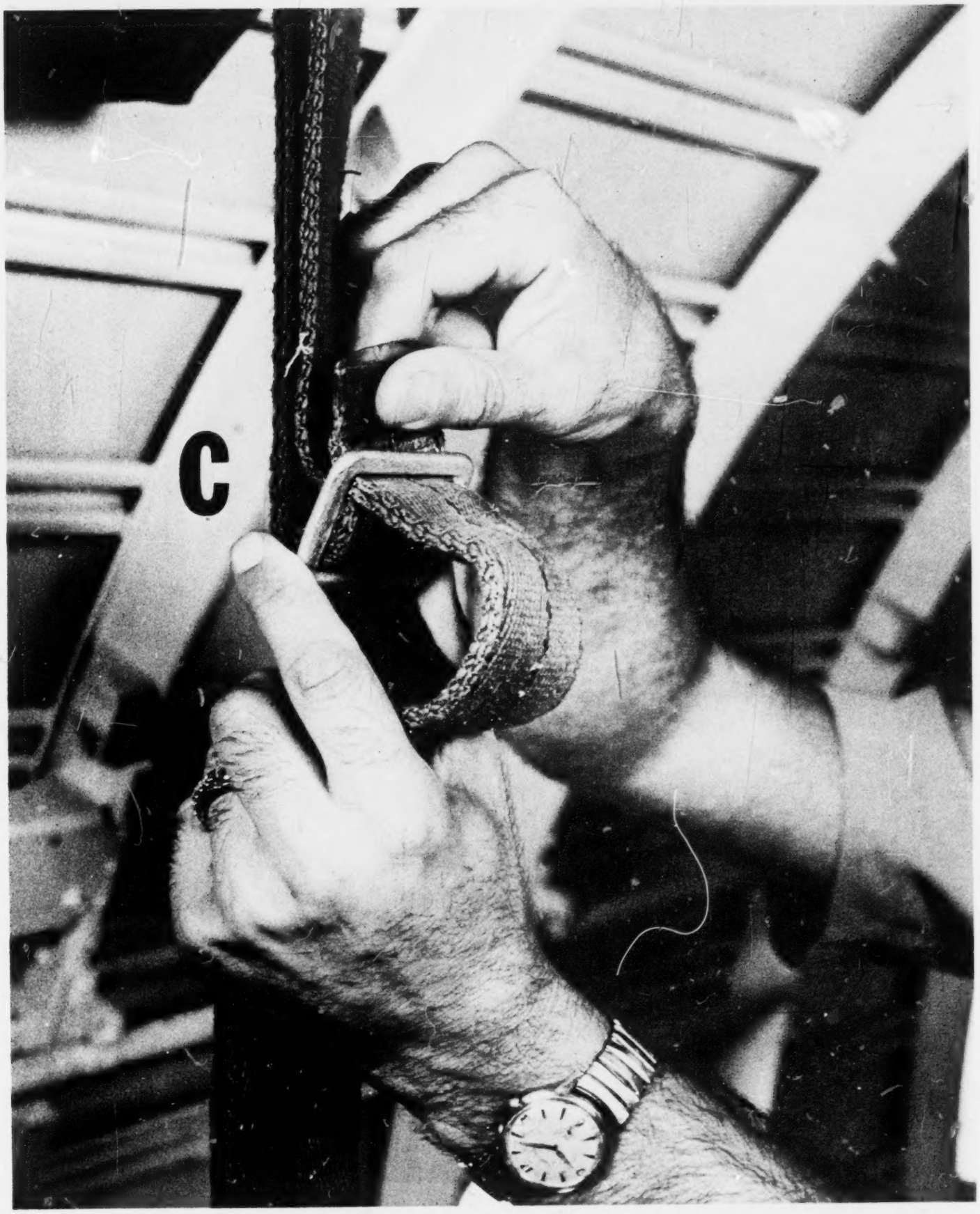

Figure 2-9. Utilizing Securing Devices. (Continued.)

2020

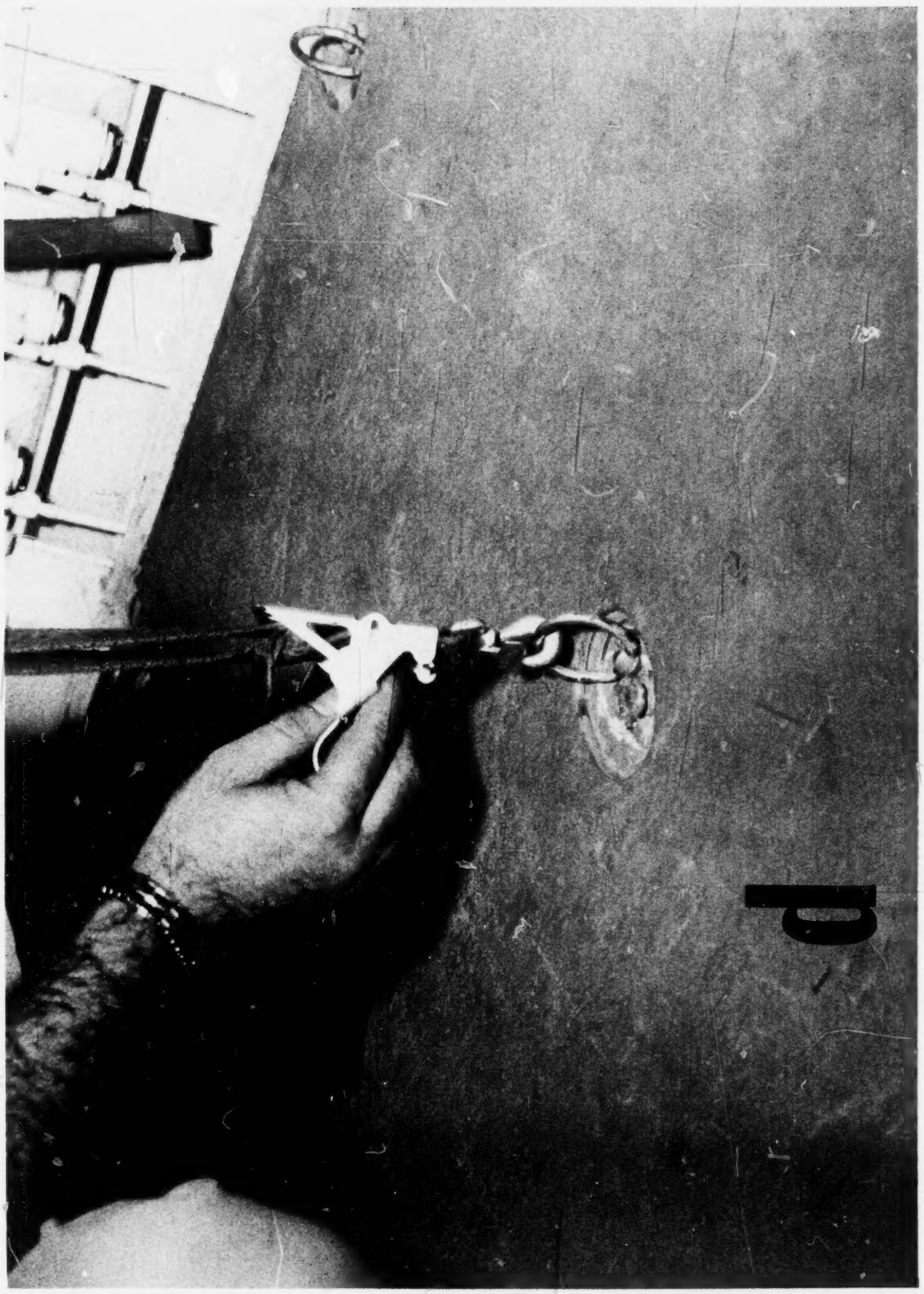

Figure 2-9. Utilizing Securing Devices. (Continued.)

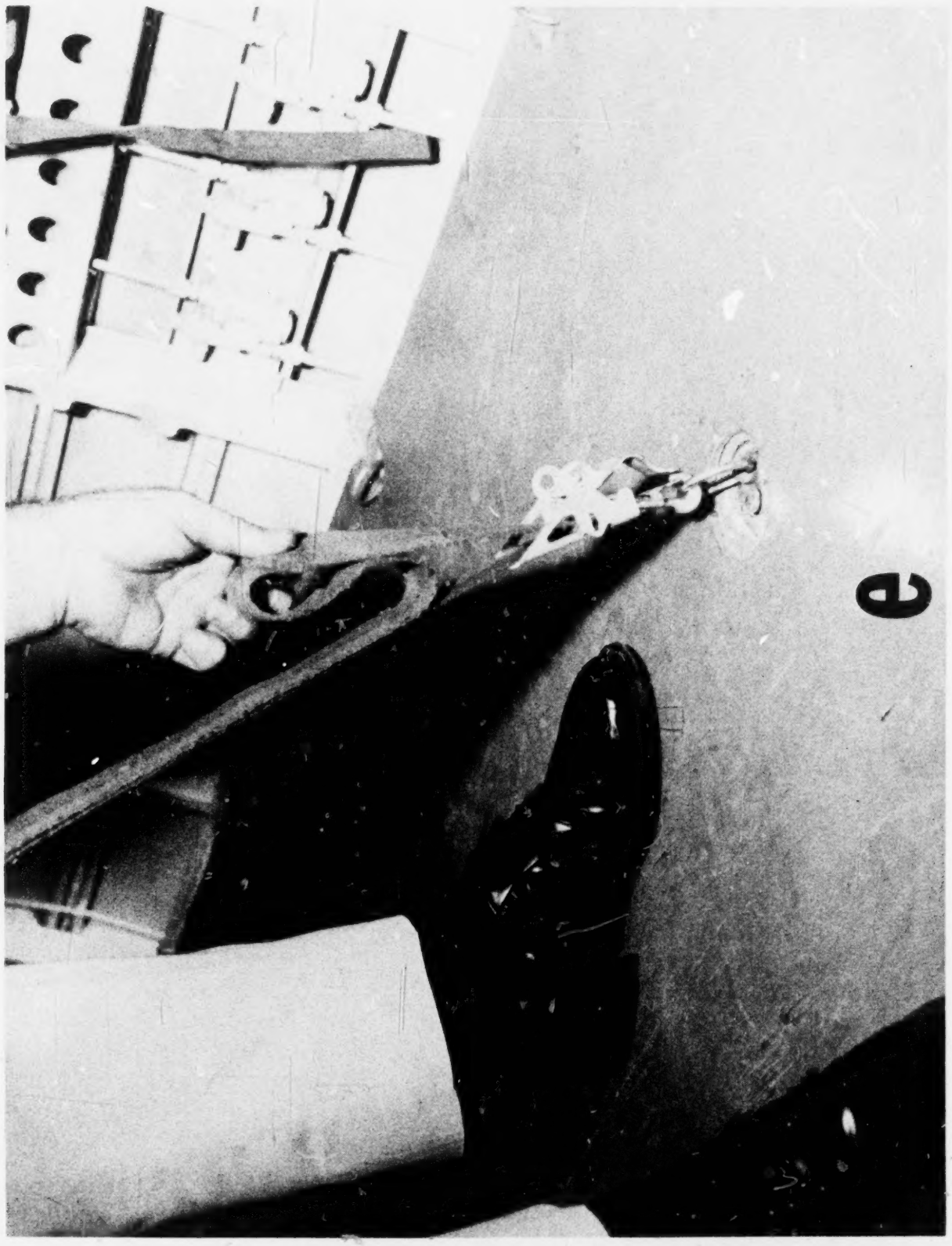

Figure 2-9. Utilizing Securing Devices. (Continued.)

2022

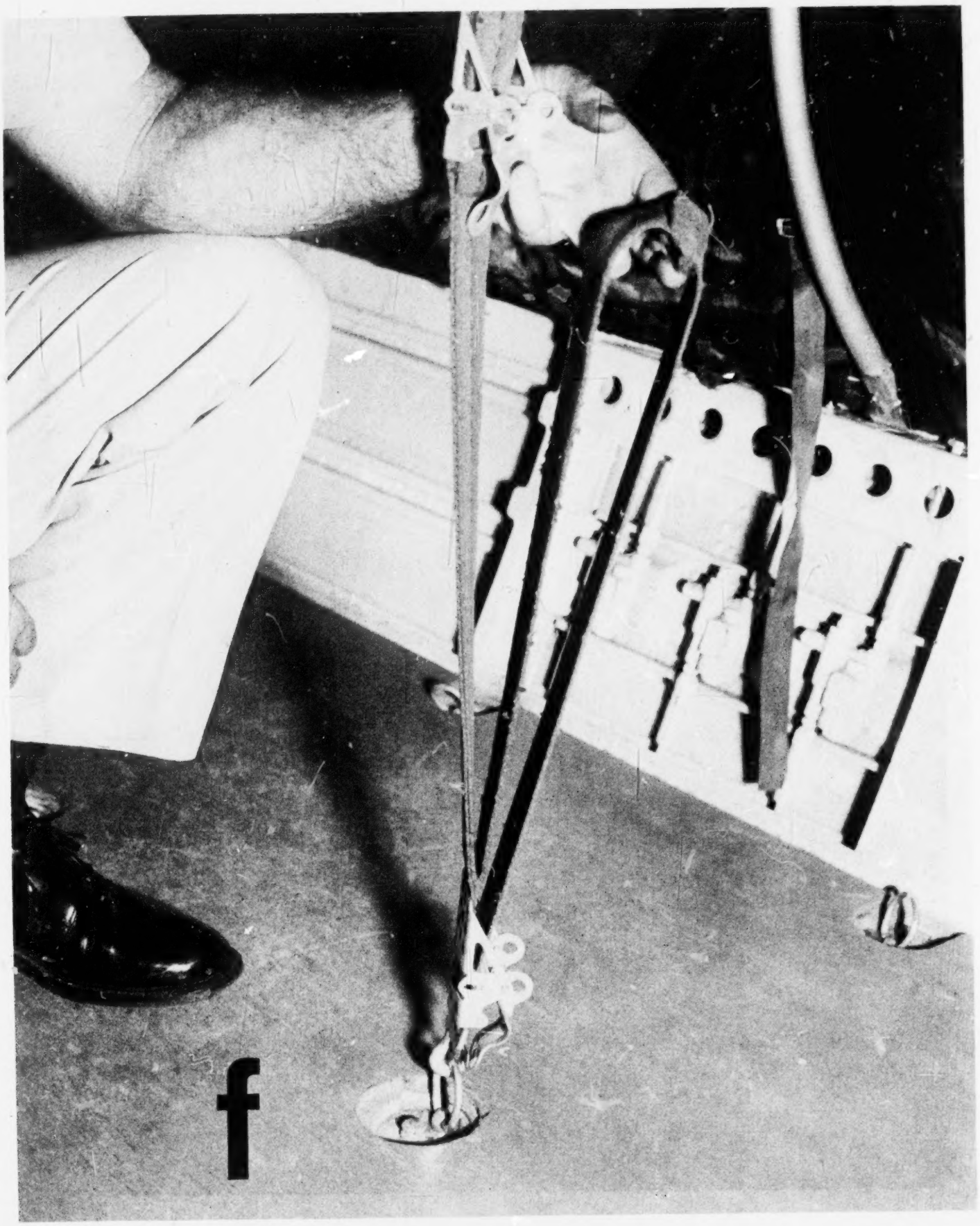

Figure 2-9. Utilizing Securing Devices. (Continued.)

2023

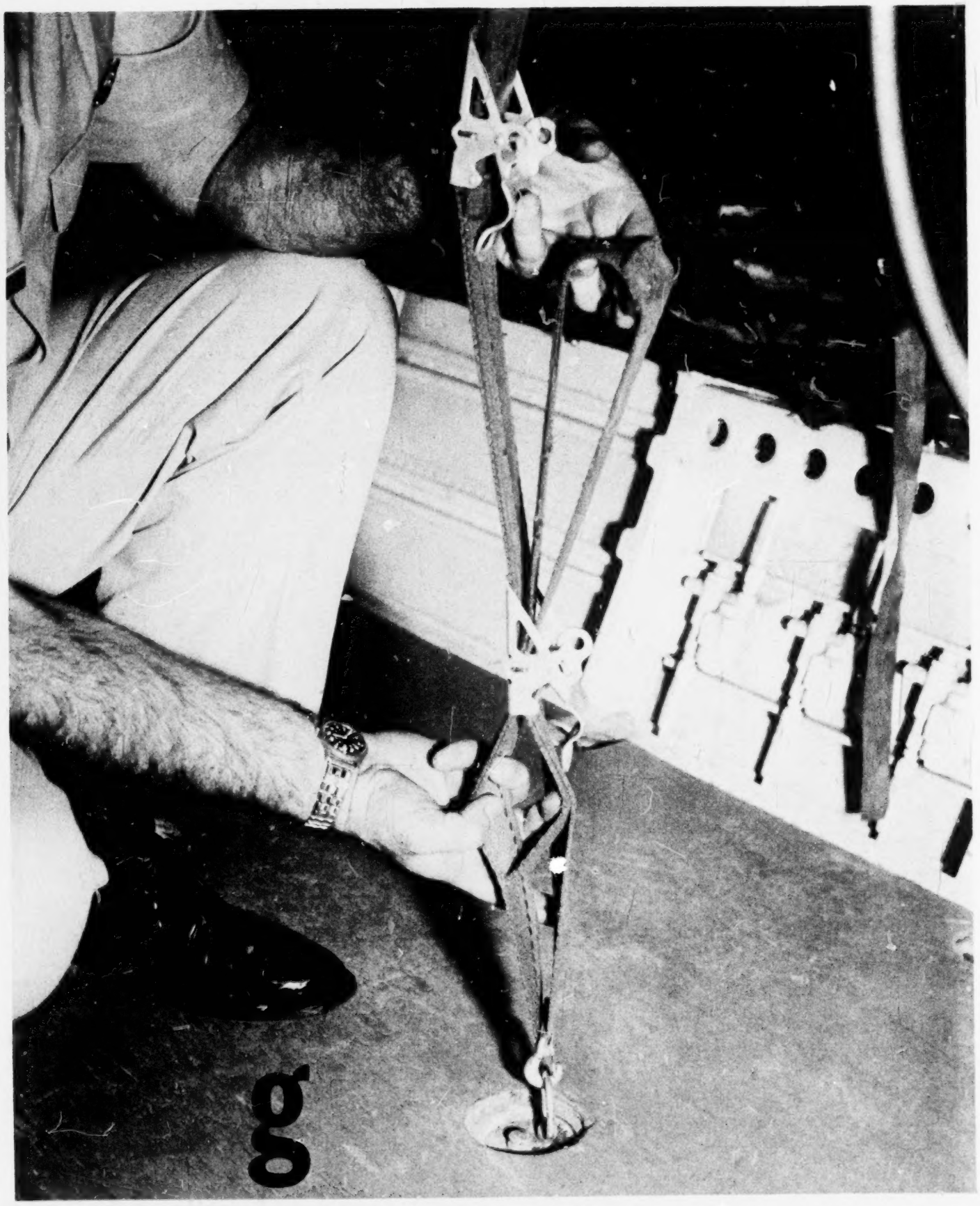

Figure 2-9. Utilizing Securing Devices. (Continued.)

2024

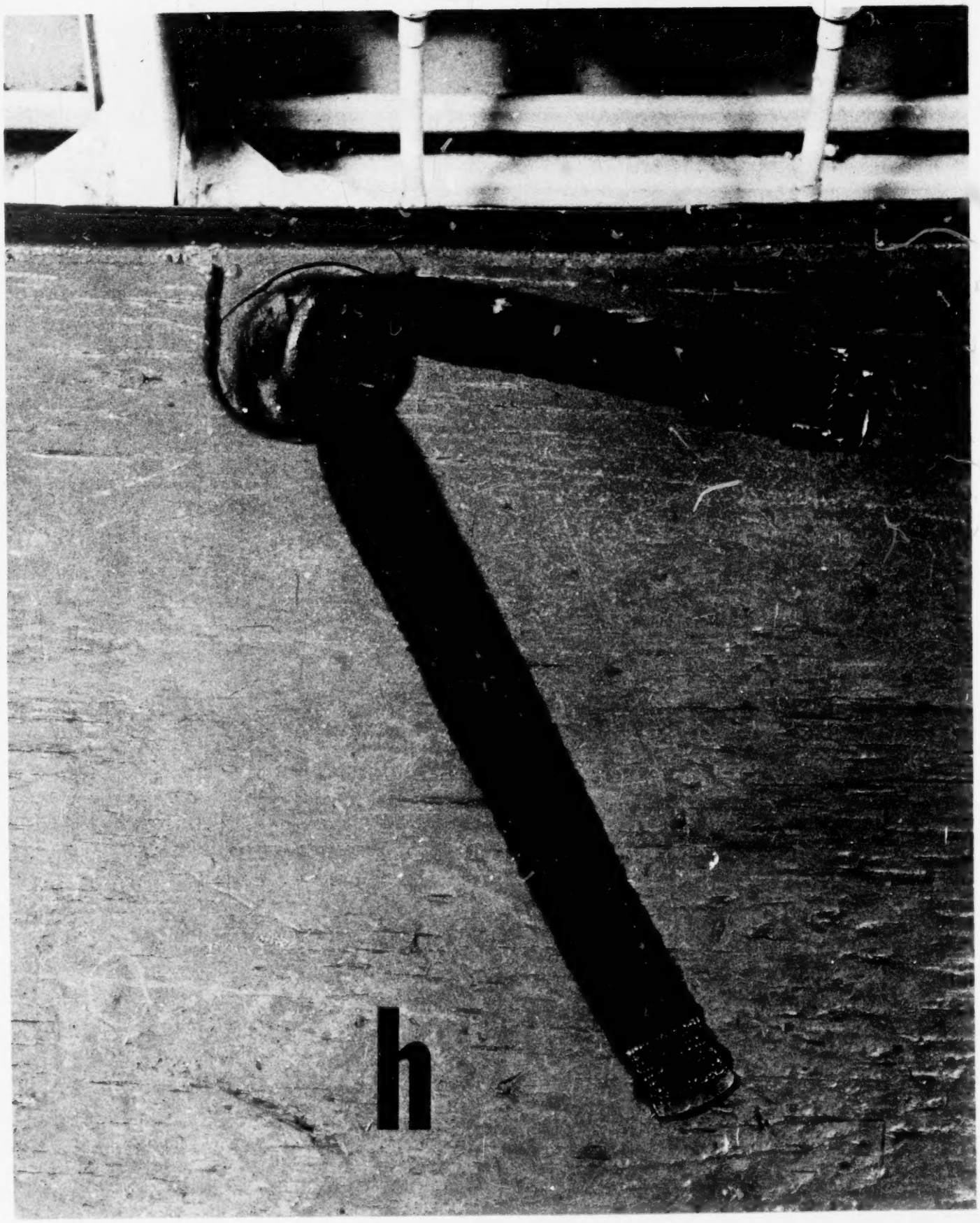

Figure 2-9. Utilizing Securing Devices. (Continued.)

Figure 2-10. Placing Litter Into Fixed Securing Devices.

2026

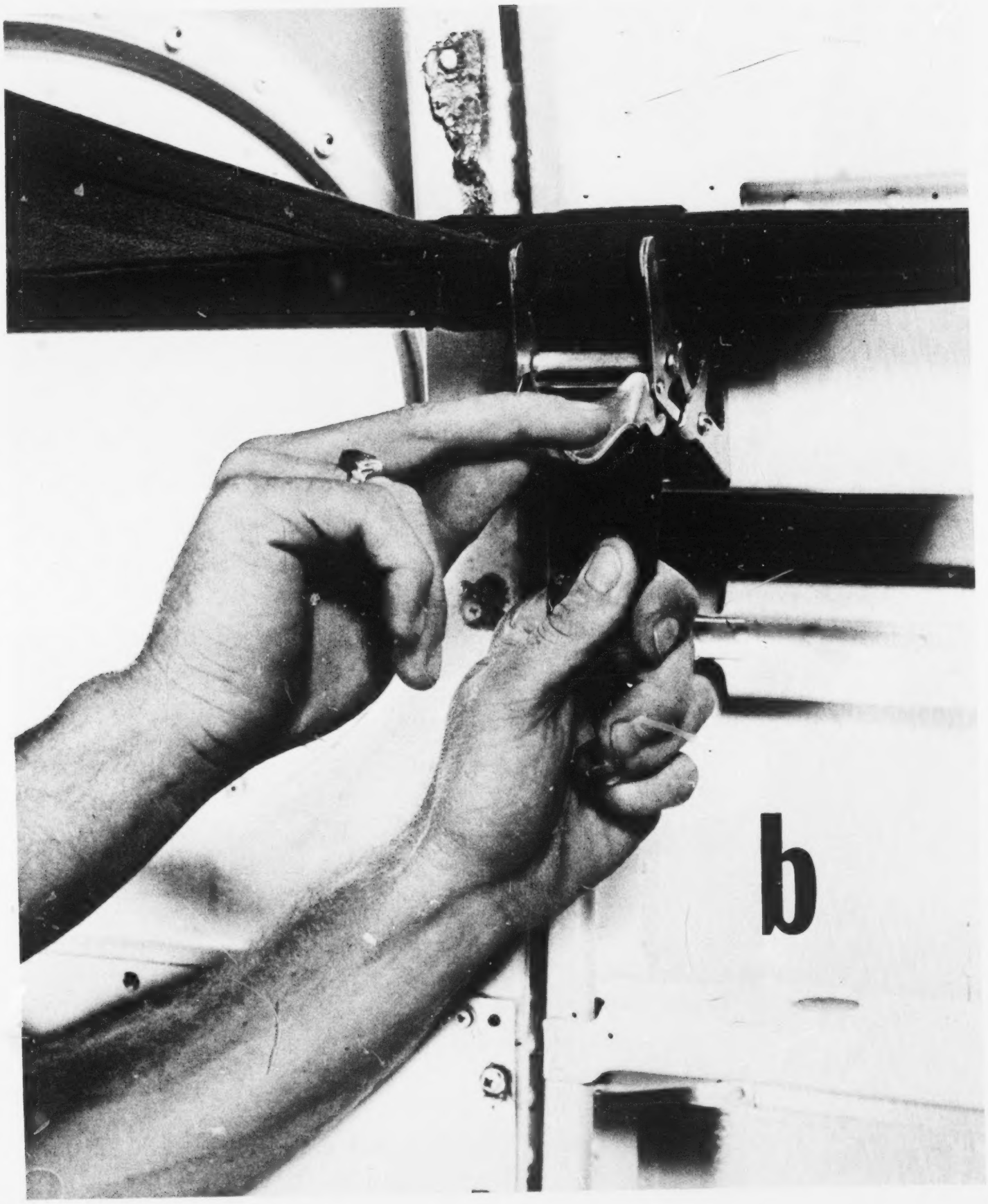

Figure 2-10. Placing Litter Into Fixed Securing Devices. (Continued.)

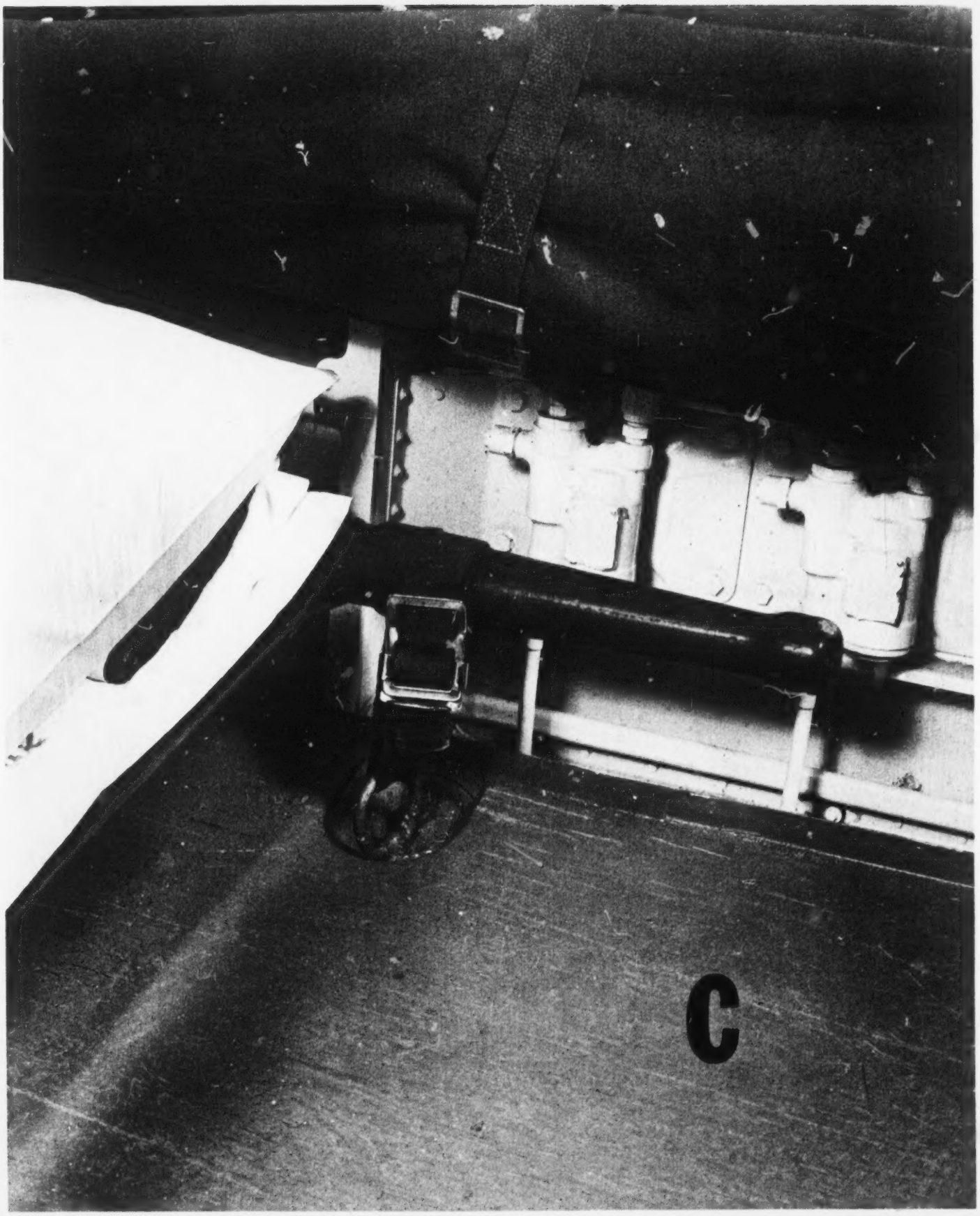

Figure 2-10. Placing Litter Into Fixed Securing Devices. (Continued.)

Figure 2-10. Placing Litter Into Fixed Securing Devices. (Continued.)

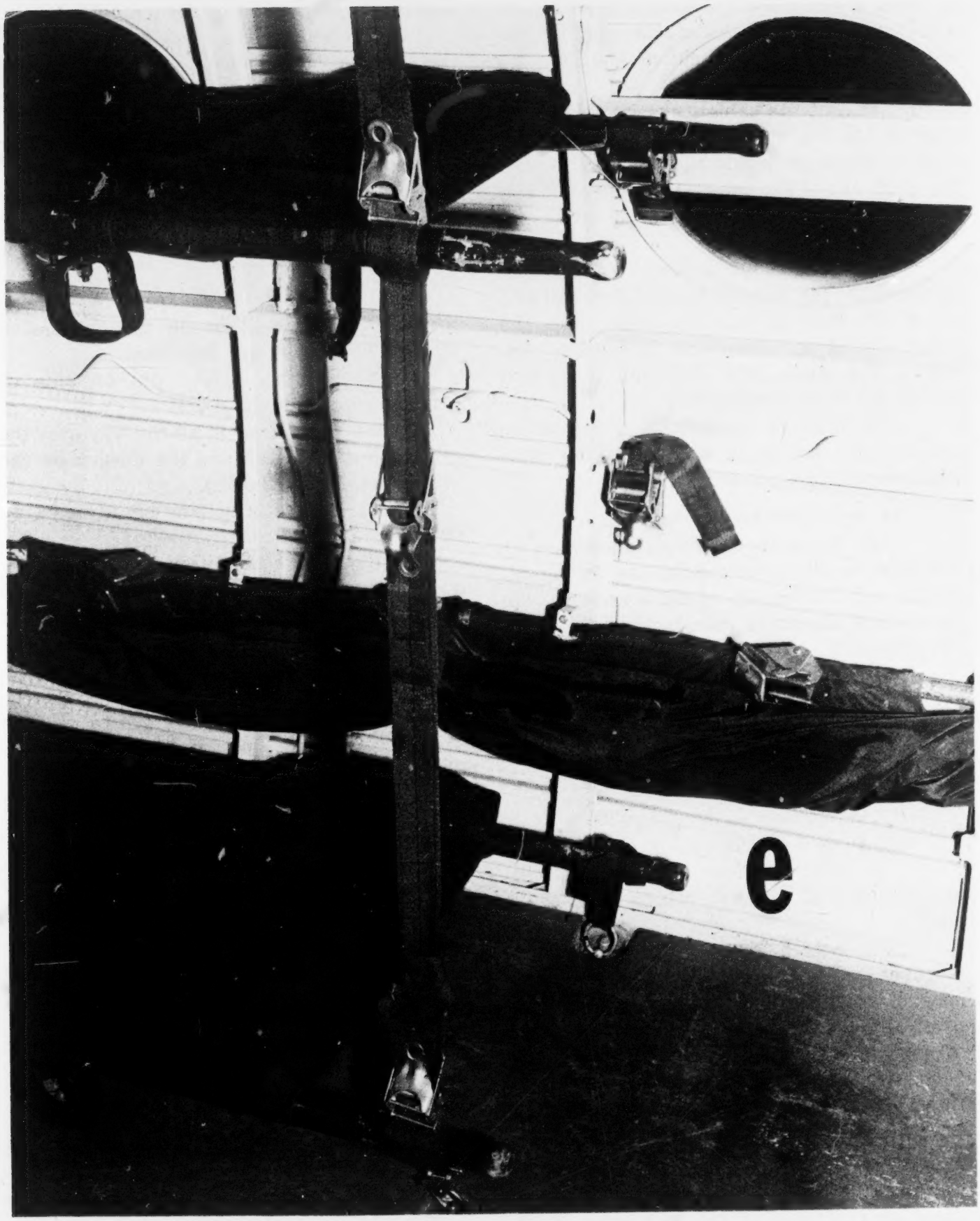

Figure 2-10. Placing Litter Into Fixed Securing Devices. (Continued.)

2030

(h) Attach each cable to a stanchion by placing the shackle around the stanchion and inserting the shackle pin through matching holes in the stanchion and in the shackle.

(i) Put the cable locks into the large ring in the top of the tie-down fitting and tighten the turn buckle just enough to take the slack out of the cable (see figure 2–11c).

(j) To remove restraining cable, reverse procedure.

(k) To remove a stanchion, pull up on the shear pin handles located forward and aft at the base of each stanchion, slide the lower end of the stanchion forward to disengage the studs, and then pull it up and out of the floor receptacle.

(l) Hold the stanchion at an angle and pull the top down and out of the overhead receptacle.

(2) *Sidewall Stanchions:*

(a) Place the sidewall stanchion so the litter bracket receptacles are facing inboard, and fit the top of the stanchion into the square stanchion receptacle in the overhead support.

(b) Place the fitting at the bottom of the stanchion around the support rail and align the holes in the stanchion fitting with the holes in the support rail.

(c) To remove sidewall stanchion, reverse procedure.

(3) *Suspension Strap:*

(a) Place a suspension strap with litter brackets at each stanchion pole to be used.

(b) Attach the suspension strap to the overhead supports by leading each suspension strap around and through the support and back down, locking the strap through its own buckle (see figure 2–12a).

(c) To secure suspension strap to the floor, insert the end fitting into a floor receptacle (see figure 2–12b).

(4) *Litter Brackets for Stanchion Pole:*

(a) To install litter bracket, pull outward on the lever at the underside of the bracket to retract the spring-loaded shear pin.

(b) Insert the track studs into the stanchion receptacle (see figure 2–13a).

(c) Release the lever and then move the bracket up or down slightly to permit the shear pin to drop into one of the holes and lock the bracket.

(d) To adjust the height of the bracket, pull outward slightly on the lever at the underside of the bracket and slide the bracket up or down on the track (see figure 2–13b). (Check to make sure bracket is locked.)

(5) *Litter Brackets for Suspension Strap.* Brackets will be on the suspension straps. To adjust the brackets:

(a) Depress safety pin on side of bracket (see figure 2–14a).

(b) Push lever in all the way over the locking pin. This releases the tension on the strap (see figure 2–14b).

(c) Bracket can now be adjusted up or down.

(d) Adjust the litter brackets on all suspension straps until they are the same height from the floor as the brackets on the stanchions. The brackets should be adjusted so a litter placed in position will be level and parallel to the floor.

(e) All brackets that are to be used should be in the open position (see figure 2–14c).

d. *Placing Litters into Adjustable Devices:*

(1) Place the poles of the litter in the brackets. Fasten the locking lever on the inboard side first. Then, fasten the outboard side.

(2) Place the last litter in the tier in position.

(3) Insert the end fitting into a floor receptacle and remove slack in suspension strap by pulling up on excess end of suspension strap above the end fitting (see figure 2–15a).

(4) Figure 2–15b shows a loaded tier.

2–5. Loading Devices. It is essential to be careful when carrying litter-fast patients; personnel must always face forward when doing so. Care must also be exercised when

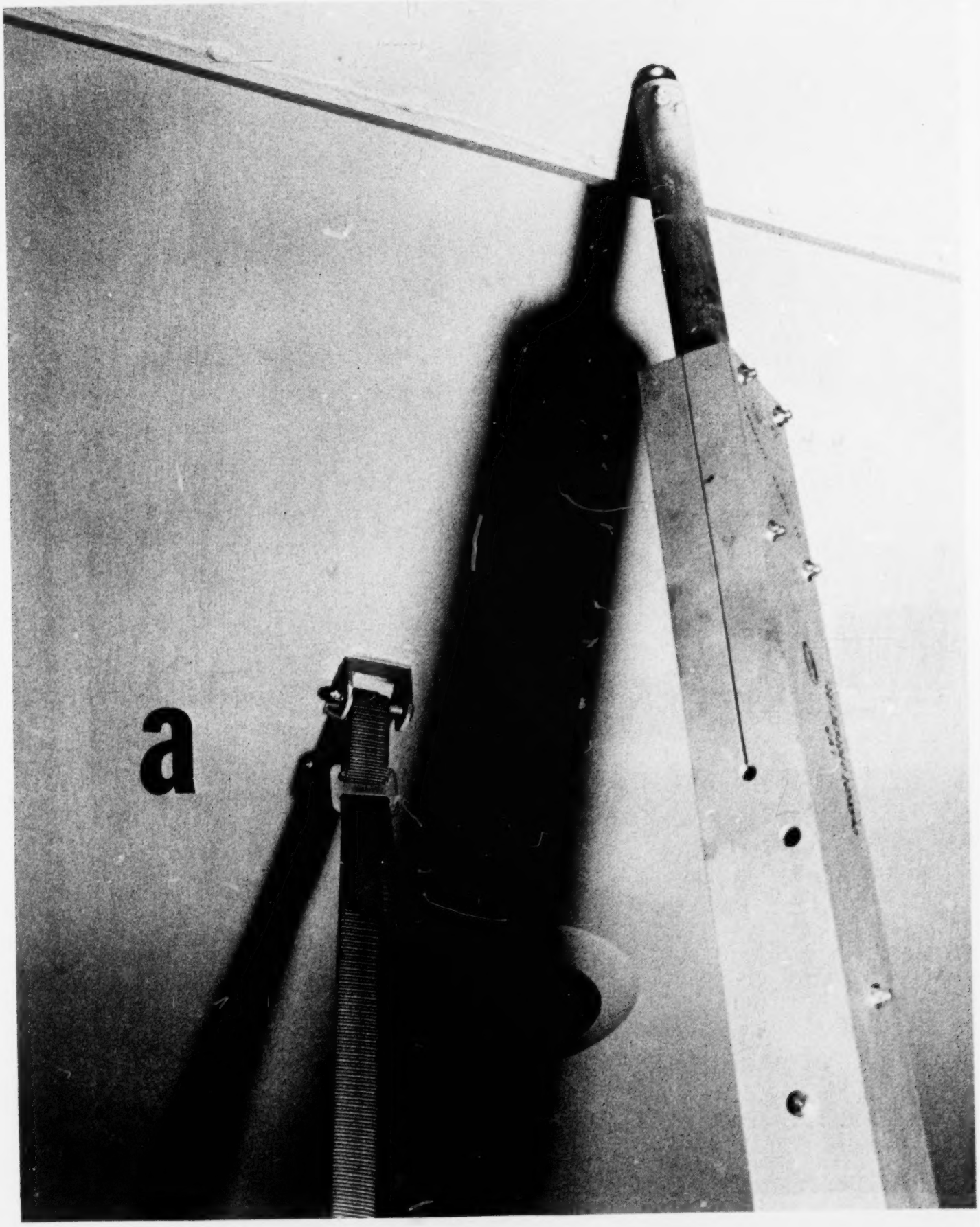

Figure 2-11. Preparing Adjustable Securing Devices.

2032

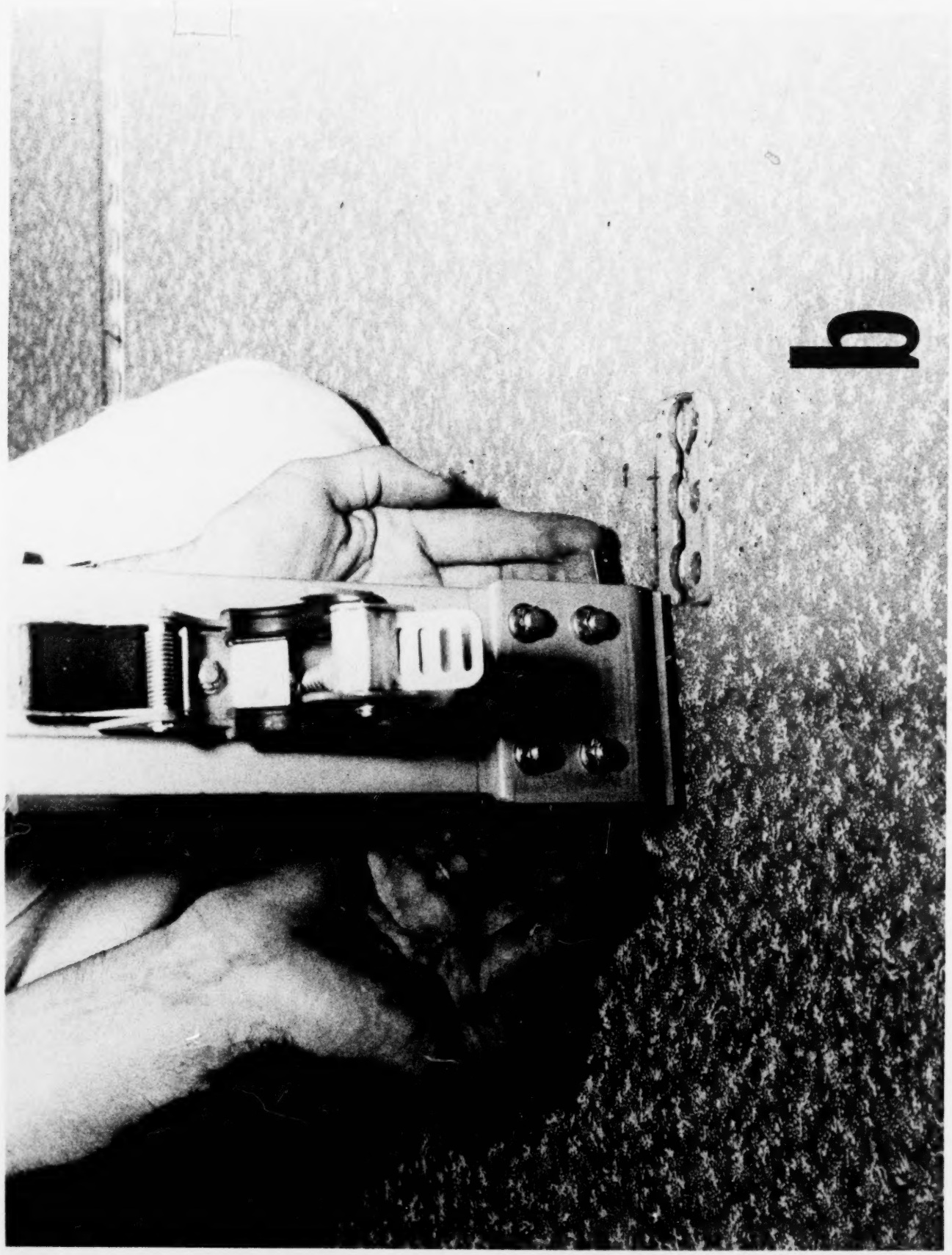

Figure 2-11. Preparing Adjustable Securing Devices. (Continued.)

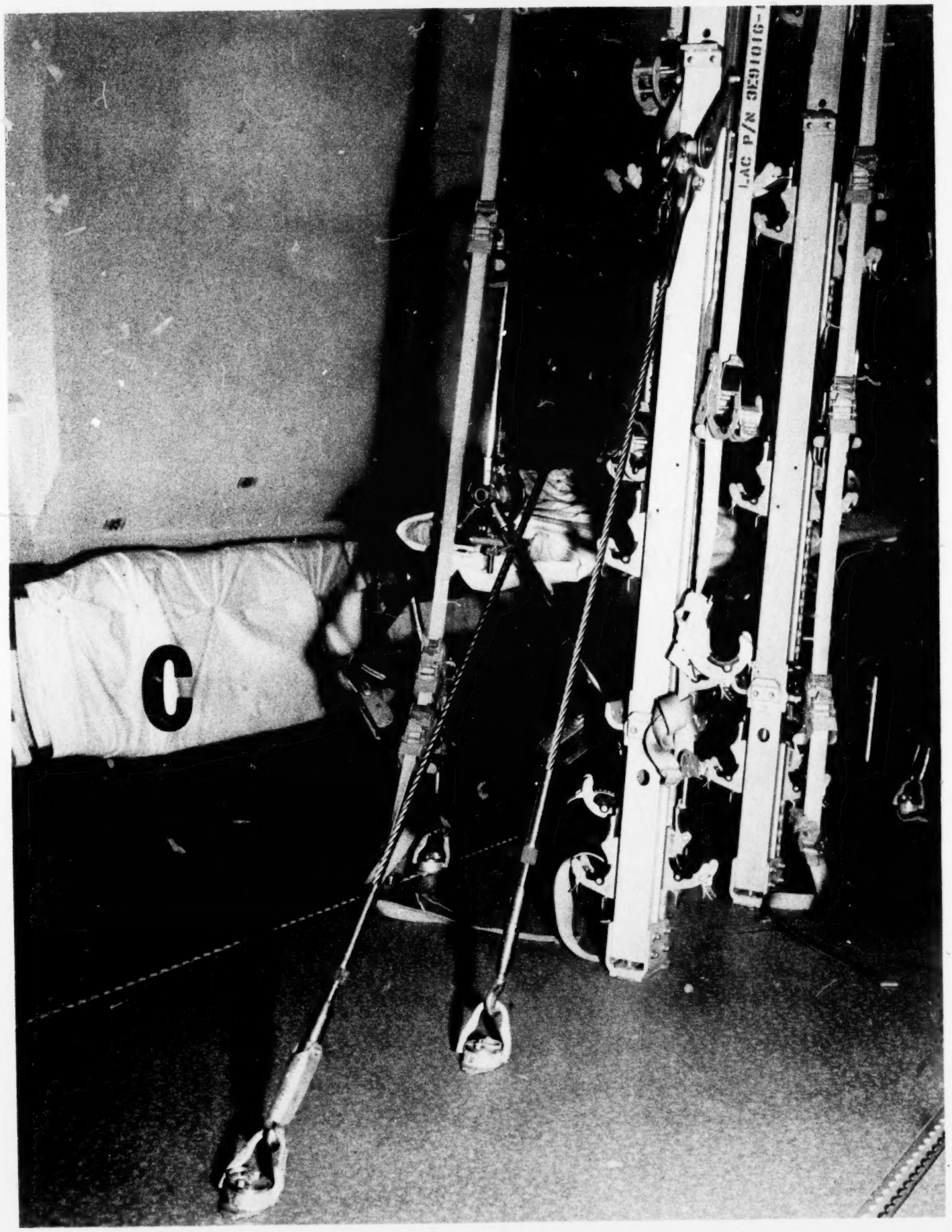

Figure 2-11. Preparing Adjustable Securing Devices. (Continued.)

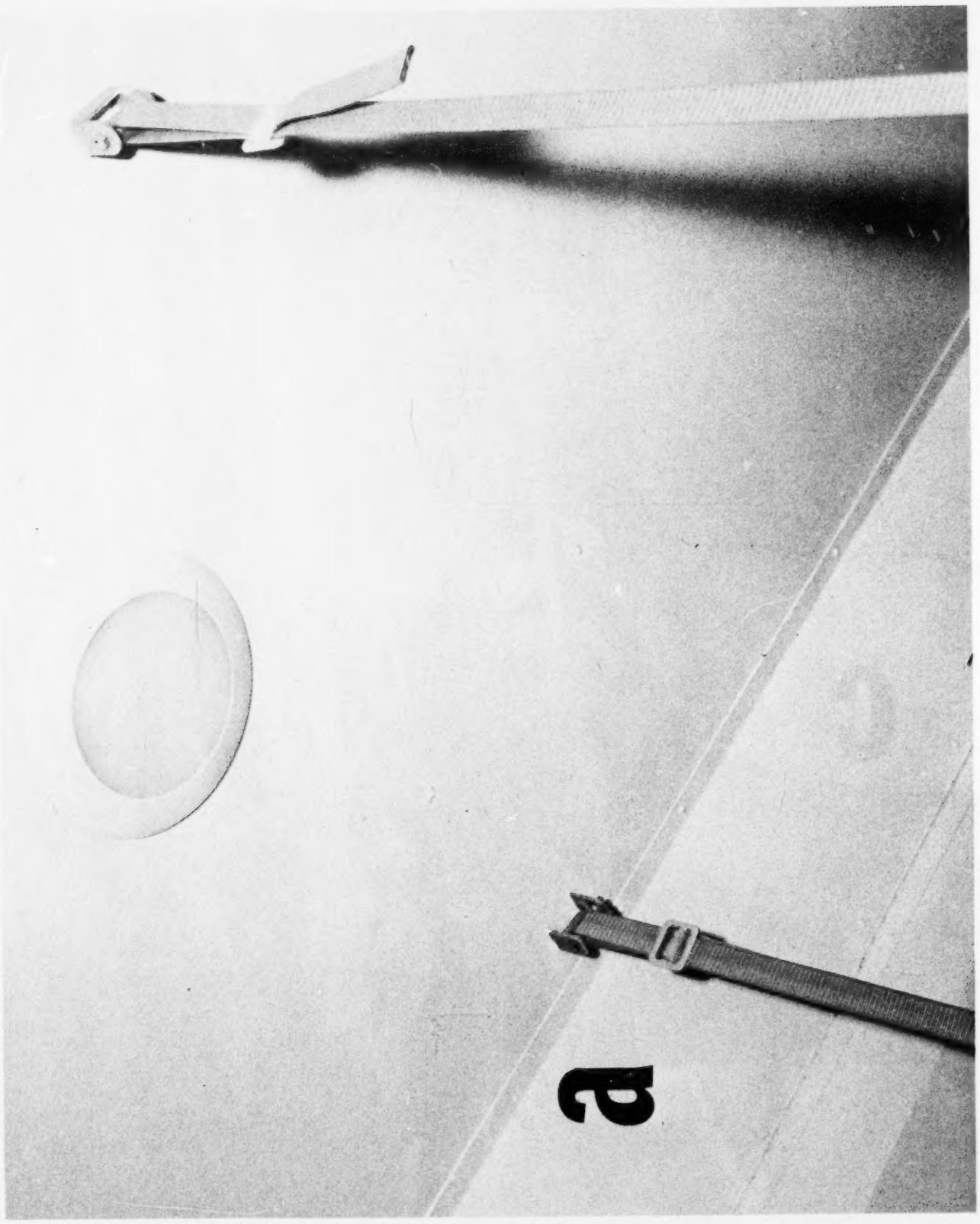

Figure 2-12. Locking and Securing the Suspension Strap.

2035

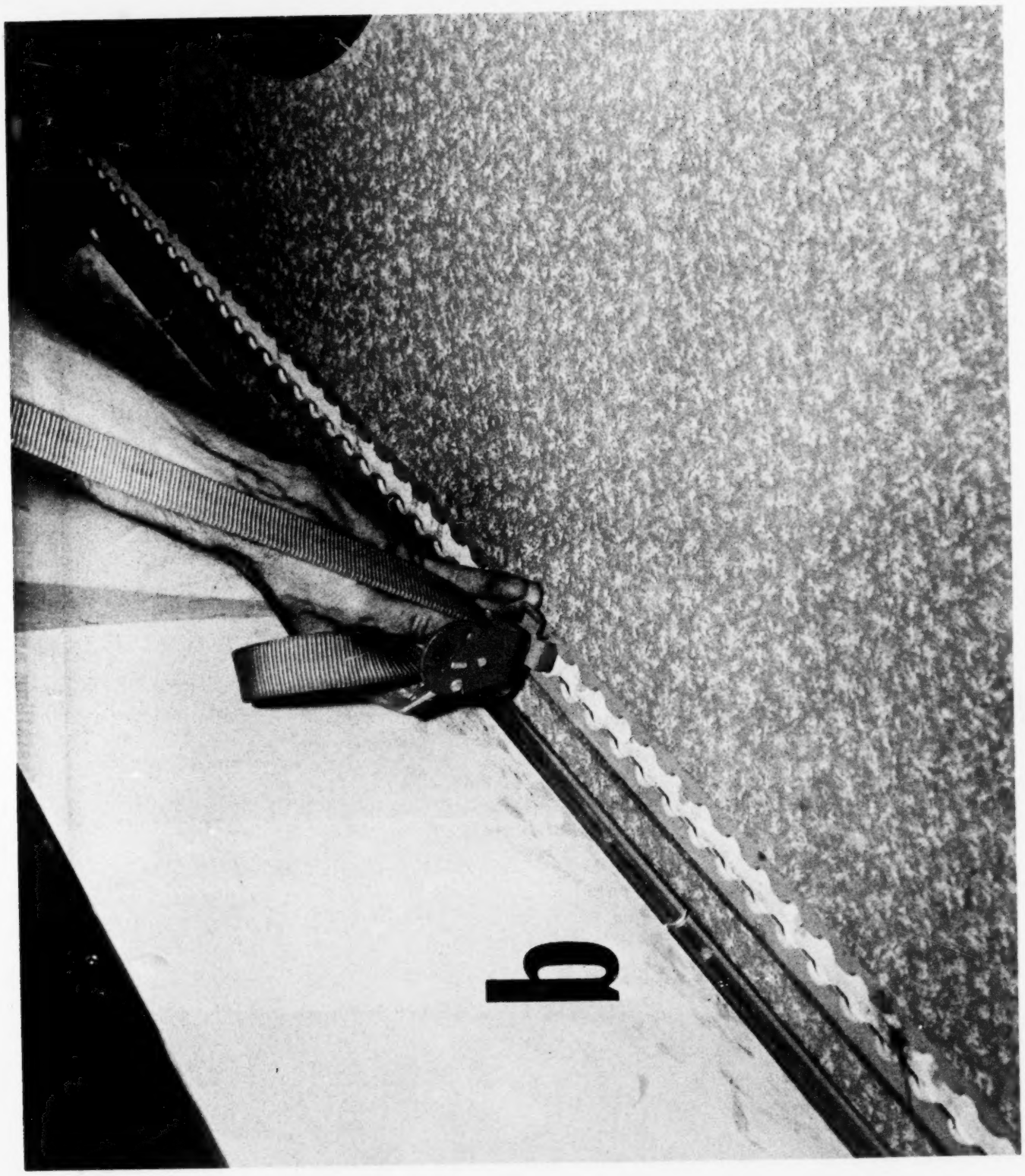

Figure 2-12. Locking and Securing the Suspension Strap. (Continued.)

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Figure 2-15. Installing and Locking the Litter Bracket.

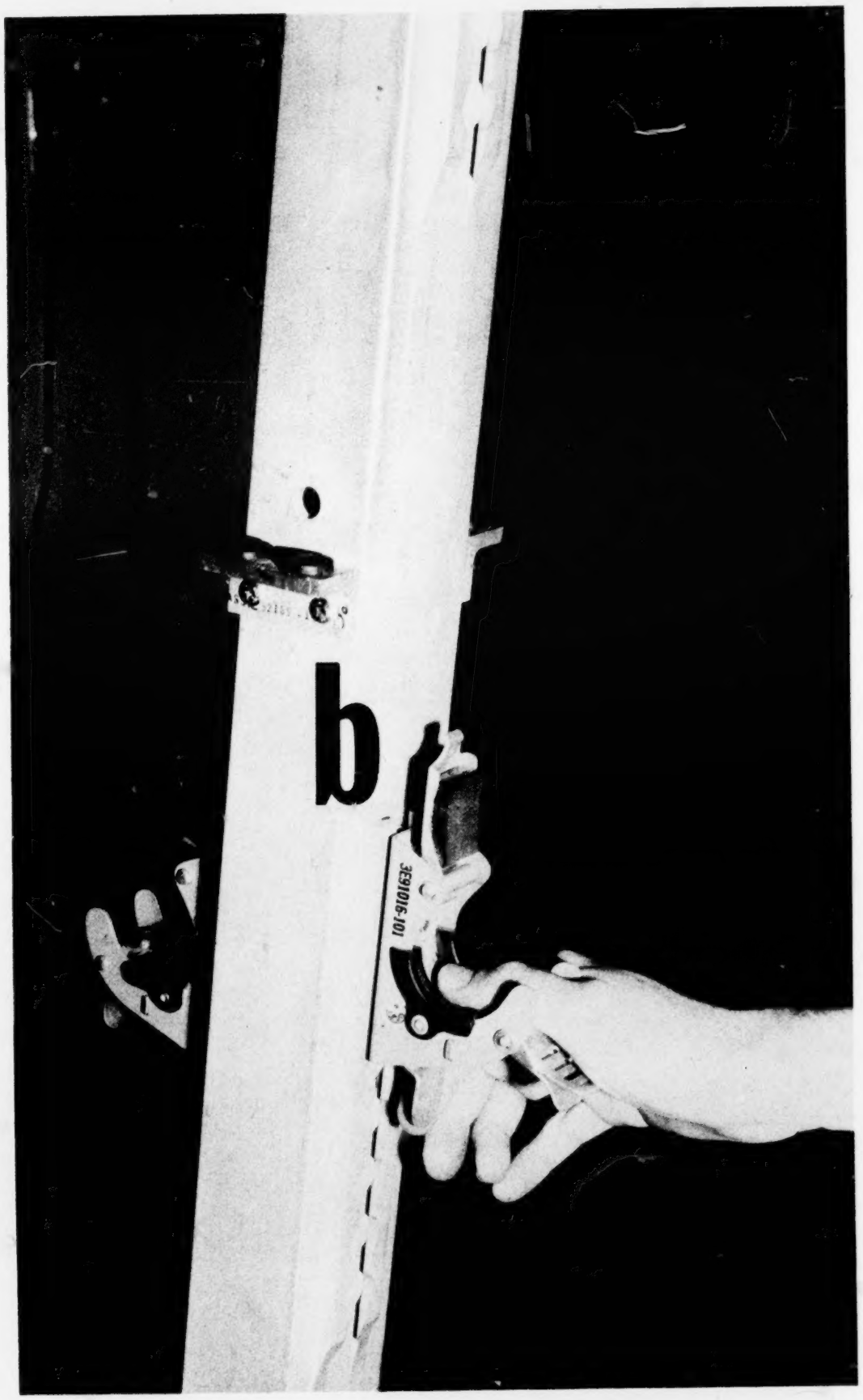

Figure 2-13. Installing and Locking the Litter Bracket. (Continued.)

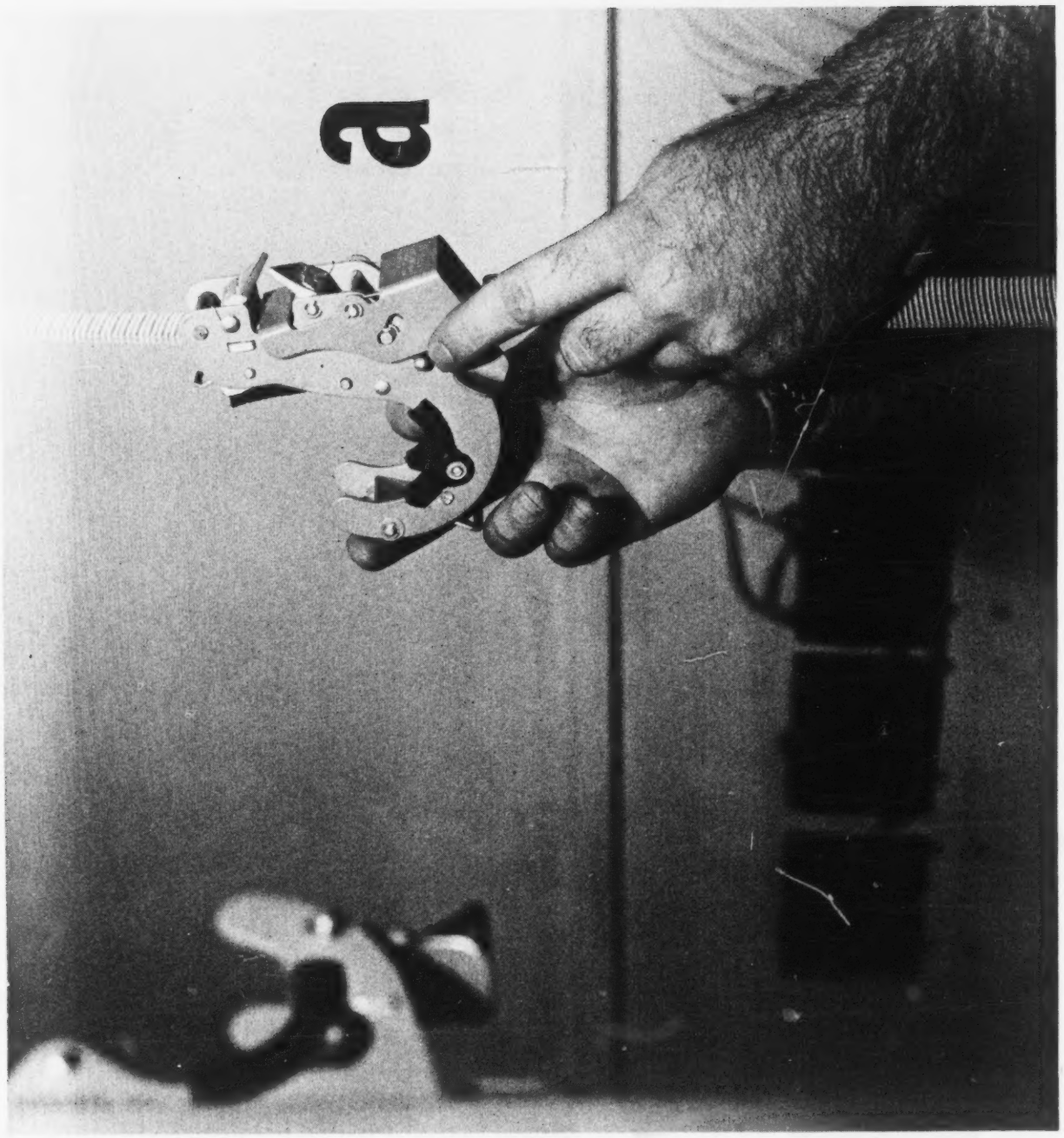

Figure 2-14. Adjusting Litter Brackets on the Suspension Strap.

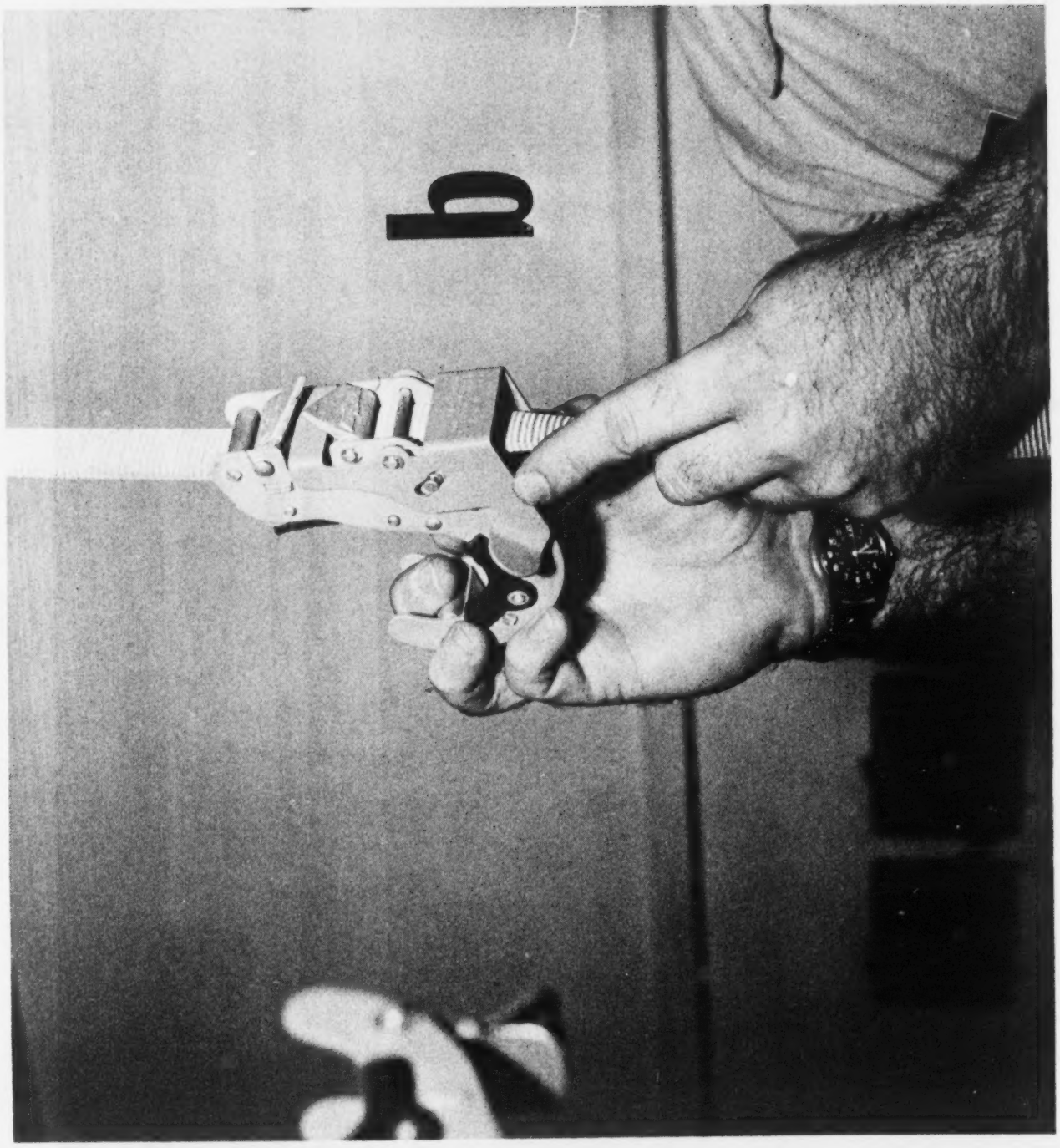

Figure 2-14. Adjusting Litter Brackets on the Suspension Strap. (Continued.)

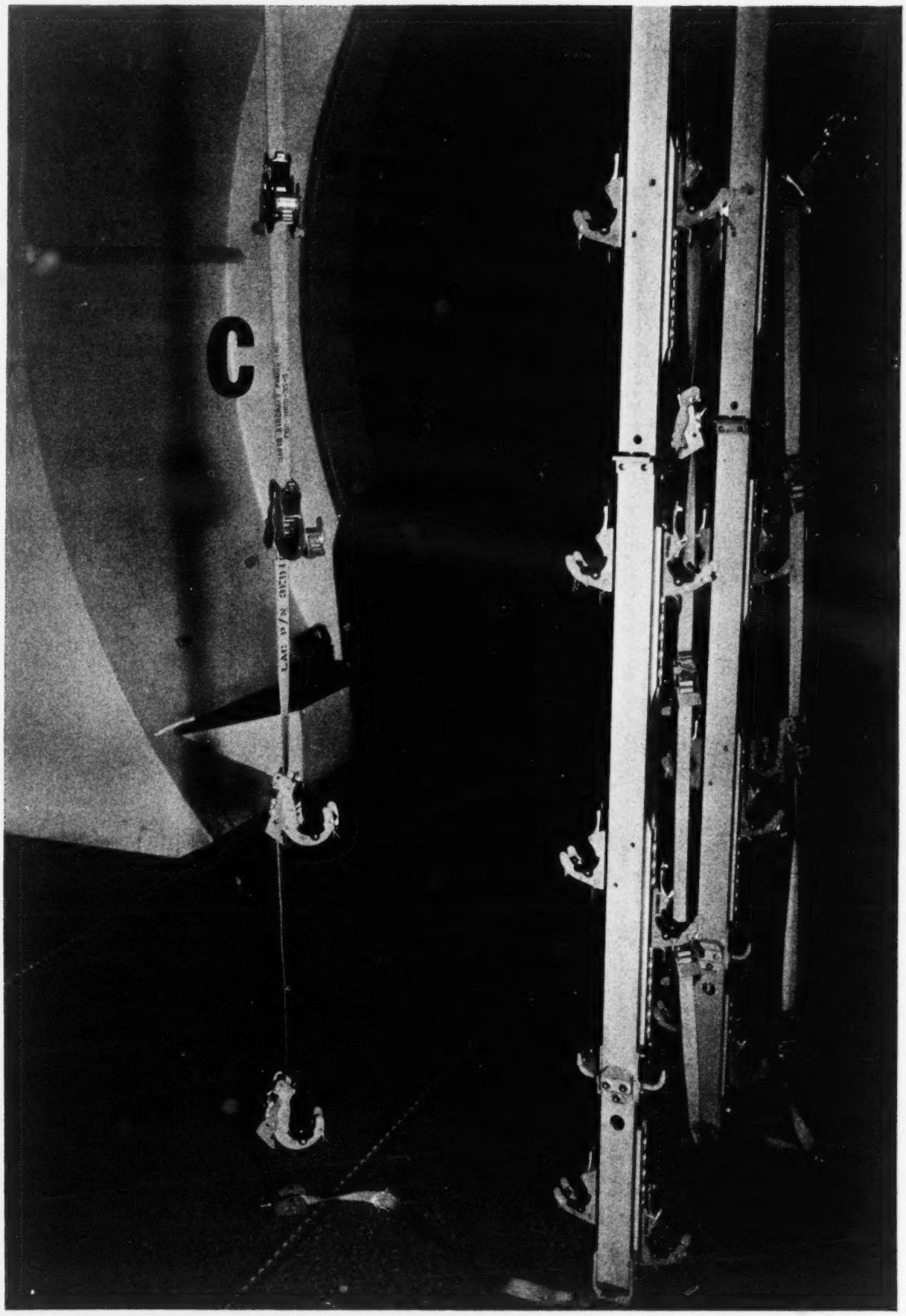

Figure 2-14. Adjusting Litter Brackets on the Suspension Strap. (Continued.)

Figure 2-15. Placing Litter Into Adjustable Devices.

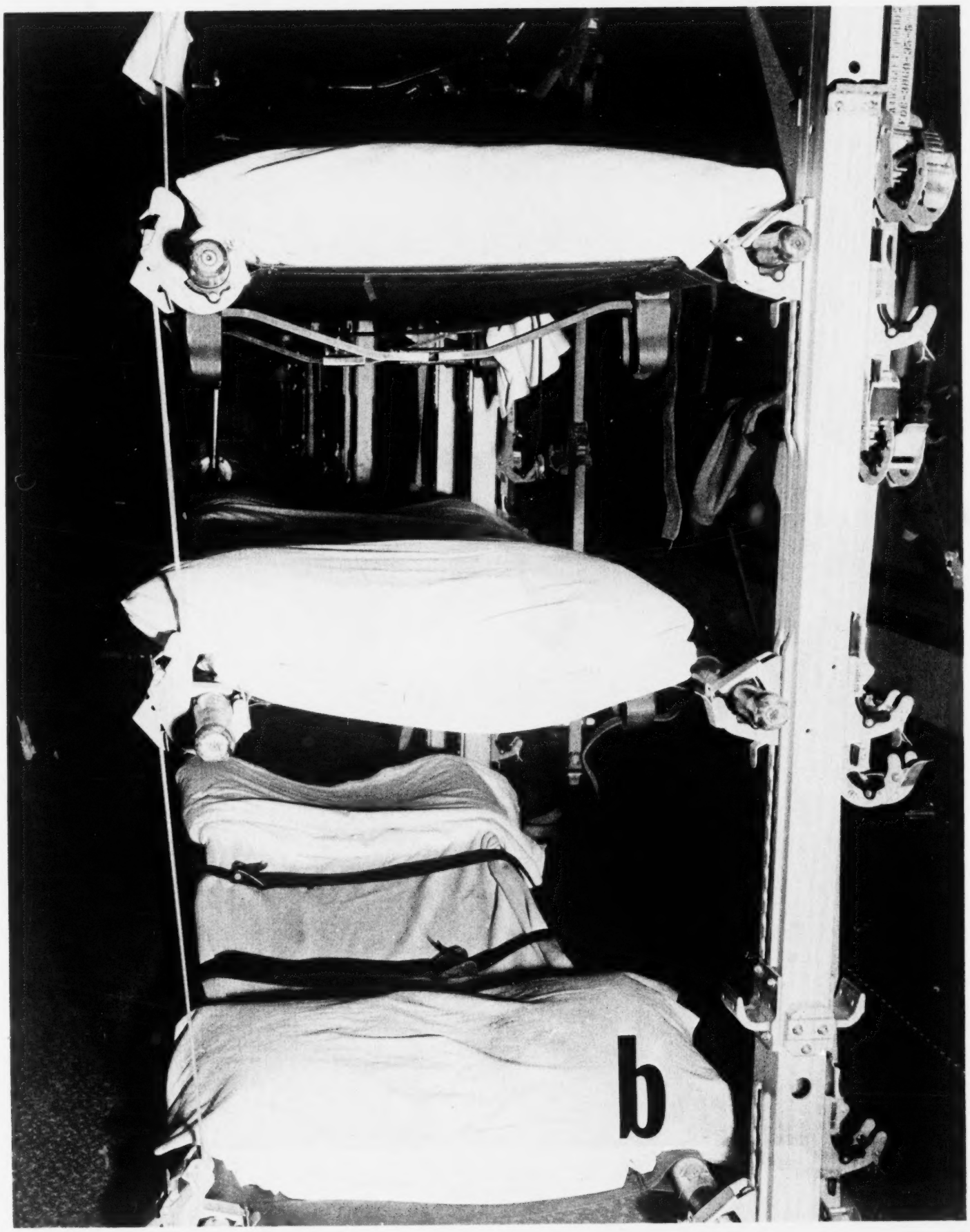

Figure 2-15. Placing Litter Into Adjustable Devices. (Continued.)

2043

enplaning or deplaning such patients. Most aircraft have the cargo door 12 to 16 feet off the ground and it is impossible to enplane patients safely without a loading device of some kind. As aeromedical evacuation aircraft sometimes land in areas where only bare essentials are available, crew member ingenuity may be taxed to improvise loading devices. Above all else, the safety of the patient must be considered and any device used must be sturdy and safe. Stairs are not used except as a last resort. Types of devices used are:

a. **The Sloping Ramp.** This is the loading device most commonly used (see figure 2–16). It is hydraulically operated and can be made stationary. Some of these are open and some are enclosed.

b. **The Fork Lift.** The fork lift (see figure 2–17) is found in civilian airports and in combat areas. It is normally used for on- and off-loading cargo. A wooden cargo pallet is used when a patient is lifted on it. A medical crew member must accompany the patient on the lift.

c. **Truck Bed Ramp Extension.** This extension, shown in figure 2–18, is used in combat situations and at civilian airports.

d. **Self-Contained Ramp.** Some aircraft have their own built-in-ramp. This type, shown in figure 2–19, is preferable because of ease of operation and convenience—it's always with the aircraft.

2–6. Weight and Balance Problems of Transport Aircraft. Modern aircraft operations change constantly and, thus, present increasingly complex load combinations consisting of fuel, crew, cargo, passengers, and baggage. A precise system control over the weight and balance of aircraft is needed if flight is to be efficient and safe. Aircraft are balanced and loaded according to exact rules and specifications, and the aircraft commander is responsible for determining the weight and distribution of the aircraft's cargo and fuel within the limits of these guides. The aeromedical evacuation technician must be aware that weight and balance problems exist as these influence flight planning, patient positioning plans, and the placement of equipment used in flight.

a. **Requirement for Weight and Balance Computation.** The weight of the aircraft when loaded must not exceed the specified maximum for that particular kind of aircraft. The center of gravity must remain within the specified limits if the aircraft is to be flown safely. Whenever a repair, alteration on change of equipment may affect the weight or balance of the aircraft significantly, weight and balance computations must be made again. For example, adding or removing equipment would affect the empty weight of an aircraft and, thus, affect the permissible load. The pilot can quickly determine the loading limits of a particular aircraft by using center of gravity and loading graphs and charts supplied by the manufacturer of the aircraft. Stresses upon the aircraft structure or altered flying characteristics of the aircraft caused by improved loading can result in the loss of life and property. The maximum gross weight limits for a particular aircraft are based upon the most favorable conditions of flight. For flight safety, authorized gross weights are reduced to compensate for various operation conditions such as turbulence, icing, temperature extremes, airports at high elevation, small airports, rough landing surfaces, and other contingencies.

b. **Effects of Improper Loading.** A condition that is dangerous under one set of conditions may not be significant under another. However, many individual factors contributing to overloading or placing too much weight forward or to the rear are potentially hazardous. If an aircraft is overloaded, for example, any one of several conditions can exist, such as reduced maneuverability, increased stalling speed, increased landing speed, and other critical situations which could contribute to an accident. The center of gravity is shifted forward when too much weight is placed toward the front of the aircraft, and it is shifted to the rear when too much weight is placed toward the tail of the aircraft. A study of the conditions which would result from a shift of the center of

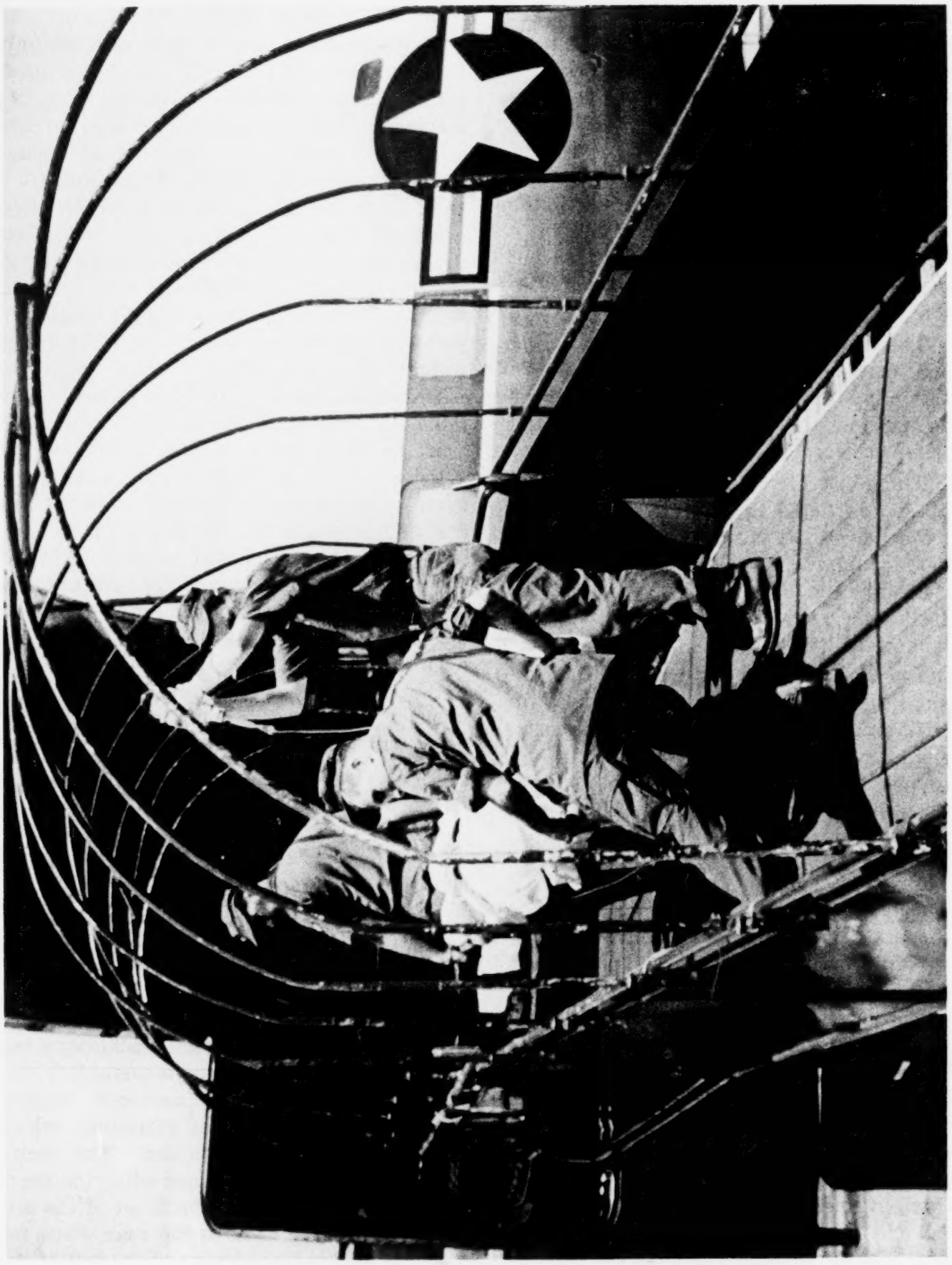

Figure 2-16. Hydraulic Ramp.

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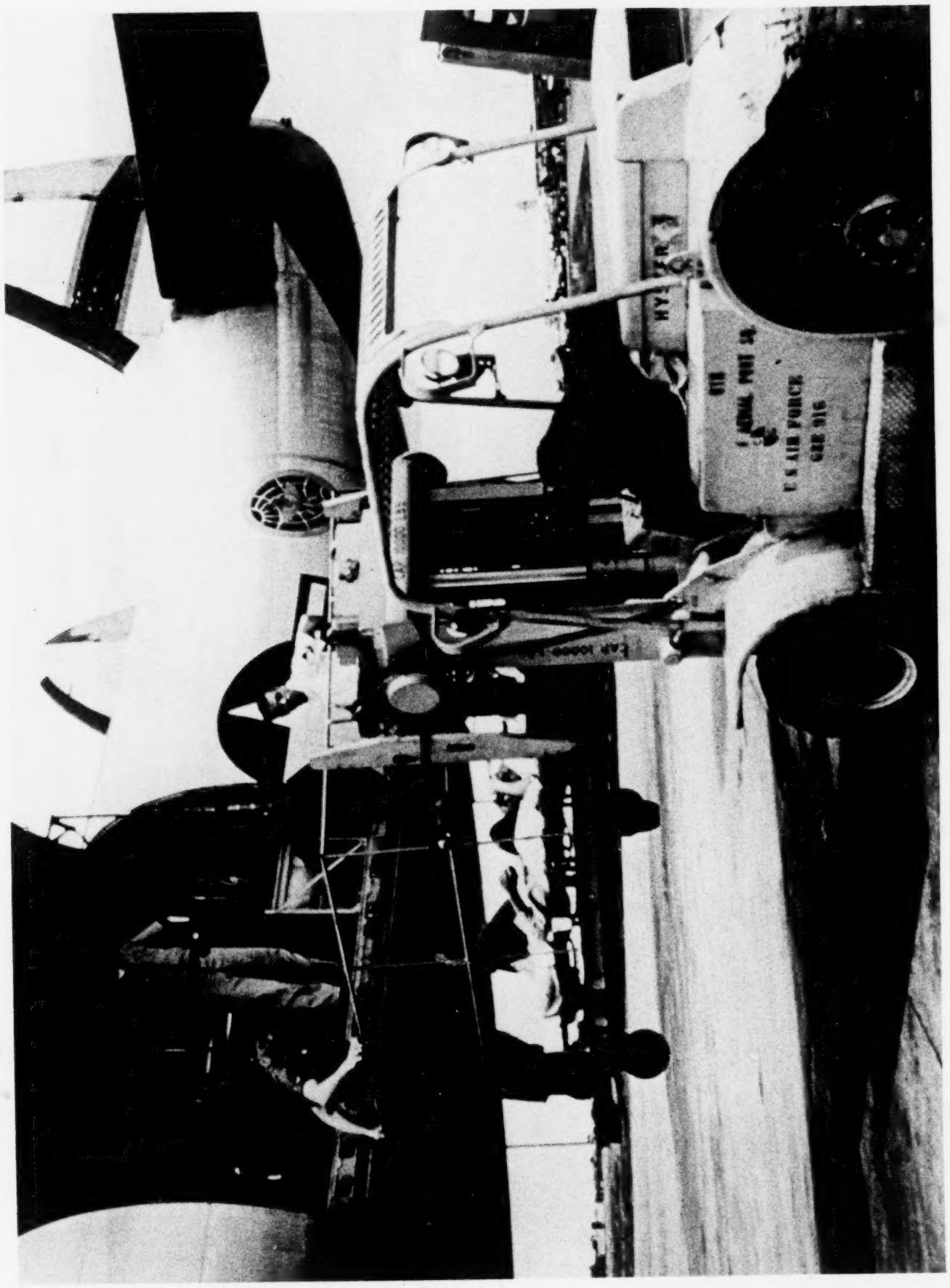

Figure 2-17. Fork Lift.

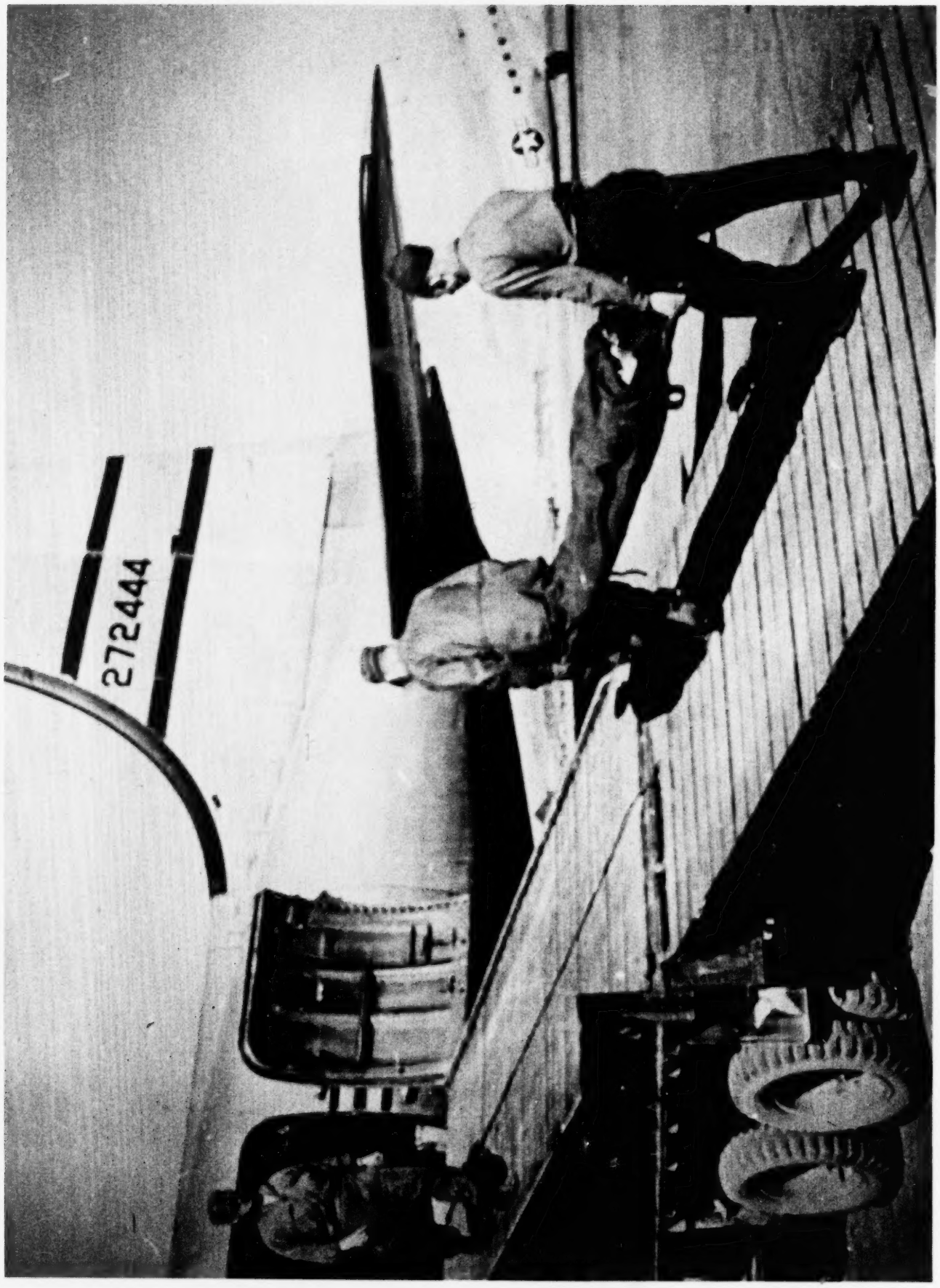

Figure 2-18. Truck Bed Ramp Extension.

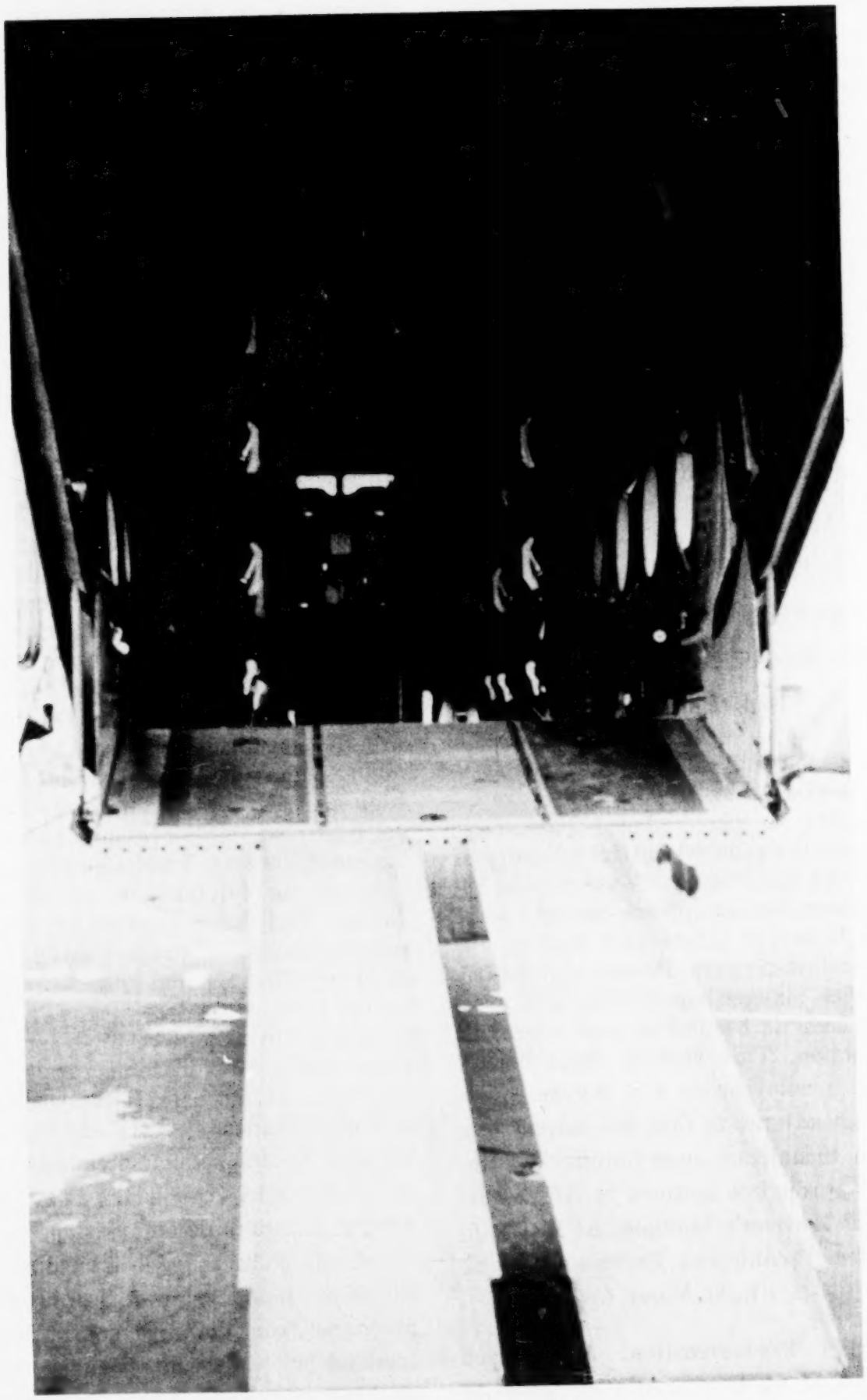

Figure 2-19. Self-Contained Ramp.

gravity shows that any one of them can cause serious accidents which can result in loss of life or of the aircraft. Generally, heavy equipment is placed over the wing insertion area where the aircraft's center of gravity is located and where the equipment will be more stabilized. Another factor in weight and balance is the need to restrict the number of persons in the tail of the aircraft at any one time so as to prevent the aircraft from becoming "tailheavy." In addition to being safer in flight, a balanced aircraft is easier to fly.

2-7. Pressure Check and Wing Scan Inspection. When absolutely necessary, a medical technician may have to perform a pressure check and wing span inspection. In the interest of patient care and safety, this type of duty should be avoided.

SECTION B—AIRCRAFT PRESSURIZATION AND OXYGEN EQUIPMENT

The most serious physiological hazards associated with flights to high altitudes are directly related to the reduced barometric pressure and the reduced partial pressure of oxygen in the ambient air. Consequently, increasingly complex equipment has had to be developed to insure safety and comfort for the crew and passengers. Pressurized cabins, sealed cabins, oxygen equipment, and pressure suits have all been developed to provide this protection. This section deals briefly with cabin pressurization and oxygen equipment. As an adjunct to this, the aeromedical evacuation technician must familiarize himself with appropriate sections in AFM 160-34, *Medical Airman's Manual*; AFM 160-5, *Physiological Technician's Training Manual*; and AFP 164-2, *Flight Nurse Guide*.

2-8. Aircraft Pressurization. Pressurized cabins are used up to altitudes of 70,000 to 80,000 feet; above these altitudes a sealed cabin is used. In the pressurized cabin, ambient air is compressed by the aircraft pressurization system so that the cabin pressure is greater than the ambient pressure. Most of today's bomber and cargo aircraft are designed to tolerate a maximum of 7.5 to 8.5 p.s.i. differential pressure. Pressure differential is simply the difference in pressure inside and outside a pressurized cabin. This difference is measured in pounds per square inch (p.s.i.). For example, when an aircraft is flying at 40,000 feet, the ambient pressure (barometric pressure) is approximately 2.72 p.s.i. If a pressure differential of 8.5 p.s.i. is maintained, the total pressure inside the cabin is increased to 11.22 p.s.i. (2.72 + 8.5). This cabin pressure is equivalent to the barometric pressure at an altitude of approximately 7,500 feet. In aeromedical evacuation, the pressurized cabin is especially important. It also provides more effective control of cabin temperature and ventilation; promotes greater mobility and comfort; and reduces fatigue. Cabin pressurization does not eliminate all problems, however. Because aircraft are not pressurized to sea level, ears and sinuses must be cleared when operating at high altitudes. In an aeromedical evacuation jet transport, cabin pressure does not usually exceed 8,500 feet. Unfortunately, cabin pressure can be lost as a result of mechanical failure, such as a window or door blowing out, the failure of pressurization equipment, or enemy fire. Sudden loss of pressure is referred to as rapid decompression and can be recognized by a noise or air blast, cabin fogging, and a drop in temperature occurring almost simultaneously. If this should happen at high altitudes, hypoxia will rapidly develop and decompression sickness could also occur. Since hypoxia is the first hazard following a rapid decompression, all personnel should obtain oxygen immediately. Then, the pilot should begin a descent to protect personnel from the physiological hazards associated with altitude. Blankets and warm clothing should be readily available. Crew members must remember to use their own

oxygen equipment first; an unconscious crew member is of no use to patients or to himself!

2-9. Aircraft Oxygen Systems. Since the advent of pressurized cabins, there has been less necessity for administering oxygen in flight. Generally, all crew members and passengers who fly above 10,000 feet need supplemental oxygen, but patients often need oxygen at lower altitudes. In administering oxygen to patients in a pressurized cabin, the cabin pressure is the determining factor. For example, if the aircraft is flying at 15,000 feet and the cabin pressure is 4,000 feet, then 4,000 feet is the existing altitude for patients. In an unpressurized aircraft, the pilot consults with the senior medical crew member before he ascends higher than 10,000 feet. If he cannot avoid bad weather by flying below that altitude, there must be enough oxygen aboard for everyone. The aeromedical evacuation technician is concerned with three different types of oxygen storage systems aboard the aircraft: high pressure, low pressure, and liquid oxygen (LOX).

a. **High Pressure Cylinders.** High pressure cylinders range in size from 13.7 cu. ft. to 244 cu. ft. A dark green color code is used to indicate that they contain a high pressure substance—not to indicate that they contain oxygen. A white band around the shoulders of a green commercial cylinder indicates that it contains aviator's breathing oxygen and will so state in white letters on the cylinder side, "Aviator's Breathing Oxygen." Oxygen is stored in the cylinders between 1,800 and 2,200 p.s.i. High pressure cylinders must be well secured. If a cylinder develops a leak, or if it falls and the gauge becomes dislodged or damaged, the force of the high pressure that is released may be sufficient to rip the cylinder from its moorings. The pressure in the cylinder is so great that when this happens the cylinder may spin violently and cause considerable damage in the aircraft. When in use, the oxygen storage cylinder must have a gauge and regulator to reduce the pressure and measure the flow to the patient(s).

b. **Low Pressure Cylinders.** All gaseous oxygen carried under low pressure is in a yellow colored tank. The portable assembly (walk around bottle) is an example of a low pressure cylinder. It is nonshatterable, light weight, easily managed, and can be refilled from the aircraft oxygen supply. Oxygen is stored in low pressure portable cylinders between 400 to 450 p.s.i. and generally should be refilled at a gauge reading of 100 p.s.i. because, for all practical purposes, the cylinder is considered empty at 50 p.s.i. For normal usage, the portable assemblies will last approximately 20 to 30 minutes. However, usage should *never* be timed in this fashion. Use the pressure gauge reading on the assembly instead of time (minutes) to determine the contents. Refill the cylinder at a reading of 100 p.s.i. except in emergency situations.

c. **Liquid Oxygen (LOX) Converters.** In comparison with gaseous systems, liquid oxygen systems have a definite advantage so far as weight and volume are concerned. Liquid oxygen converters (70 or 300 p.s.i.) are installed as storage containers for oxygen in its liquid form. These are available in capacities of 2, 5, 8, 20, 25, and 75 liters. They replace the cylinders used in the gaseous system. There are important considerations in the storage and handling of LOX.

(1) *Storage.* LOX will boil at –119°C. unless protected against ambient sources of heat. Primary methods of hindering heat exchange are:

(a) Double-walled container with a high vacuum between the walls to prevent transfer of heat from outside to inside the container where the LOX is located. With this vacuum at 250 microns of Hg or less, the LOX can be kept in the liquid form for long periods of time. Some heat exchange occurs regardless of the vacuum; thus, eventually, the LOX will be lost through vaporization.

(b) LOX will remain in a liquid state if it is subjected to pressure and maintained at a temperature below –119°C. Due to the continuous vaporization of LOX, it generates its own pressure which is then con-

trolled by pressure relief valves. If the pressure becomes excessive, it is then vented overboard. Due to the unavoidable exchange of heat, the temperature may eventually exceed –119°C; the LOX then "boils off" regardless of the pressure applied.

(2) *Handling.* LOX is to be respected, not feared, for its properties. If safe handling procedures are adhered to, then LOX is no more dangerous than other materiels. Points to be remembered are:

(a) Storage tanks are not to be located in the vicinity of combustible materiels.

(b) No smoking.

(c) No oil is to be used on parts that may come in contact with LOX or gaseous oxygen.

(d) Allow for ventilation wherever oxygen is stored.

(e) Do not allow LOX to come in contact with any combustible materiel, such as asphalt, while filling or draining tanks.

(f) Do not handle any part that has LOX flowing through it.

(g) Make sure all fittings are free of moisture.

(h) Do not use rubber hose to transfer LOX.

(i) In filling, make sure vent valve is open.

(j) Cap all hoses that are not in use.

(k) A container should be located in a position to collect LOX overflow to prevent its contact with the ground.

d. **C-141 LOX System.** As examples of LOX systems, the C-141 aircraft has two complete and separate systems—the crew oxygen system and the troop oxygen system. Oxygen is stored at 300 p.s.i. The crew oxygen system consists of a 25-liter converter which can provide the oxygen requirements of an 8-man crew for 15 hours per man. The troop oxygen system consists of two 75-liter converters, located in the nose section of the right-hand wheel pod, which are capable of providing 600 man-hours of oxygen. Troop oxygen can be manually turned on at any altitude by operating the on-off by-pass valve. It will be automatically activated at any time the cabin altitude increases to approximately 12,500 to 14,000 feet. It will automatically deactivate when cabin altitude decreases to 11,500 feet. The initial flow of oxygen to the troop system will cause the ON light of the troop oxygen panel to illuminate, the cabin lights to turn bright, and the warning horn to sound. There are five recharger hoses in the forward area of the aircraft and they are supplied from the crew oxygen system. The use of these by the medical crews should be restricted to absolute emergencies since the crew oxygen, once depleted, cannot be replenished from the troop oxygen system. The therapeutic oxygen is supplied by the troop oxygen system. There are seven oxygen outlets for therapeutic use. These are divided between the two therapeutic oxygen panels located on the right bulkhead, three outlets on the panel in the forward area (see figure 2-20a), and four on the centrally located panel (see figure 2-20b). Each outlet must have a gauge and regulator to be used. Certain C-141 aircraft have been modified to provide three recharger hoses from the troop oxygen system within the cabin of the aircraft.

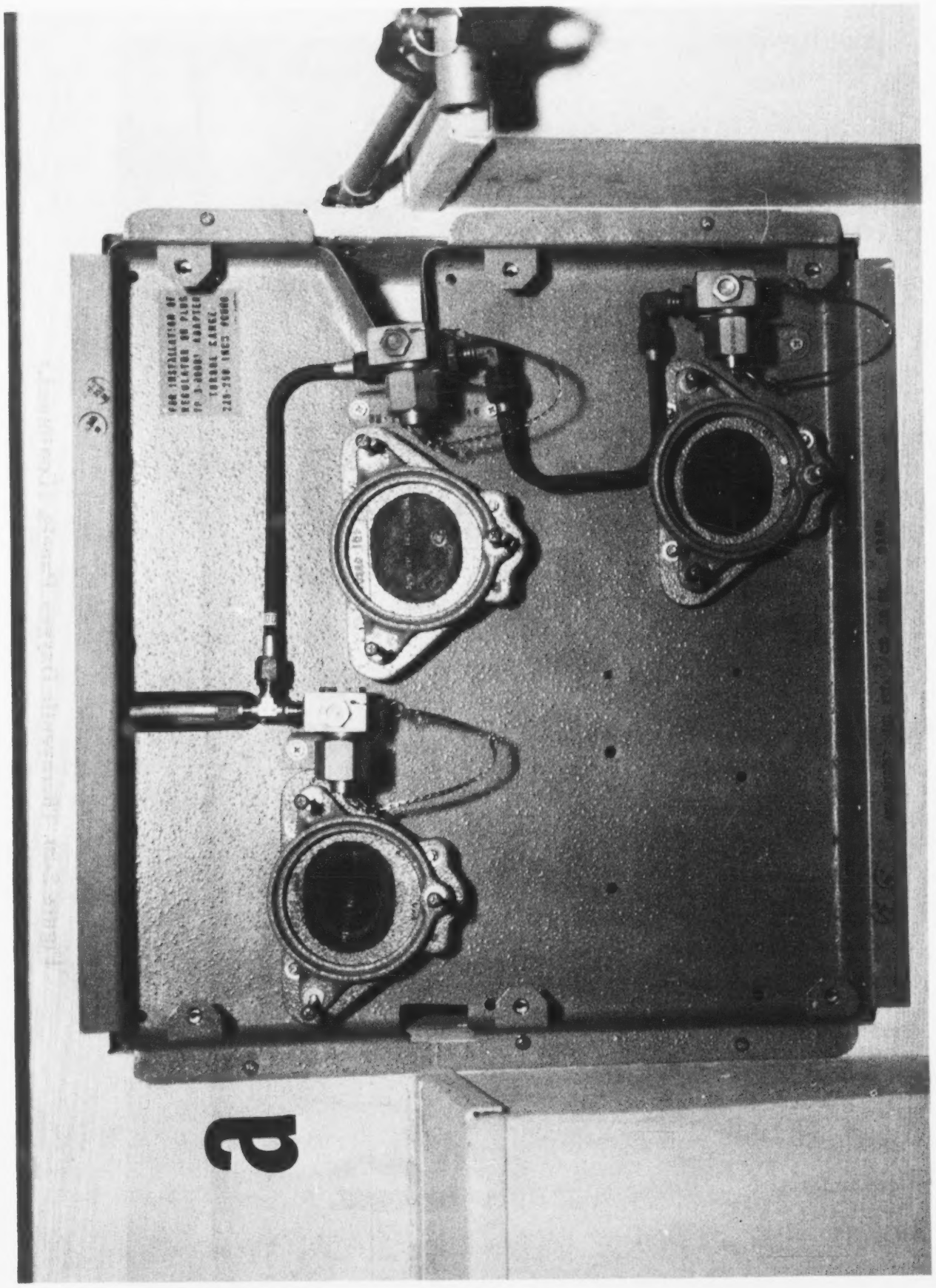

Figure 2-20. Therapeutic Oxygen Panels.

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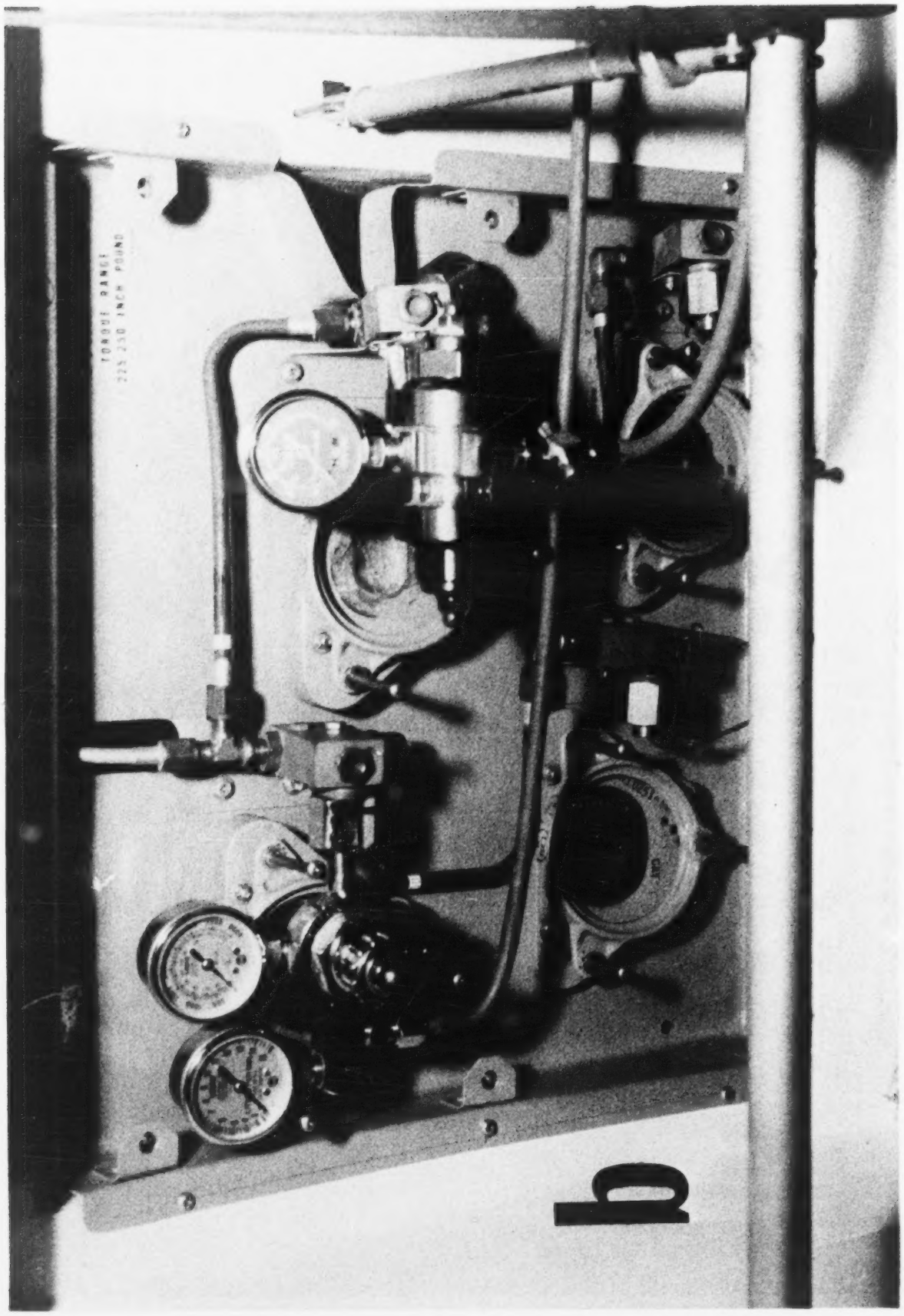

Figure 2–20. Therapeutic Oxygen Panels. (Continued.)

CHAPTER 3

THE AEROMEDICAL EVACUATION SYSTEM

Aeromedical evacuation is the movement of patients under medical supervision to and between medical treatment facilities by air transportation. A Department of Defense policy requires that in both peace and war, patients of the Armed Forces shall be moved by airlift when airlift is available and conditions are suitable for aeromedical evacuation, unless medically contraindicated. Aeromedical evacuation is generally classified into three broad categories as follows:

• **Strategic Aeromedical Evacuation.** Normally provided by MAC between oversea air terminals or aeromedical staging facilities and CONUS, using aircraft specially allocated or specially designed and equipped for this purpose.

• **Domestic and Intra-Theater Aeromedical Evacuation.** Provided by MAC within the United States, by USAFE within the European Theater, and by PACAF in the Pacific area for air movement of patients to definitive treatment facilities or aeromedical casualty staging facilities, using aircraft specially allocated or specially designed and equipped for this purpose.

• **Tactical Aeromedical Evacuation.** Provided by the Air Force Component Commander (Tactical Air Force) for movement of Combat casualties from airheads within or in proximity to the combat zone to rear area treatment facilities using the return backhaul capability of the assault airlift force insofar as possible. All assault airlift aircraft in a tactical air force can quickly be configured for litter and ambulatory patients.

This chapter concerns global aeromedical evacuation operations with emphasis on those aspects most pertinent to the aeromedical evacuation technician.

SECTION A—THE MILITARY AIRLIFT COMMAND (MAC) AEROMEDICAL AIRLIFT SYSTEM

The primary mission of the MAC Aeromedical Airlift System is to provide air transportation for the sick and wounded active duty members of the U. S. Armed Forces in an expeditious and medically acceptable manner over air routes of MAC responsibility from overseas to, and within, the CONUS. To fulfill its mission, MAC operates three separate and distinct aeromedical systems: domestic, Pacific, and European. The systems are interconnected, though they operate differently. The Command Surgeon, MAC, with Headquarters at Scott AFB, Ill., coordinates and directs operation of MAC Aeromedical Airlift activities.

3-1. **Domestic System.** The domestic aeromedical evacuation system is the result of the assignment of a specific mission and the organization necessary to carry out this mission.

a. **Mission.** This system provides aeromedical airlift within CONUS under the direction of the 375th Aeromedical Airlift Wing (AAWg), whose mission is to:

(1) Operate a domestic aeromedical evacuation system for expeditious movement of U.S. Armed Forces patients as medically directed.

(2) Maintain in a state of readiness an aeromedical evacuation capability within the CONUS in support of war plans and contingencies.

b. **Organization:**

(1) With the acquisition of C-9 aircraft, the domestic airlift activities have been

consolidated into one squadron—the 11th Aeromedical Airlift Squadron (AASq) of the 375th AAWg, Scott AFB, Ill. Units which have airlift as part of their title (e.g., AASq) operate their own aircraft and are commanded by a pilot. If airlift is not in the title (e.g., Aeromedical Evacuation Squadron, AESq), the squadron does not possess aircraft and is commanded by an MSC officer. In addition to the 11th Aeromedical Airlift Squadron, the 375th Aeromedical Airlift Wing has under its command detachments at Travis AFB, California; Andrews AFB, Maryland; Buckley ANG Base, Colorado; Maxwell AFB, Alabama; and Kelly AFB, Texas. Detachments perform administrative functions and are primarily Aeromedical Evacuation Control Centers (AECC's).

3-2. Pacific System. This area is the responsibility of 22nd Air Force, one of two numbered Air Forces of MAC, with Headquarters at Travis Air Force Base, Calif. and the 10th Aeromedical Evacuation Group (AEGp), located at Hickam AFB, Hawaii. Directly responsible to the 10th AEGp are the 47th Aeromedical Evacuation Squadron at Clark AB, Philippine Islands and the 56th Aeromedical Evacuation Squadron at Yokota AB, Japan. Detachments are located at Anderson AFB, Guam; Elmendorf AFB, Alaska; and Tan Son Nhut, Cam Ranh Bay, and Danang Air Bases in Vietnam. Others are established as required. These units are comprised of medical crews and administrative personnel. Airlift support is provided from flying units in CONUS which airlift cargo and passengers to the Far East and carry patients on return trips to area treatment facilities and CONUS.

3-3. European System. MAC's 21st Air Force at McGuire Air Force Base, N. J. and the Aeromedical Evacuation Squadron at Rhein Main AB, Germany are responsible for intertheater missions in Europe. Intratheater operations in Europe are the responsibility of USAFE.

3-4. Aeromedical Evacuation Control Centers (AECC). These are located throughout the MAC aeromedical system. Specific geographic areas of responsibility for patient movement control are assigned to each center.

a. **Duties and Responsibilities.** Duties and responsibilities assigned to AECC's are as follows:

(1) Consolidate and coordinate patient movement requests. The originating medical facility contacts the AECC within its area of responsibility to report patient airlift requirements.

(2) Keep records of patients moved.

(3) Determine aircraft space and combination requirements.

(4) Supervise ground handling and loading.

(5) Coordinate aircraft availability for date, time, and patient movement.

(6) Maintain patient movement and aircraft capability records.

b. **Central AECC.** The 375th AAWg's Command Post directs the domestic system by using trip frequency forecasts and other mission directives to coordinate the transportation of patients with their medical requirements. The Command Post coordinates the activities of the other CONUS Aeromedical Evacuation Control Centers, maintaining current information on the location, status, and movement of aircraft assigned to the mission. It directs the operation of all special support projects and the airlift for special requirements approved by higher authority.

3-5. Aeromedical Evacuation Operations Officer (AEOO). A Medical Service Corps officer of the airlift force or air command is responsible for activities relating to planning and directing aeromedical evacuation operations; maintaining liaison with the medical and airlift activities concerned; operating an AECC; and coordinating patient requirements and airlift.

3-6. Status and Management Boards. Such boards are usually prominently displayed in the AECC's. They aid in the operation and

management of the overall aeromedical evacuation mission. The Julian date is generally used to record on these boards. This means the date is recorded by its order in the number of days in the year. For example, the date of 21 February is recorded as 52 because it is the 52nd day of the calendar year. Types of boards found in the AECC's are:

a. **Aircraft and Aircrew Status Boards.** This board reflects the status of maintenance for each aircraft and the availability of aircrew personnel. It enables center personnel to keep changes current and to relay the necessary data through the aeromedical communications system. It also enables medical and aircraft crew members to see their availability for flight and the availability of aircraft.

b. **Aeromedical Mission Management Information Board.** This provides information needed to plan an aeromedical evacuation mission, to follow its progress, and to manage it.

c. **Patients Holding in Aeromedical Staging Unit (ASU).** This board reflects the status of all patients in ASU's served by AECC, who are awaiting further movement in the aeromedical evacuation system.

d. **Patients Originating in Area.** This board provides pertinent data on patients awaiting routine movement from hospitals in the AECC's area of responsibility.

3-7. Aeromedical Staging Unit. Aeromedical staging facilities and flights, which include embarkation, debarkation, and RON holding wards, are indispensable to operation of the aeromedical evacuation system. The functions of the aeromedical staging facilities and aeromedical staging flights are quite similar, the main difference being in the scope of their operation. They operate at points along the aeromedical evacuation routes where the movement of patients must be interrupted temporarily. Their mission is to provide for patient reception, shelter, temporary medical care, and processing at airstrips, air bases, and aerial ports. In a national emergency, any military hospital could be suddenly designated a debarkation or staging area, with patients flowing in and out with little opportunity for advance preparation by the hospital.

3-8. Medical Reserve Force Program. To meet requirements that would be generated by a general war or other contingency, MAC may augment its present aeromedical airlift organization with additional medical crews. Such augmentation is assured by MAC's being the gaining command for many Reserve Forces medical units located throughout the United States. Some of the units are Air National Guard (ANG) and some are Air Force Reserve; the term Reserve Forces applies to both groups. The Guard is a state controlled organization under the National Guard Bureau in Washington, and the Air Force Reserve units are assigned to AFRES. MAC, as gaining command for these units, is responsible for their training and inspection during peacetime. Present training of these units is accomplished in active units and is aimed at qualifying crews as operationally ready. An operationally ready crew is one which has progressed in ground and flying training to the point where it could be depended upon to augment active duty units, if mobilized, with a minimum of supervision and indoctrination. Under the overall supervision of the 375th AAWg, Reserve crews conduct aeromedical missions as required.

SECTION B—OTHER AEROMEDICAL EVACUATION ORGANIZATIONS AND CONSIDERATIONS

3-9. Tactical Air Command (TAC) Aeromedical Evacuation. The primary mission of TAC is to provide fast-reacting, combat ready tactical air forces for deployment anywhere in the world in concert with other air, land, or sea forces. Additionally, TAC provides an ever ready, highly mobile capability for establishing and operating a tactical aeromedical evacuation system at any of the

world's trouble spots on very short notice. Aircraft designed exclusively for this mission are not required as the backhaul capabilities of assault airlift are utilized. These aircraft can be quickly configured for carrying patients. The mission of TAC aeromedical during peace-time is primarily a training one geared to maintain maximum capability in providing effective rapid movement of casualties from a forward area in wartime. Participation in joint exercises and maneuvers helps maintain this capability. A secondary mission is to assist in disaster relief and other domestic emergencies. The individual aeromedical evacuation system generally includes an AECC, forward and rear aeromedical staging facilities inflight elements, liaison teams, a support element, and a command element. The size and complexity of the system depends upon anticipated casualty workloads, location of airhead, and other factors which must be evaluated to determine aeromedical evacuation resources required.

a. **Aeromedical Evacuation in a Wartime Theater of Operations.** In wartime, the military establishes specific theaters of operation with definite geographical boundaries and designates a theater commander to be in charge of all Armed Forces in his theater. Within a theater of operations, the commander establishes specific zones, the three basic ones being the communications, combat, and airhead zones. The theater commander establishes their boundaries. Basically, the communications zone is a large, relatively safe area far enough behind the front lines to insure safety of troops, supplies, and hospitals. The combat zone lies where the troops are actually fighting and can cover an area of hundreds of square miles. An airhead is a drop zone behind enemy lines. Aeromedical evacuation in these zones is carried out as follows.

(1) The Army is responsible for aeromedical evacuation in the forward area of the combat zone.

(2) TAC aircraft fly troops and supplies into the combat zone and on their return flights carry patients back to hospitals in the communication zone. Similarly, they bring supplies to the airhead and the wounded back to the communication zone on the return flight. TAC establishes aeromedical staging facilities at airfields in the combat zone. They serve as holding wards and provide temporary medical care for patients to be evacuated by air. They also have a liaison mission. Medical crew members stationed in the communication zone deadhead to the other zones with their own supplies and equipment and care for the patients on the return flight back to the hospital.

b. **Tactical Operational Procedures for Patient Evacuation.** These are minimal and basic and include:

(1) *Patient Screening.* This is done to remove patients from forward areas and move them back to definitive care, if necessary.

(2) *Patient Preparation.* Only lifesaving measures are used, such as splinting fractures and stopping hemorrhage.

(3) *Categorizing Patients.* Patients are divided into categories such as seriously ill, still under anesthesia, in shock, foreign nationals, and prisoners.

(4) *Aircraft Loading.* The plane is loaded to capacity as determined by the pilot as long as the litters can be properly secured to the floor. Loading ramps are improvised as necessary.

(5) *Records.* These are minimal. Only vital facts, such as administration of narcotics or blood, are entered on patient field tags.

(6) *Medical Supplies and Equipment.* These must be minimal and portable as medical crew members must carry them.

c. **First Aeromedical Evacuation Group (1st AEGp).** Group headquarters is at Pope AFB, N.C., and has under its jurisdiction the 21st AESq also at Pope AFB and the 22nd AESq at Seward AFB, Tennessee. This group has the mission of providing assault airlift forces with a specialized mission capability for the conduct of tactical aeromedical evacuation. Its responsibility is also to:

(1) Administer and operate an integrated tactical aeromedical evacuation system within or between specified areas including

patient movement from USAF aeromedical staging units to hospitals outside the combat zone and from an airhead or airborne objective area where airborne operation includes air landed logistical support by the USAF.

(2) Participate in joint exercises and maneuvers.

(3) Implement emergency war plans.

(4) Participate in disaster relief and other domestic emergencies.

(5) Coordinate the employment of tactical aeromedical evacuation capability with medical regulating agencies of other using services.

(6) Train assigned and other appropriate USAF units in tactical aeromedical evacuation.

(7) Make recommendations to the assault airlift force commander concerning the utilization of available tactical aeromedical evacuation capability.

(8) Provide advisory assistance to Air Reserve Forces aeromedical staging units for which TAC is the gaining command.

d. **AECC.** An AECC is located within the Tactical Air Control Center of the Air Force Component Commander (or Airlift Task Force). The number of personnel assigned to it depends on the size of the aeromedical evacuation system and the requirements for 24-hour manning. AECC responsibilities are to:

(1) Control and monitor the aeromedical evacuation casualties from the initial point of treatment in the combat zone or airborne objective areas through forward aeromedical staging flights to aeromedical staging flights at rear area airfields near fixed medical treatment facilities.

(2) Select aircraft, from those that are scheduled to airlift personnel and equipment to airfields of forward areas, for use as aeromedical evacuation transports on return flight. Selection is based upon the casualty workload at the forward aeromedical staging flight, the type of aircraft available, cargo load, scheduled ground time at the forward airfield, and ease of configuration to litter capability.

(3) Schedule casualties by classification as litter or walking patients on flights identified for return as aeromedical evacuation transports.

(4) Coordinate flights selected as return aeromedical evacuation missions.

(5) Provide operational information and guidance to other elements of the tactical aeromedical evacuation system.

(6) Arrange airlift missions for movement of aeromedical staging flights and support activities, necessitated by relocation of airheads or ground force field medical treatment facilities.

(7) Maintain casualty evacuee status charts and other required records on aeromedical evacuation missions.

(8) Provide essential casualty status information to the commander, tactical aeromedical evacuation system.

e. **Aeromedical Staging Facilities.** TAC's aeromedical staging facilities are air mobile units which are equipped and staffed to receive, process, and load casualties requiring aeromedical evacuation from forward field medical treatment facilities to rear area hospitals. The normal capacity is 50 patients; patients are not usually held for more than 3 hours. These facilities are also used at rear area airfields, where aeromedical evacuation flights end, for temporary holding and processing of casualties pending their removal to fixed hospitals.

3-10. Pacific Air Force (PACAF) Intra-Theater Aeromedical Evacuation. Aeromedical evacuation within the Far East and Southeast Asia is a PACAF mission performed by its theater airlift, the 315th Air Division. Two units of the division share this responsibility; the 9th Aeromedical Evacuation Group, Clark AB, Philippine Islands, for the medical service function, and the 6458th Operations Squadron for airframe and aircrew support. The primary aircraft for intra-theater aeromedical evacuation is the C-118, but other types of aircraft under operational control of the 31th Air Division are regularly assigned to missions as required.

a. PACAF intra-theater aeromedical evacuation closely parallels both the MAC and TAC systems in concept, policies, procedures, and administration. The 9th AEGp, with its subordinate squadrons and a series of detachments, is organized to provide both routine and emergency service. The detachments, functioning as control centers for in-country flights, have a limited medical crew capability and coordinate with associated Transport Movement Control Centers to meet patient movement requirements.

b. Transfer of patients between medical facilities in the area is controlled by the Far East Joint Medical Regulating Office. Regularly scheduled flights provide routine evacuation service to major medical facilities, from which point further movement to Hawaii and the CONUS is the responsibility of MAC.

3-11. Armed Services Medical Regulating Office (ASMRO). ASMRO is located in Washington, D.C., and is staffed by Army, Navy, and Air Force personnel. It serves as a clearing house to receive, request, and issue instructions to move patients, and regulates the movement of military patients between Armed Forces hospitals in accordance with Department of Defense policy. Its functions are to:

a. Regulate the flow of patients to specialized medical treatment facilities available to care for military patients.

b. Obtain necessary reports of bed availabilities in specialized medical treatment facilities.

c. Recommend doctrine, policy procedures, and guidance for issuing patient movement directives to appropriate agencies.

d. Initiate recommendations to the military departments to designate certain Armed Forces medical installations, in whole or in part, to act as temporary or permanent debarkation hospitals.

e. Maintain liaison with the Joint Military Transportation Committee and a close working liaison with appropriate transportation agencies and other agencies on matters pertaining to moving the sick and wounded to and within the United States.

f. Coordinate the movement of military patients from military hospitals to Veterans Administration (VA) hospitals and coordinate these movements with the VA Central Office.

g. Perform other services and duties as required in patient movement.

3-12. Special Considerations for Oversea Operations. When personnel move from an oversea area back to territorial United States, certain additional forms must be accomplished before the individual can clear a port of entry. The port of entry is wherever the aircraft first touches U. S. soil—e.g., Hickam AFB, Hawaii, and Elmendorf, AFB, Alaska. The senior medical crew member is responsible for seeing that all forms are in order when an aircraft reaches the port of entry. The various inspectors usually board the aircraft as it lands so that patients can be cleared quickly and deplaned.

a. **Customs.** Declarations are prepared by each individual aboard the aircraft. They are usually accomplished in flight. The senior medical crew member is responsible for accomplishing the forms for patients and the medical crew, and signs the forms for isolation, unconscious, and psychiatric litter patients. The aeromedical evacuation squadron keeps crew members informed of current regulations such as duty free items, liquor restrictions, etc. These regulations must not be violated.

b. **Immigrations.** Proper identification is required for all individuals entering the country and the identification papers of an acutely ill patient are the responsibility of the senior medical crew member. Identification ordinarily required is:

(1) *Civilians, Dependents.* Passport.

(2) *Military.* ID card and travel orders.

(3) *Foreign Nationals.* Passport, visa, I 94 (Immigration Form) and, if indicated, an I 115 (Alien Registration Receipt Card, or a Re-entry Permit).

c. **Immunizations.** These are required for all personnel arriving from oversea areas or crossing national boundaries IAW AFR 161-

13, *Immunization Requirements and Procedures.* Requirements of AFR 161-16, *Tuberculosis Detection Program,* must also be met. Medical crew members are responsible for keeping their own records current and checking patients' records at the port of embarkation.

d. **Agriculture.** The aeromedical evacuation technician has responsibility for carrying out requirements of the Department of Agriculture to spray the aircraft when necessary before landing, put all fruit and garbage in plastic bags, and pick up all flowers and plants to be given to the agriculture representative.

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CHAPTER 4
ADMITTING PATIENTS TO THE AEROMEDICAL EVACUATION SYSTEM

Smooth functioning of the entire aeromedical evacuation system is dependent on the conduct of all phases of its operation. The aeromedical evacuation technician working in the Aeromedical Evacuation Control Center (AECC) performs an important function in the initial steps of this operation as well as in the inflight portion.

This chapter describes the process for admitting patients to the aeromedical evacuation system, from the original medical screening through the accomplishment of necessary coordination in the AECC.

SECTION A—MEDICAL ADMINISTRATIVE SCREENING FOR AEROMEDICAL EVACUATION

According to AFR 164-1, *Worldwide Aeromedical Evacuation,* patients selected for transportation by air must be cleared for the proposed flight by the medical officer in charge of the originating medical or intransit aeromedical evacuation facility or, in his absence, by other competent medical authority. The only exception to this requirement is in forward aeromedical evacuation.

4-1. Persons Authorized Travel in Aeromedical Evacuation. The categories of persons who are authorized travel in aeromedical evacuation are: in-patients, out-patients, recovered patients (patient returnees), attendants to patients, and passengers. Official orders or other written travel authorizations for patients must be issued by competent authority and must show how the carrier will be reimbursed. Commanders of aeromedical evacuation squadrons, aeromedical evacuation operations officers (AEOOs) in the Continental United States (CONUS), and/or the senior medical attendant aboard a flight can authorize travel for persons who are not patients. In matters involving flying safety, the aircraft commander's decision is always final.

4-2. Clinical Acceptance Criteria. There are two factors in the selection of patients for aeromedical evacuation flights. These are (1) contraindications for aeromedical evacuation and (2) patients requiring special considerations.

a. **Contraindications for Aeromedical Evacuation.** There are no absolute contraindications for aeromedical evacuation, but there are certain patients who should be accepted only if there is no possible alternative. These are:

(1) Patients in infectious stages of a quarantinable disease.

(2) Patients whose general conditions are so poor they are unlikely to survive the flight.

(3) Patients who have permanently fixed tie-wires between their jaws.

(4) Patients who are beyond the 240th day of pregnancy are not routinely accepted, but will be moved if determined necessary.

b. **Patients Requiring Special Consideration:**

(1) Respiratory embarrassment.

(2) Cardiac failure.

(3) Severe anemias (less than 2.5 million RBC per cm; or less than 7 g. hemo-

globin per 100 ml., estimated as near the proposed flight time as possible, and not more than 72 hours before).

(4) Trapped gas within any of the body cavities, e.g. pneumothorax.

4-3. Patient Classification. All patients are classified by a code number and letter to simplify the completion of many records and, in the case of psychiatric patients, to restrict the knowledge of their classification to personnel involved in the patient's movements. The classification also furnishes an estimate of a patient's ability to care for himself during an emergency situation as well as in routine flight. Once the patient's classification has been established, it cannot be changed on official documents by the aeromedical evacuation crew enroute, unless a medical officer is aboard the flight and makes this change. The flight nurse may exercise judgment in placing a walking patient on a litter or allowing a litter patient ambulatory privileges. A classification change can be requested at an en route stop where a medical officer can re-evaluate the patient's conditions. Patient classifications as listed in AFR 164-1 are:

a. **Litter:**

(1) *Class 1A, Severe Psychiatric Patients.* These psychiatric patients are usually treated on a locked ward. Sedation or other appropriate medication is required preflight. The use of restraints does not lessen the degree of supervision required to and from the flight line and on the aircraft. Competent medical personnel should accompany these patients at all times.

(2) *Class 1B, Psychiatric Patients of Intermediate Severity.* Psychiatric patients who may require tranquilizing medication or sedation, but do not normally require the use of restraining apparatus. They may react badly to air travel and may commit acts likely to endanger themselves or the safety of the aircraft.

(3) *Class 2A, Immobile Litter Patients Other Than Psychiatric.* Patients unable to move about on their own volition under any circumstances. *Examples:* Stryker frame patients, spica cast, severe burns, unconscious patients.

(4) *Class 2B, Mobile Litter Patients Other Than Psychiatric.* These patients are able to move about on their own volition in an emergency. *EXAMPLES:* Tuberculosis patients, recovered cardiacs, patients with long leg casts.

b. **Ambulatory (Walking):**

(1) *Class 1C, Psychiatric Patients of Moderate Severity.* These psychiatric patients are cooperative and have proved to be reliable under observation.

(2) *Class 3, Walking Patients, Other Than Psychiatric.* These are walking patients who may require medical treatment.

(3) *Class 4, Troop Class.* These walking patients, other than psychiatric, require no medical treatment during flight and are physically and emotionally able to travel unattended, and do not require observation or custodial care.

4-4. Patient Movement Precedence. This is a classification to indicate urgency for flight movement and is the responsibility of the medical facility commander who makes the original request for movement. Generally, precedence is designated as follows.

a. **Urgent.** An emergency case which must be moved as a life or limb saving measure or to prevent complication of a serious illness.

b. **Priority.** Patients requiring prompt medical care not available locally. They must be picked up *within 24 hours* and delivered with the least possible delay.

c. **Routine.** Patients who should be picked up *within 72 hours* and moved on routine or scheduled flights.

4-5. Procedure for Requesting Aeromedical Evacuation. Requests for patient movement must meet the authorization requirements contained in AFR 76-15, *Movement of Traffic by the Single Manager Operating Agency for Airlift Service.* Within the CONUS, the medical facility concerned must submit requests directly to the appropriate MAC Aeromedical Evacuation Control Center. However, all urgent and priority patients are

reported directly to the 375th Aeromedical Airlift Wing. In overseas areas, requests are submitted as directed by the appropriate commander. Requests must contain the following information.

a. Originating medical facility.

b. Patient's name.

c. Diagnosis, including significant secondary diagnosis.

d. Patient classification.

e. Destination medical facility.

f. Movement precedence.

g. Nonmedical attendant, if any.

h. Special equipment or other unusual requirements.

i. Name and address of agency or person to be billed for reimbursable transportation.

SECTION B—AECC COORDINATION AND ACTIVITY

This section describes the role of AECC personnel in the aeromedical evacuation process with emphasis on pertinent forms. As the aeromedical evacuation technician sometimes functions in the AECC, he should be familiar with the patient reporting process and with the forms used to facilitate patient movement.

4–6. Processing Incoming Telephone Calls. Day personnel generally receive incoming calls from area hospitals reporting patients and record the information on a Patient Data Card. The night personnel assemble the Patient Data Cards and prepare the patient manifest from the information on them.

4–7. Processing Requests for Patient Movement. This is an extremely important part of the aeromedical evacuation process, requiring close coordination and accuracy.

a. **Forms:**

(1) The *Patient Data Form.* This form is prepared from information received from the registrar or Aeromedical Evacuation Coordinating Officer (AECO) at the originating hospital. Source of such information is usually telephone communication, but it may be received by teletype communication (TWX), in which case a copy of the TWX should be stapled to the Patient Data Form. The Patient Status Board reflects information gahered from the Patient Data Cards. All entries must be made legibly as they are needed for accurate completion of other forms.

(2) *Patient Manifest and Report of Patients Evacuated by Air.* Accomplishing these forms is the responsibility of the airmen working in the AECC. Entries should be typewritten or in ink in block letter form. These reports include a listing of the crewmembers, patients, and attendants on the flight; the trip itinerary summary; the type aircraft (model and series); and a remarks and discrepancy section as well as signature blocks. They are prepared in manifest form and may also be accomplished on index cards used for filing. Locally, copies are given to the patient baggage section, hospital aeromedical staging unit, the aeromedical evacuation technician assigned to the flight, and the majority to the flight nurse, who uses them for work copies and to leave at each stop as a "souls on board" record.

b. **Communications.** According to AFR 164–1, immediately prior to or upon departure of an aeromedical evacuation aircraft, the AECC must notify all intransit and destination medical facilities concerned of the estimated time of arrival (ETO) and patient load data.

c. **Scheduling of Flights.** AECC works closely with the responsible operations personnel to schedule flights. In general, feeder-type flights are programmed to provide coverage during daylight hours whenever possible. Scheduling of overseas and CONUS trunkline flights will take daylight operation into full consideration; however, operation of these flights will be determined largely on a basis which will provide the most expeditious movement of patients and least delay at aerial ports. After being reported to an AECC, patients will be picked up on the basis of the movement classification (urgent, priority, routine) established by the attending physician.

CHAPTER 5

PREFLIGHT PROCEDURES

Once patients have been admitted to the aeromedical evacuation system, many facilities have a part in preparing for their movement by air. This chapter concerns itself with those preflight activities prior to takeoff which are of most direct interest to the aeromedical evacuation technician. As an adjunct to this information, the technicians should familiarize himself with the preflight procedures directed in AFR 164-1, *Worldwide Aeromedical Evacuation.*

SECTION A—PREPARATION BEFORE ENPLANING PATIENTS

The originating hospital has the responsibility for properly preparing a patient for flight. This preparation includes administrative activities, such as forwarding an incompetent patient's valuables to his destination hospital by registered mail; nursing care activities, such as changing dressings as near the time of flight as practical; bivalving casts applied within 24 hours of departure time; inserting an indwelling catheter in a patient needing frequent catheterization; etc. In a wartime or emergency situation, common sense must guide patient preparation. If a patient is presented unprepared under such conditions, medical crewmembers must do the best with what is available for the patient's comfort and safety.

5-1. Preparation of Litter Patients. All litter patients are dressed in hospital pajamas and slippers and put on a litter having a mattress. Exceptions are made under unusual circumstances, such as combat conditions. Figure 5-1 shows the steps involved in a correctly made litter.

a. **Preparing the Litter.** Ordinarily, hospital personnel make up litters. For purpose of review, one method of making up a litter with a mattress is detailed below.

(1) Place mattress on litter. (Figure 5-1a.)

(2) First Sheet. Fold in half lengthwise, place over mattress leaving excess hanging over both sides and both ends of mattress, and tuck excess under mattress on both sides and both ends. (Figure 5-1b.)

(3) Second Sheet. Even with top of mattress, with excess over one end and both sides. Do not tuck in excess. (Figure 5-1c.)

(4) Blanket. Fold blanket in half lengthwise and place over second sheet. (Figure 5-1d.)

(5) Excess linen at foot of mattress is tucked under mattress. (Figure 5-1e.)

(6) Second sheet and blanket are folded toward foot of litter. (Figure 5-1f.)

(7) Place pillow and two patient-securing straps on litter. (Figure 5-1g.)

b. **Special Patient Considerations:**

(1) All patients under observation for, or with, a diagnosis of pulmonary tuberculosis must be transported as litter patients, wearing a mask.

(2) As there are no security facilities aboard aircraft, preflight medication and restraints are required for some patients, such as psychiatric patients. Class 1A and 1B psychiatric patients must have every dangerous article, such as razor blades, pocket knives, matches, etc., removed from their persons, clothing, and litters. They should

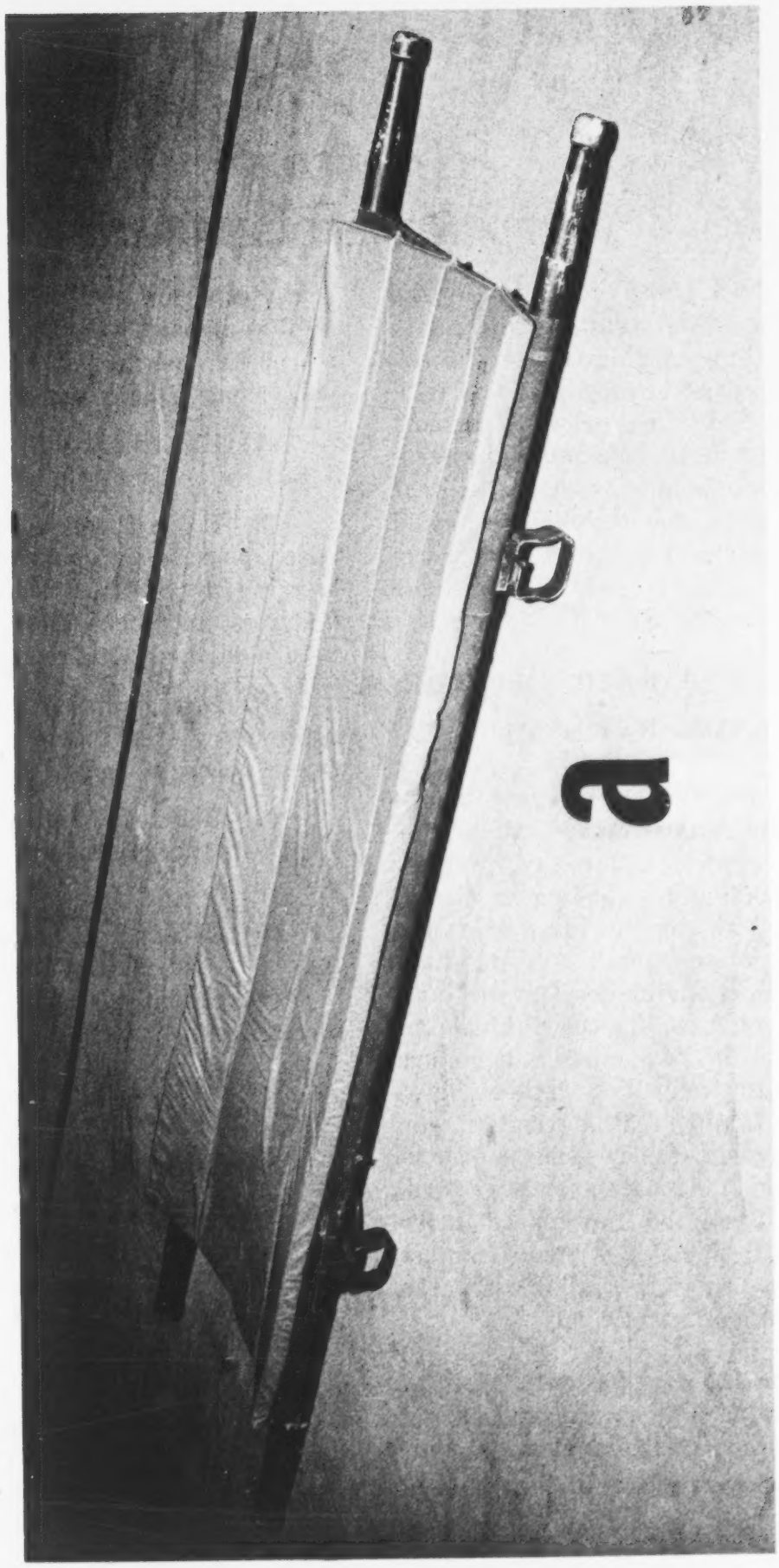

Figure 5-1. Steps Involved in Making a Litter.

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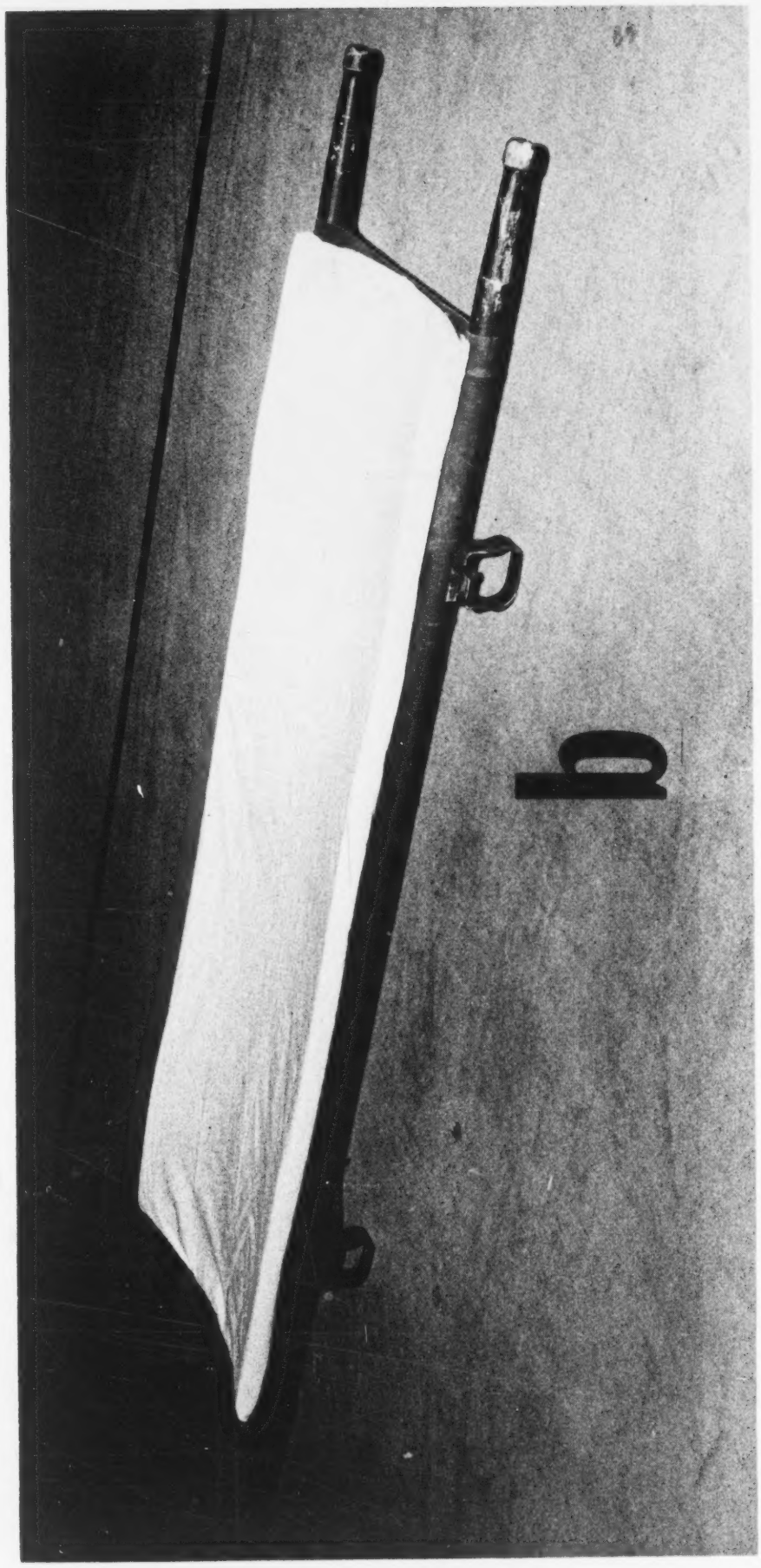

Figure 5-1. Steps Involved in Making a Litter. (Continued)

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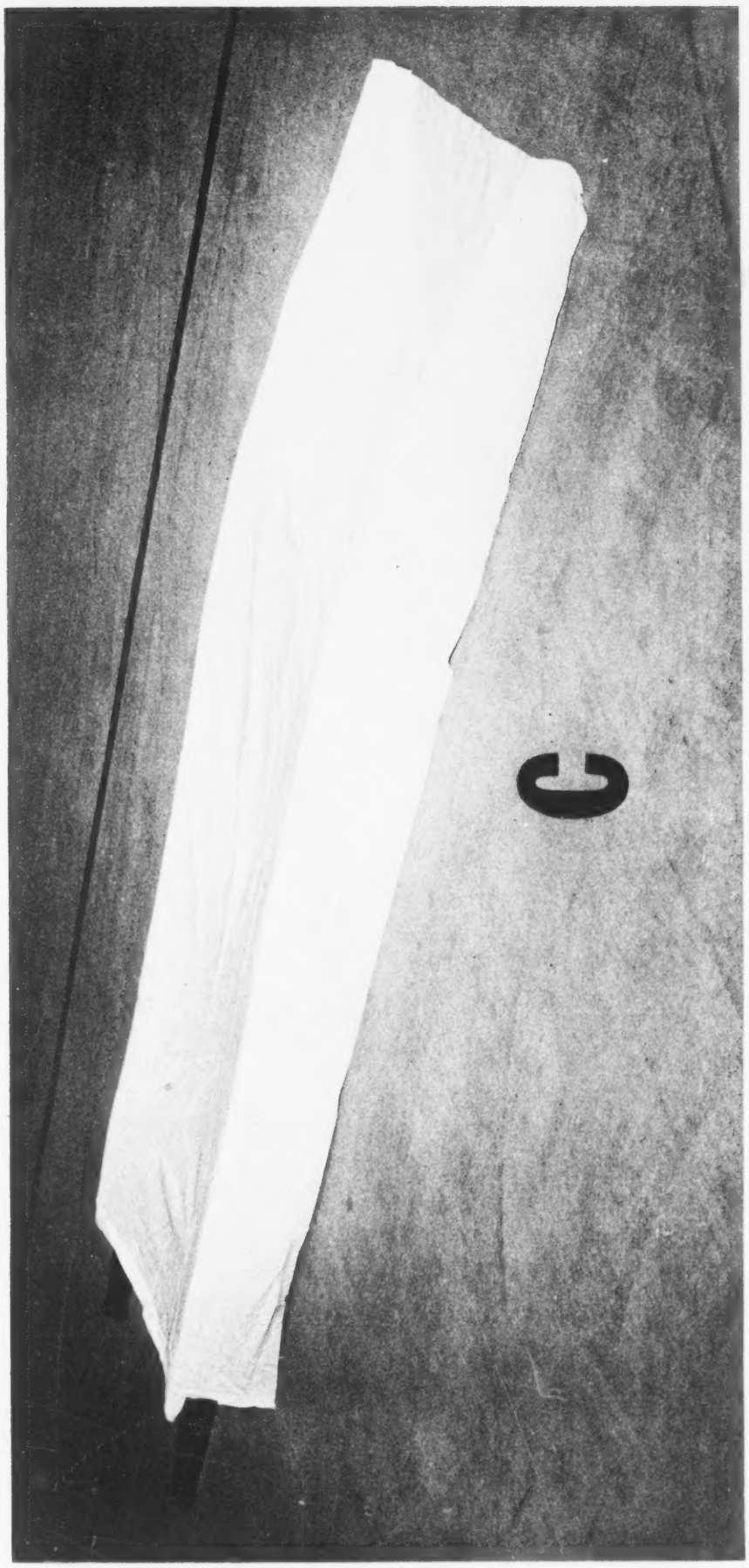

Figure 5-1. Steps Involved in Making a Litter. (Continued)

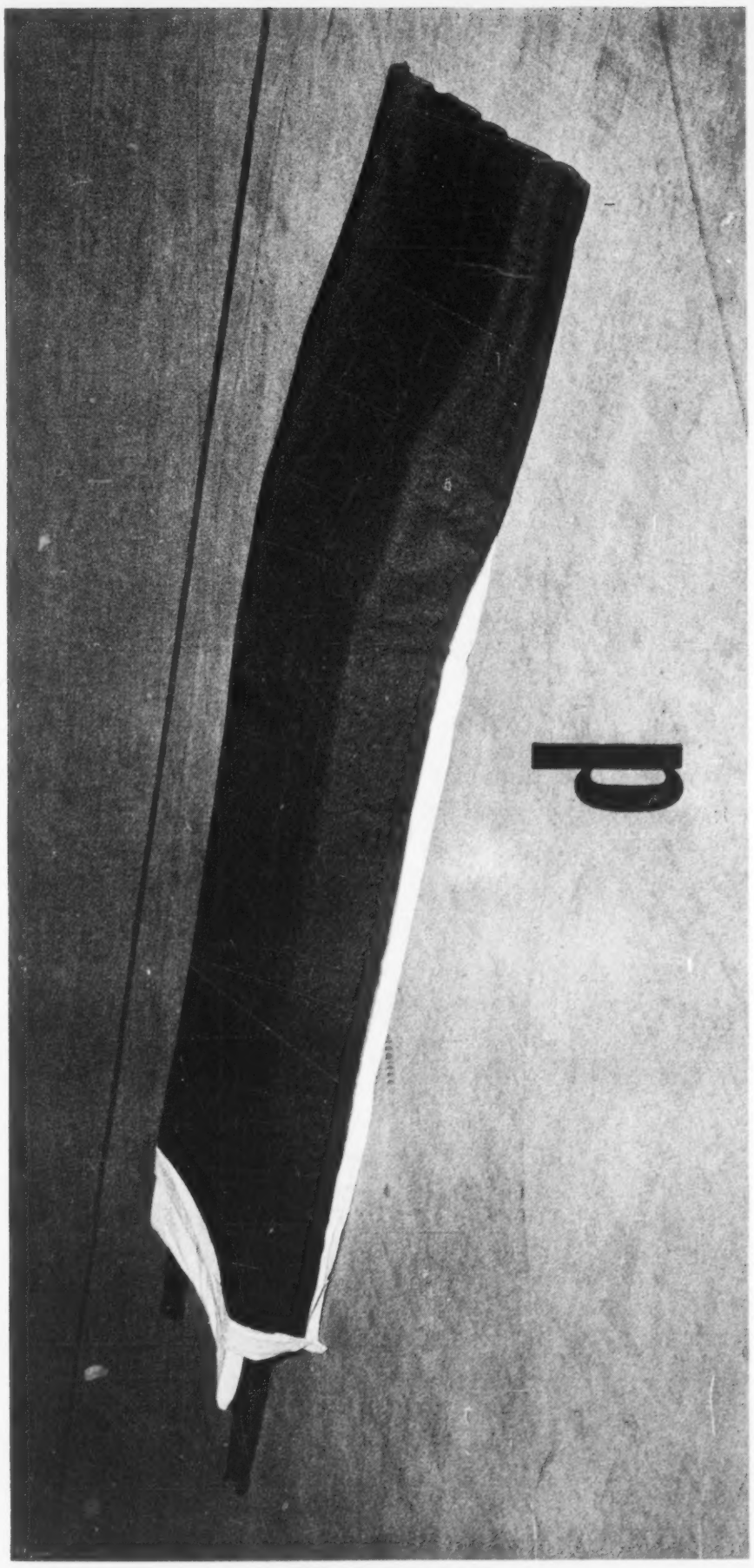

Figure 5-1. Steps Involved in Making a Litter. (Continued)

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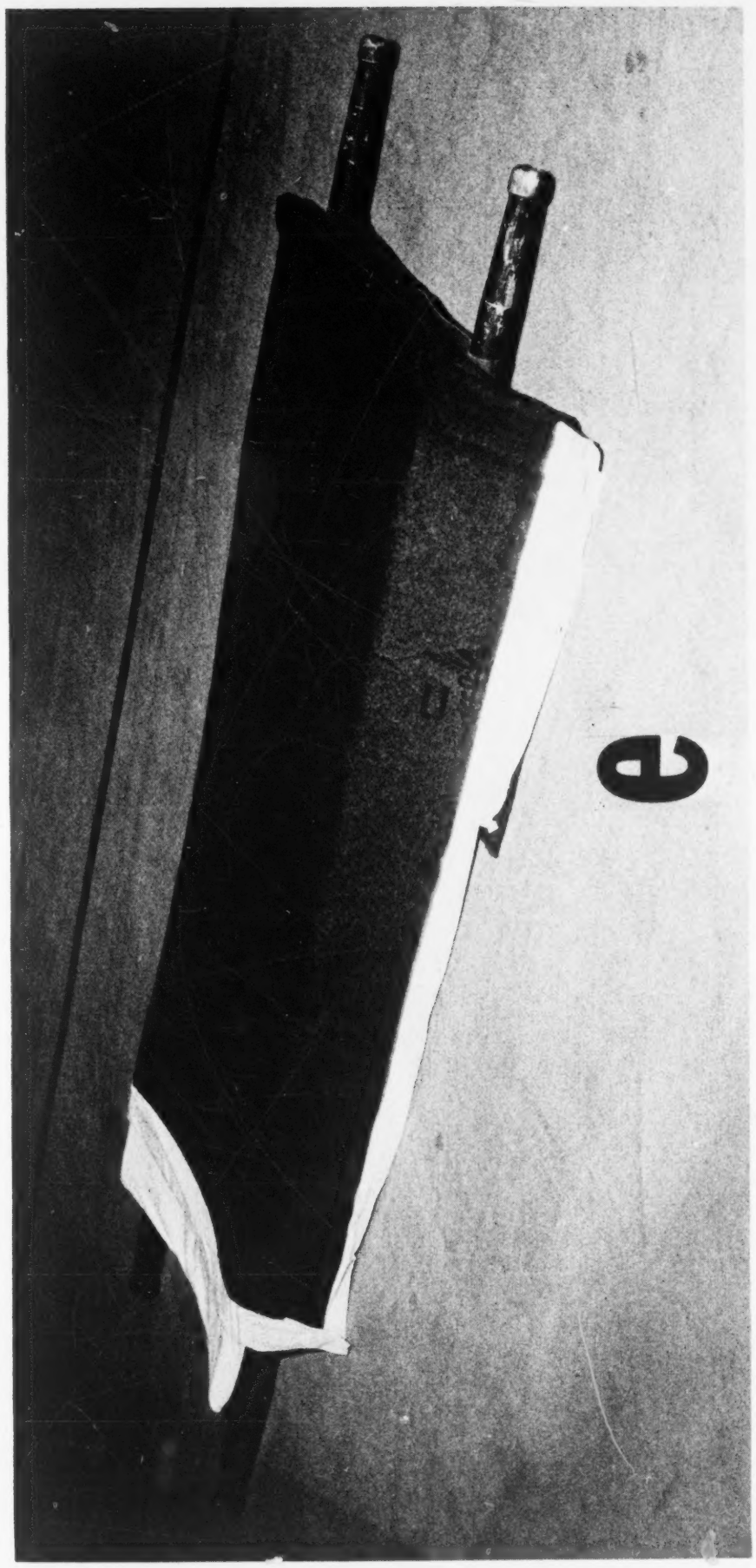

Figure 5-1. Steps Involved in Making a Litter. (Continued)

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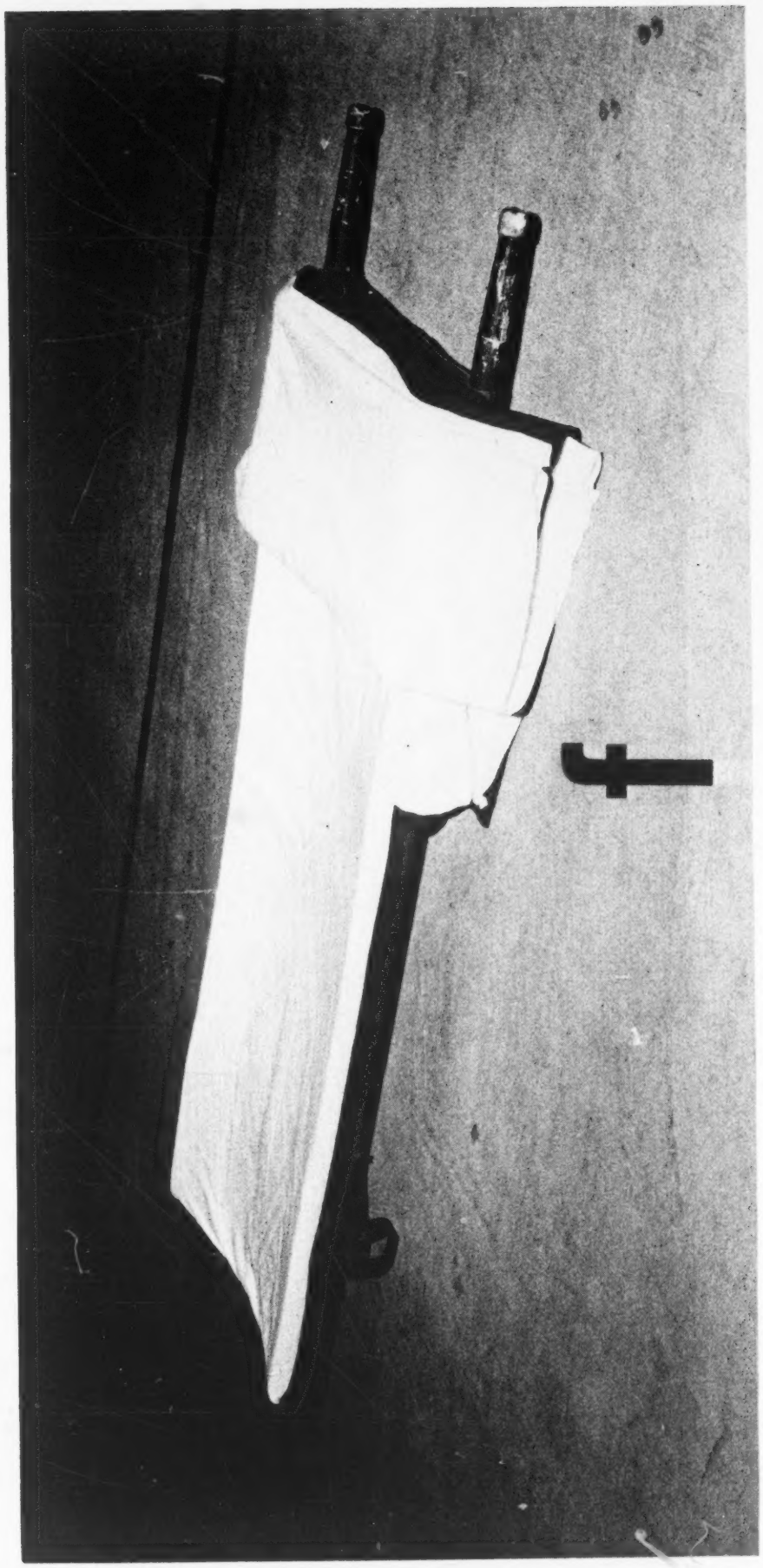

Figure 5-1. Steps Involved in Making a Litter. (Continued)

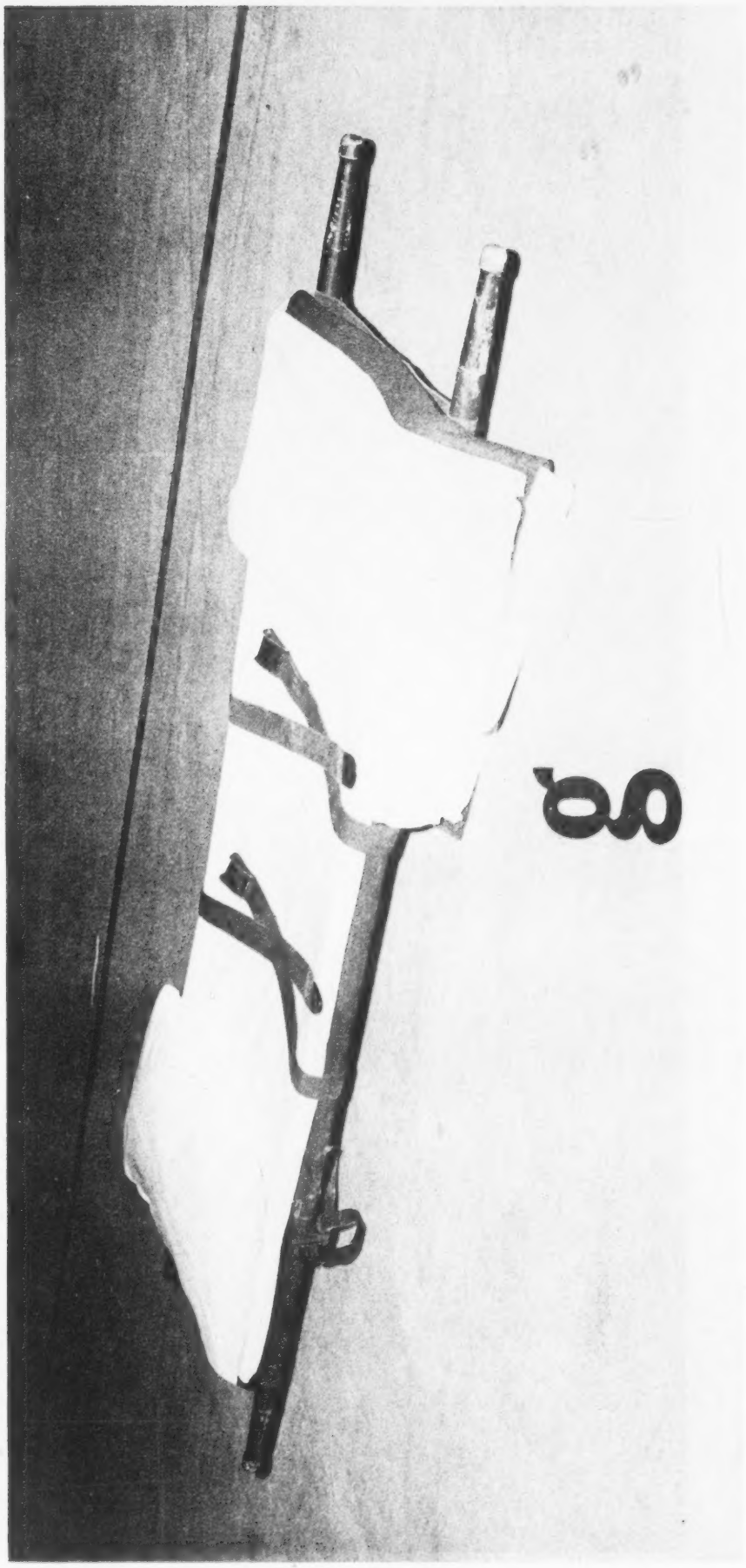

Figure 5-1. Steps Involved in Making a Litter. (Continued)

have no belt or shoes, but may have with them on their litters, cigarettes, reading material, or eye glasses (with the physician's permission). These are safety and control measures and should be checked before leaving the hospital, before loading into the ambulance, and before loading on to the aircraft. The latter is the responsibility of inflight medical crewmembers who must search litters for dangerous articles to preclude unfortunate incidents when airborne. An additional evacuation tag is prepared for sedated and/or disoriented patients and attached to the litter beyond reach of the patient. This tag listing name, rank, and originating and destination facilities is used for identification purposes by medical crewmembers and the receiving hospital.

(3) All Class 1A patients require preflight sedation; restraints must be in place and patients must be secured to the litter with the restraint straps. The senior aeromedical evacuation technician should inspect the restraints to make sure they are properly applied. Until the patient is aboard the aircraft, restraints should be covered by a sheet to save the patient from embarrassment. Patients are transported by litter and medicated prior to leaving the medical facility.

c. *Ambulatory Litter.* A litter is set up for a walking patient, with 1 blanket and 2 securing straps. The blanket is folded in thirds, the selvage edge underneath and next to fuselage (see figure 5-2a), and the excess is folded at top for the pillow. (Figure 5-2b.) Two litter straps are used to secure the patient. (figure 5-2c.) Use an additional blanket as needed.

5-2. Preparation of Walking Patients. It is best to review the patient's classification just before flight to make sure it correctly reflects his condition. If a hospital walking patient appears unable to withstand a long or possibly delayed flight, he should be classified by a physician as a litter patient while in an aeromedical evacuation status. The type of clothing worn by walking patients depends upon who the patients are. Active duty personnel wear appropriate Class A uniforms except in an emergency, during field maneuvers, during field exercises, or because of other unusual circumstances. Civilian patients wear street clothing. Female civilians may wear slacks for warmth and comfort. Female patients and attendants should not wear high heeled shoes because they can be dangerous on the patient loading ramp and they damage aircraft flooring. Some units provide disposable slippers for use by patients wearing such shoes aboard the aircraft.

5-3. Records Preparation. This section deals briefly with some of the pertinent records originated prior to flight. Other records with which the aeromedical evacuation technician should be familiar are discussed in appropriate sections in this manual.

a. **Patient Records.** The patient's hospital records and any X-ray films accompany him from the originating to the destination hospital. Ordinarily, the flight nurse signs for these. If there is no flight nurse, the senior aeromedical evacuation technician signs a receipt for the records and, in turn, is given a signed receipt at the destination facility. In addition, the patient's Military Personnel Record often accompanies the patient and is maintained with his clinical records. Other patient records include the Patient's Evacuation Tag and the Patient's Baggage Tags. DD Form 602, Patient Evacuation Tag, shown in figure 5-3, is used as the patient's chart en route. It is initiated by the originating hospital, used throughout the entire trip, and becomes a part of the patient's permanent record at his destination hospital. If the patient originates at a nonmilitary medical facility, the tag is initiated by the military medical flight representative who receives him. Figure 5-4 shows DD Form 600, Patient Baggage Tag, which is initiated at the originating hospital and attached to each piece of baggage accompanying the patient aboard military aircraft. If the patient originates at a civilian medical facility, one of the aeromedical evacuation technicians prepares the form for each piece of baggage.

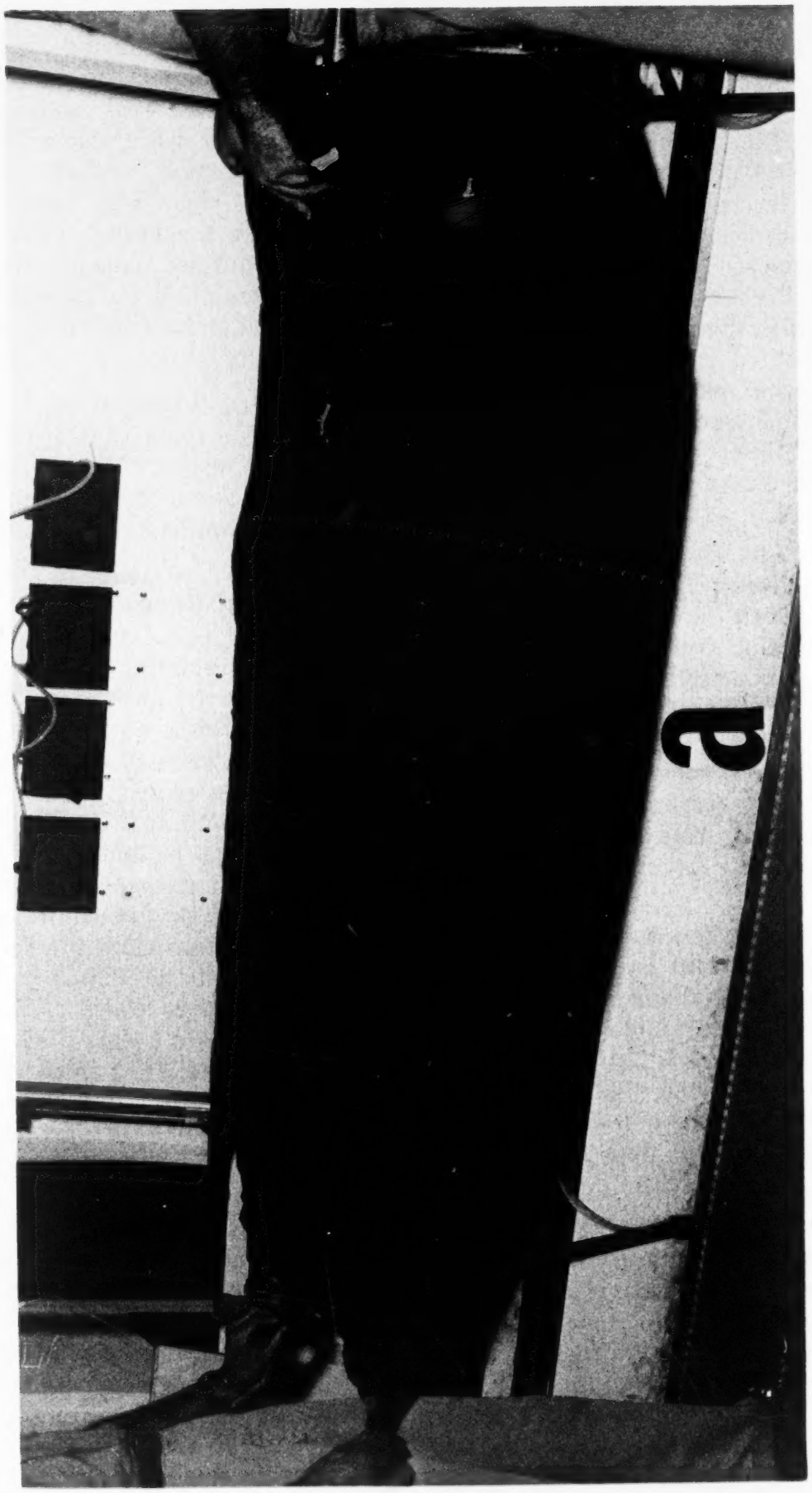

Figure 5-2. Preparing the Ambulatory Litter.

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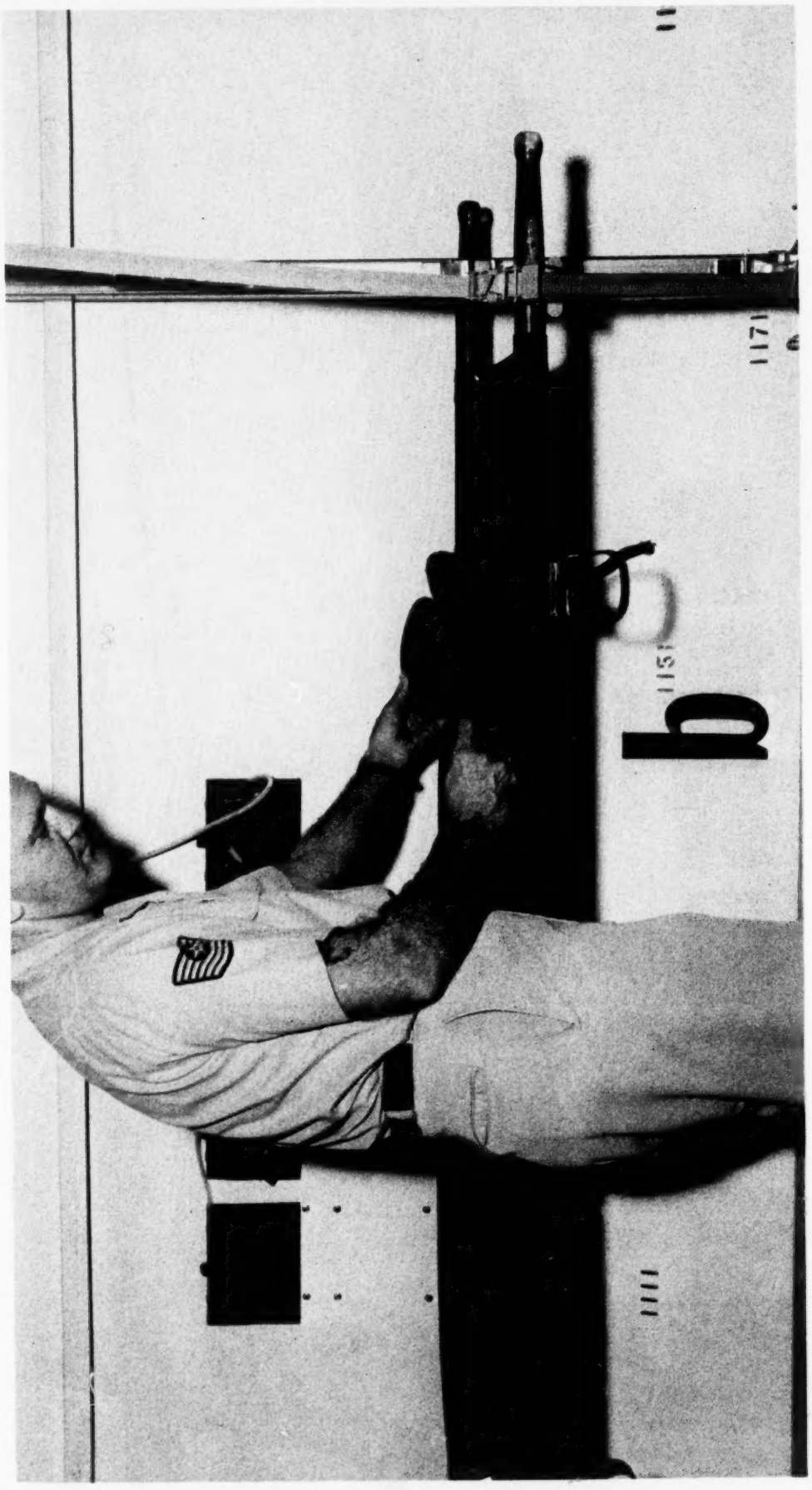

Figure 5-2. Preparing the Ambulatory Litter. (Continued.)

Figure 5-2. Preparing the Ambulatory Litter. (Continued.)

DD FORM 1 FEB 63 602

REPLACES DD FORM 602, 1 OCT 51
PREVIOUS EDITIONS ARE OBSOLETE
REPLACE DD FORM 602, 1er OCTOBRE 1951
LES ÉDITIONS PRÉCÉDENTS SONT CADUQUES

PATIENT EVACUATION TAG---FICHE D'ÉVACUATION DE PATIENT
(Tie this tag to patient—Attacher cette fiche au patient)

FROM (Medical treatment facility)
ORIGINE (Installation de traitement médical)
BROOKE GENERAL HOSPITAL, TEXAS

NAME (Last—first—middle initial)
NOM (Nom de famille—premier prénom—initiale deuxième prénom)
LYONS, FRED D.

SERVICE NUMBER / NUMÉRO MATRICULE	RANK/RATING/GRADE / GRADE	CATEGORY OF PERSONNEL (Service or employer and nationality) / CATÉGORIE DE PERSONNEL (Service ou employeur et nationalité)
457-56-6271FV	1Lt	DF USA

DIAGNOSIS
DIAGNOSTIC
ULCER DUODENAL 5410

CLASS—CLASSE		DISEASE / MALADIE	BATTLE CASUALTY / BLESSÉ AU COMBAT	INJURY / BLESSURE
1A	2A	X		
1B	2B			
1C				
3 X	4			

VSI
TRÈS GRAV. MAL.
☐ Yes / Oui ☐ No / Non

CABIN OR COMPARTMENT NO. / NO. CABINE OU COMPARTIMENT
BUNK NUMBER / NUMÉRO COUCHETTE
BAGGAGE TAG NUMBER(S) / NUMÉROS ÉTIQUETTES BAGAGE: 5791

DESTINATION / DESTINATION: AFH, SCOTT AFB, ILL.
SHIP/AC (Number/type) / NAVIRE/AVION (Matricule/type)

TREATMENT RECOMMENDED ENROUTE (If no treatment is required a notation to this effect is made)
TRAITEMENT RECOMMANDÉ ENROUTE (Indiquer si aucun traitement n'est nécessaire)
MULTI VIT I QID
PHENOBARB 15 MG QID
PROBANTHINE 30 MG BID
VS QID

SIGNATURE OF MEDICAL OFFICER / SIGNATURE DU MÉDECIN: H.C. Kennedy Maj USAF MC
DATE / DATE: 15 NOV 69

REGULAR DIET / RÉGIME NORMAL
SPECIAL DIET (Describe) / RÉGIME SPÉCIAL (Description)
BLAND WITH HS FEEDINGS

SHIP'S RECORD OFFICE TAB—FICHE POUR ARCHIVES TRANSPORTS

Figure 5-3. Patient Evacuation Tag.

DD FORM 1 OCT 51 600 REPLACES WD AAF FORM 94D WHICH MAY BE USED.

PATIENT'S BAGGAGE TAG (DO NOT DETACH)	NO. 303871
ORIGINATING CARRIER MAC	
PATIENT (Last name - First name - Middle initial) LYONS, FRED D.	
GRADE 1Lt	SERVICE NUMBER 457-56-6271FV
FROM	
ORIGINATING MEDICAL FACILITY BGH, TEXAS	ORIGINATING TERMINAL SKF
TO	
HOSPITAL	TERMINAL
DESTINATION HOSPITAL AFH, SCOTT AFB, ILL.	TERMINAL BLV

PATIENT'S STUB	NO. 303871
ORIGINATING CARRIER MAC	
PATIENT (Last name - First name - Middle initial) LYONS, FRED D.	
GRADE 1Lt	SERVICE NUMBER 457-56-6271FV

Figure 5-4. Patient Baggage Tag.

b. **Passenger Records.** The Passenger Manifest lists all passengers aboard the aircraft. It is originated at the on-load passenger terminal by passenger service personnel and is given to the senior medical crewmember. If there is no passenger service, the responsibility for filling out a passenger manifest falls to members of the flight crew.

5-4. Fleet Service. Fleet service establishes and maintains a uniform standard of service for all aircraft. This insures that aircraft are clean, persentable, and fully equipped with necessary equipment and supplies. At areas where there is no fleet service available, the aeromedical evacuation technician assumes the responsibilities. These are:

a. **Cleaning Aircraft.** Make sure the cabin and latrines are clean and properly configured. Check the galley for cleanliness and required equipment.

b. **Loading Basic Supplies.** This includes loading flight lunches, liquids, wash water, paper towels, soap, toilet tissue, seat covers, airsick bags, and paper cups.

5-5. Medical Supplies and Equipment. These are discussed extensively in chapter 7. Suffice to say here that preflight planning is imperative to the success of the mission. Adequate supplies and equipment must be aboard the plane before takeoff because once the aircraft is in flight, it is impossible to pick up a telephone and order needed items. In addition, all equipment requiring electrical power must be checked operationally using the aircraft electrical system. Prior to enplaning patients, the aircraft is inspected to insure that aeromedical evacuation equipment is in satisfactory operating condition. This includes examination of litter straps, clamps, stanchions, the galley, and flashlights to assure their proper condition and functioning. Also, the senior medical crewmember should assure patient care equipment, trash receivers, and other gear are secured to withstand severe turbulence. Safety equipment may be loosened in flight or for patient care, but it is kept in place and secured during takeoff, landing, in turbulence, or while sleeping.

SECTION B—PATIENT ENPLANING

5-6. Patient Positioning Plans. The senior medical crewmember usually prepares the patient positioning plan. However, this policy varies in different areas. Patient placement depends on diagnoses and off-load points, and the positioning plan is used to aid in such placement to facilitate patient on-loading, and to make it easier for the medical crew to identify and more effectively care for each patient. Guidelines for placing patients are:

a. **Litter Patients:**

(1) Seriously ill patients, as well as any one requiring extensive nursing care, should be placed in the most accessible litter space in the most stable part of the aircraft. Spaces 2 and 3 are the best. If there is a center tier, that is the best location so care can be provided from either side.

(2) Psychiatric patients should be low in the tier where care can easily be given. Consideration should be given to placing the patient away from other types of patients to avoid disturbing them.

(3) Infectious and isolated patients should be in an area of least traffic. If it is necessary to place other patients in the tier, the isolated patient should be at the lowest level. Positioning of these patients is influenced by the airflow characteristics of the aircraft.

(4) In enplaning patients with casts, the following general rules apply:

(a) Patients with heavy casts should be placed in the bottom litter spaces. Excessive cast weight makes it difficult to lift patients into upper spaces. Also, the heavy cast creates an additional burden on the securing device.

(b) Patients with large extremity casts should be positioned with the cast on the aisle side to avoid pressure and vibration

from the bulkhead or bumping by a patient if the litters are double tiered (side-by-side).

(c) Patients with spica casts are usually placed in the floor litter space and, if possible, allowed two spaces. In the floor space, these patients can be moved inboard if necessary in order to allow adequate space for the cast extending over the side of the litter.

(d) Patients with heavy aeroplane splints should be placed in a bottom litter space with the litter above omitted.

(5) Patients with drainage bags should be placed in any litter space but the bottom one so the drainage bag can be at a lower level than the litter.

(6) Patients using a Bird Respirator should be in the most accessible litter space and, generally, two spaces are needed.

(7) Patients in Stryker frames or Foster beds require a whole tier, when possible, in the most stable part of the aircraft. The top litter space is used to accommodate required equipment.

(8) Female litter patients should be segregated as much as possible from male patients and curtains used in double litter tier sections. More privacy is provided when they are placed in bottom litter spaces below male patients.

(9) Patients requiring Fowler's position need two litter spaces.

b. **Walking Patients.** In enplaning walking patients, the following general rules apply:

(1) These patients should be placed forward in the aircraft, when possible, to reduce the likelihood of airsickness as they are more prone to airsickness than patients on litters.

(2) They may be placed on litters if there is a shortage of seats.

(3) Psychiatric patients should not be placed in seats next to each other nor seated next to an emergency exit.

(4) Epileptic patients should be placed in seats on the aisle side to decrease the possibility of photic stimulation. There have been instances of epileptic patients in flight receiving sufficient photic stimulation from the reflection of the sun on the aircraft propeller to precipitate a convulsive seizure.

(5) Those with disability of upper extremities, women, and children should not be placed next to emergency exits.

(6) A patient with an arm cast should be in a seat next to the fuselage so the cast can be elevated.

(7) The patient with a leg cast or lower extremity circulatory problems should have the seat back in front of him lowered to use for elevating the effected part.

(8) Patients with visual handicaps and those with gastrointestinal disorders should be close to the latrine.

(9) A patient with hearing difficulty should be placed between two patients who can transfer necessary information to him.

c. **Additional Considerations.** Patients to be deplaned first should be placed as low in the tier as possible. Passenger positioning should be considered after litter and walking patients are enplaned. The type and modification of aircraft, number of spaces available, types and number of patients, spaces needed for medical crew and records, en route stops, and the length of the flight must also be considered. On long overwater flights, empty litters should be in place for walking patients who may become fatigued. Also, a few unassigned seats are usually saved to be used by 2B patients. These seats are not released to passengers, except those on emergency leave. In certain instances, the senior medical crewmember may release seats to others.

5-7. Boarding. Generally, passengers are enplaned first, followed by ambulatory patients, then litter patients. Normally, litter patients are positioned feet forward as this position offers the most protection during abrupt deceleration. They should be positioned head forward in aircraft having a tail landing gear, or when required for patient care or comfort because of fixed location of accessories on the aircraft, or when considered necessary by the senior medical crewmember aboard. Personnel must be extremely careful and always face forward when

carrying litters. At times it may seem easier to walk backwards, but that is a dangerous practice. A firetruck must be near the aircraft when enplaning or deplaning litter patients. Ambulances, ambuses, and loading crew personnel are to remain in the vicinity of the aircraft until released by appropriate authority.

5-8. Briefing. A preflight briefing should be given routinely by the senior medical crewmember or a designated representative. It should be friendly, informative, and reassuring because a well-informed patient is generally more cooperative and less apprehensive than one who is ill informed. Briefings should be brief and to the point. It is best to use an intercom system if one is available and working properly. If possible, briefings on the aircraft are given before engines start. If patients are picked up at a holding ward, they can be briefed on the ward or on the bus en route to the flight line. In that event, such information must be reinforced by additional facts received at the aircraft from the pilot, such as altitude, ETA, etc. As the briefing may set the tone for the whole flight, it should be a good one.

a. **Routine Briefing.** Points to be covered in a routine briefing are:

(1) Welcome and introduction of self and other crewmembers.

(2) Concise itinerary with stops en route, flying time, and cruising altitude.

(3) Type of aircraft and pertinent details (e.g., cabin vapor in C-131 caused by air conditioning).

(4) Flight safety rules such as:

(a) No smoking while aircraft is on the ground, during takeoff or landing, or while walking about aircraft.

(b) No Smoking signs should be pointed out as well as location of ashtrays. Litter patients should be told they will be furnished ashtrays when the plane reaches cruising altitude.

(c) Safety belts must be fastened prior to takeoff and left on until the sign goes out. Patients should be told that if they desire to sleep, they should leave their seat belts fastened so they need not be disturbed should the belts have to be fastened later.

(d) Emergency exits should be pointed out and the fact that they are outlined in yellow noted.

(e) Seats upright for takeoff and landing; location of control button.

(5) Patients should be told of facilities available on the aircraft. Indicate location of the restrooms and ask that only one person go to the restroom at a time. Mention that their lunches are on board and when they will be served, also that there is coffee, water, and juice on board.

(6) Inform patients that space is limited and ask that they remain in or near their seats as much as possible.

(7) Insure that patients know how to clear their ears by yawning, swallowing, or chewing gum during descent.

(8) Repeat welcome and urge patients to let members of the medical crew know of any difficulty or problem thay may experience in flight.

b. **Special Briefings.** After giving a general routine briefing, there may be patients who need individual information.

(1) *Individual Briefings.* These briefings are required for tuberculous, deaf, blind, and psychiatric patients. Tuberculous patients must be told to keep mask on except while eating. It must be changed every hour or more often if needed. Point out paper or plastic bags for tissue disposal. Remind them they must remain on litter and are not to exchange articles with other patients. This should be done with the utmost tact and kindness. For deaf patients, write the pertinent information on a card. You must be especially reassuring to the blind patient. Explain in detail all expected sounds as their hearing is usually very acute. As added support, ask a patient sitting near a blind person to explain what is happening on the aircraft. Psychiatric patients should also be briefed individually. Their reaction serves as a guide as to how much to say.

(2) *Overwater Briefing.* Such a briefing is necessary when the route is over an expanse of water. Patients must be briefed on the use of life preservers and, depending on squadron policy, ditching and crash procedures.

(3) *Oxygen Briefing.* Some squadrons that routinely fly at high altitude may have a special briefing on oxygen for the patients; this will be dictated by squadron policy. Be thoroughly familiar with available oxygen systems so such a briefing will be knowledgeable and meaningful.

5-9. Aeromedical Evacuation Technician Checklist. Some aircraft have checklists indicating general responsibilities of the aeromedical evacuation technician included in the TO for that aircraft. An example of such is the checklist of Normal Procedures for the Medical Technician found in TO 1C-131A-1CL. As it provides a general idea of the overall activities of the technician, portions of the checklist pertaining to duties before take-off are presented below. Information in parenthesis is intended to clarify the checklist items.

PREFLIGHT

a. Aircraft commander's briefing—ATTENDED. (This briefing should cover all aspects of the proposed mission: weather, flight altitude, en route and refueling stops, patient restrictions, etc.)

b. Patient check—COMPLETED. (The patient manifest, loading plan, special equipment, diets, inflight treatment, etc., will be reviewed with the flight nurse.)

c. Patient baggage check—COMPLETED. (Patient baggage will be marked and loaded so as to facilitate off-load at en route stops.)

d. Medical supplies—CHECKED. (Make sure special equipment—bassinet, incubator, etc.,—is available when required.)

e. Litter loading door—OPEN. (Use litter loading door operating instructions.)

f. Patient boarding ramp—POSITIONED. (The ramp will be positioned so it is flush with the side of the aircraft. A safety net will be installed in the opening between the patient boarding ramp and the sides of the litter loading doorway.)

g. Cabin—CHECKED. (Make sure the cabin and latrines are clean and properly configured. Check for airsick bags, headrest covers, ashtrays, etc.)

h. Fleet service—COMPLETED. (Check proper number of lunches, service items, liquids, wash water, etc.)

i. Litter brackets and straps—ADJUSTED AND CHECKED.

j. Oxygen—CHECKED. (1,000 p.s.i. minimum high pressure cylinder secured, and smoke masks and oxygen masks attached.)

k. Suction equipment—CHECKED. (Make an operational check using the aircraft electrical system.)

l. Nurse's secretary— IN PLACE.

m. Isolation area—PREPARED.

n. Extra equipment—CHECKED AND STOWED. (Any equipment requiring electrical power must be checked for operation using the aircraft electrical system.)

o. Galley—CHECKED. (Check for cleanliness and required equipment, then stow lunches, liquids, and accessories.)

p. Discrepancies—REPORTED. Report discrepancies to aircraft commander and ramp coordinator.

PATIENT LOADING

a. Firetruck—IN PLACE. (The firetruck should be located so that there is no obstruction between the firetruck and the door being used to enplane patients.)

b. Patient records—LOADED. (The patient records will be loaded so the flight nurse has access to them during flight.)

c. Patients/passengers — ENPLANED. (Patients will be enplaned according to the patient positioning plan prepared by the flight nurse; children and psychiatric patients will not be seated next to emergency exits; coats will be hung up; and handcarried baggage will be tagged and stowed.)

d. Baggage—LOADED. (Baggage will be loaded so as to facilitate off-load at en route stops if possible.)

e. Safety belts/straps — FASTENED. (Check all patients/passengers to make sure

safety belts/straps are fastened and seats are upright.)

f. Safety net — REMOVED AND STOWED.

g. Patient boarding ramp—CLEAR OF AIRCRAFT. (Make sure the patient boarding ramp has been moved far enough to assure clearance when the aircraft departs. Minimum clearance is 10 feet with at least 25-foot clearance desired.)

h. Litter loading door—CLOSED AND LOCKED.

i. Emergency escape chute—CONNECTED.

BEFORE TAXI

a. Cabin—LOADED AND CHECKED. (Make sure all patients/passengers are properly seated, and baggage and loose equipment are stowed and secured.)

b. Patient/passenger briefing—COMPLETED. (Assist the flight nurse to demonstrate the use of emergency equipment as directed.)

c. Cabin Secure—REPORTED. (Report cabin secure to aircraft commander, close cabin to flight compartment door, take seat, and fasten safety belt.)

2082

CHAPTER 6

INFLIGHT PROCEDURES

Aeromedical evacuation technicians must be thoroughly familiar with the contents of AFM 160-34, *Medical Airman's Manual*, because knowledge of basic nursing principles and procedures is essential to effective inflight care of patients.

This chapter adds to such knowledge by briefly discussing special problems for patient care encountered in the aeromedical evacuation system. It also broadly describes the aeromedical evacuation technician's general responsibilities in flight and prior to leaving aircraft after landing.

SECTION A—SPECIAL INFLIGHT CONSIDERATIONS

When evacuating patients by air, there are many factors to consider. What does the technician do about a frightened patient? What does the technician need to consider when the patient is a baby? If the flight is a long one, what is the technician's responsibility for inflight feeding? These and other questions will be answered in this section.

6-1. Patient's Psychological Reaction to Flight. Many people fear traveling by aircraft. This may be doubly true of litter patients who feel quite helpless in flight, and of patients who are flying for the first time. Factors such as engine noises, turbulence, and unexpected changes of itinerary may make patients anxious and uncomfortable. Such individuals should be treated with special tact, patience, and understanding, as anxiety can provoke physical difficulty. Calmness, friendliness, and reassurance from crewmembers can do much to allay fears and put a frightened patient at ease.

6-2. Physiological Considerations in Flight. Some clinical conditions are adversely affected by decreases in barometric pressure and by decreases in the partial pressure of oxygen in the ambient air. With reduction in the barometric pressure, gases present within the body tend to expand and if they are unable to escape, damage to body tissues may result. The decrease in the partial pressure of oxygen in the ambient air can cause grave respiratory difficulty. To provide knowledgeable care in flight, the aeromedical evacuation technician must be thoroughly familiar with these principles of aeromedical physiology and understand how such principles affect the care of patients at altitude. Reference sources, as previously mentioned, are AFM 160-34, AFM 161-5, *The Aeromedical Technician*, and AFP 164-1, *Flight Nurse guide*.

6-3. Pediatric Patients. Large numbers of pediatric patients are carried on aeromedical evacuation aircraft as some small hospitals do not have the facilities nor a pediatrician to care for them. Factors to be considered in transporting these patients are:

a. **Classification.** All infants must be classed as litter patients because a litter is required even though the baby may not actually be transported on the litter. The litter, if not used for the baby, can be used as a working area to store supplies, such as diapers, for the baby. Small children, who cannot walk aboard the aircraft, should automatically be classified as 2A patients.

b. **Loading and Transporting.** If not in an incubator, a baby should be carried aboard the aircraft in the arms of the attendant or a medical crewmember. An infant may be transported in a bassinet or an incubator which must be placed on a litter in a double space. It is best not to make up the litter as air circulation is decreased (or could be blocked off completely) by the linen since the bottom vents are located underneath the incubator.

c. **Supplies.** These should include as needed:

(1) Disposable diapers.

(2) Special dressings.

(3) Pediatric medications.

(4) Formula and/or baby food.

(5) Feeding devices—bottles, nipples, rubber-tipped droppers, gavage.

d. **Clearing Ears.** Infants should be awake for ascent and descent even though they generally do not experience difficulty equalizing middle ear pressure at such times unless they have upper respiratory diseases. It is best to hold and feed an infant during take-off and landing as sucking and swallowing, as well as crying, assist the infant in clearing his ears.

6-4. Inflight Feeding. Serving of meals aboard an aircraft is an important morale factor as well as a nutritional one, especially on long overwater flights. Meals should be served as pleasantly and efficiently as possible. Ordinarily, the base flight kitchen provides inflight meals for aeromedical evacuation patients. These meals will usually be in the form of box lunches, precooked frozen meals (similar to "TV" dinners), and auxiliary food items (juices, soups, etc.).

a. **Hot Lunches.** Precooked frozen dinners are the best and are served or C-141 and C-9 flights. Such dinners are frozen and packed in cases of 12 each, one of which is stamped "indicator enclosed." It is the responsibility of the technician signing for these meals to check the indicator in the designated package in each case to determine the condition of all meals in the case. The indicator, shown in figure 6-1, is a king-size capsule containing ice frozen in the upright position and then placed horizontally in the package. Thus, if the capsule had melted and then frozen again, the ice would be horizontal in all of the capsule (not just one end), and the package should not be accepted.

b. **Therapeutic Diets.** Medical food service kitchens provide therapeutic inflight meals to patients requiring special feeding regimes, such as those with ulcers and diabetes, and those requiring tube feedings. Special items for infant feeding (baby food—usually a 48-hour supply, and a 24-hour supply of formula) may be obtained.

c. **Paying for Lunches.** Ordinarily, this is taken care of by the hospital AECO, but in certain cases, such as needing additional lunches en route, it may be necessary for the medical crew to collect for them. For non-paying patients, the inflight kitchen needs only a copy of the manifest. No enlisted personnel are required to pay. Neither are:

(1) Battle casualties.

(2) Class 1A, 1B, or 2A patients.

d. **Ordering Additional Lunches En Route.** To do this, give the pilot the necessory information (regular diets to be ordered from fleet service and therapeutic diets from the hospital) sufficiently far enough in advance so he can radio ahead and order them or call, while on the ground, to the next stop.

6-5. Modesty Curtains. Generally, aircraft have modesty curtains, such as shown in figure 6-2, which can be secured conveniently to the litter poles above. They may be left in place when not in use by securing the flaps so the patient's view is not obstructed. If there are no commercial modesty curtains available, two sheets or two blankets suspended from the litter above may be used and left in place if a patient is seriously ill and needs constant attention. The method for doing this is:

a. Use two sheets or two blankets and pins or tape.

b. Screen the foot end of the litter first. Using the first sheet, pin and tape one end to the outboard pole of the litter above, stretch it tightly over one end of the litter

and bring it to the center in front. Repeat these steps with the second sheet starting at the head of the litter. Be sure to overlap the sheets in the center.

c. If the sheets are to be used for the same patient again, roll them neatly when not needed.

6-6. Patient Comfort. Some patients do not like to ask for anything and are needlessly uncomfortable an entire trip. Medical crewmembers should be alert to such situations and seek ways of making the patient comfortable. For example, if a plane is unavoidably cold, give blankets to any patient not adequately clothed; if a litter patient is cramped and uncomfortable, help him change his position and pad his back with pillows or whatever is required to promote his comfort; if a patient is very tall, use a litter extension. Above all, anticipate patient needs and correct or eliminate any discomfort.

6-7. Positioning Litter Patients. On long flights, litter patients must have their positions changed at least every 2 hours. This includes patients in spica casts who should be turned from side to side and be well padded for propping with one leg secured to a stanchion. Some unusual positions may be required for a litter patient. Methods of positioning are:

a. **Shock Position.** Adjust position of patient by placing him flat on the litter with his lower extremities slightly elevated. Place pillows or folded blankets under the patient's lower extremities, maintaining a position of normal flexion.

b. **Sitting Position.** This can best be acplished by use of a backrest. If there is none available, one can be improvised. The litter backrest with canvas cover is shown in figure 6-3. Follow these steps when using it.

(1) Empty litter space above when using fixed devices, or use a wide space if using adjustable devices.

(2) Raise the patient to a sitting position, remove his pillow and lift bedding toward patient.

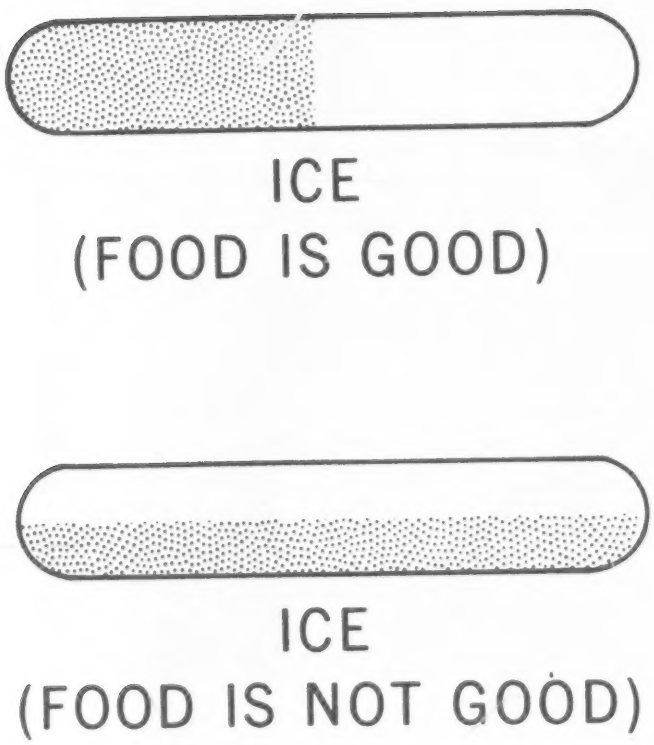

Figure 6-1. Frozen Capsule.

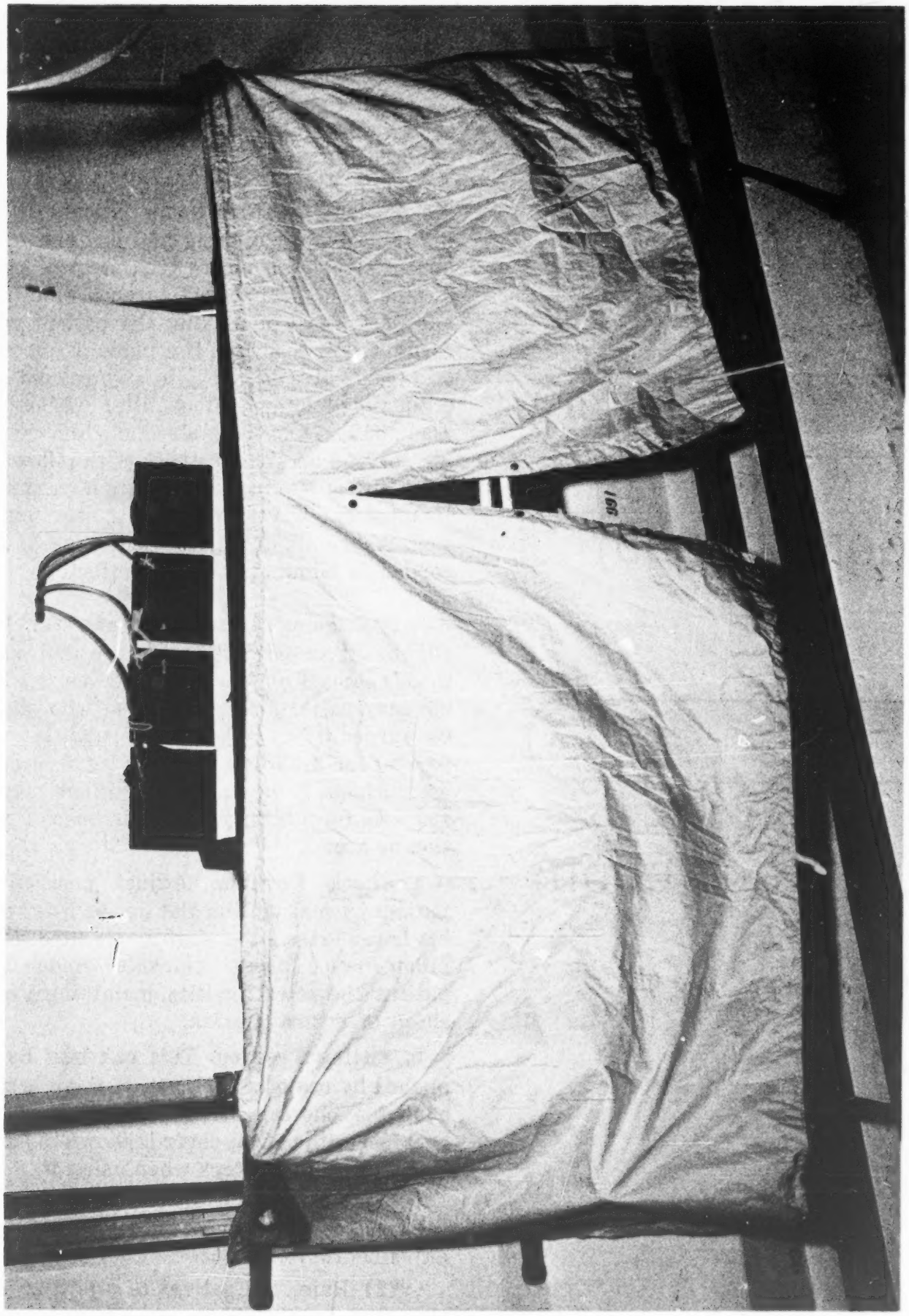

Figure 6-2. Modesty Curtains.

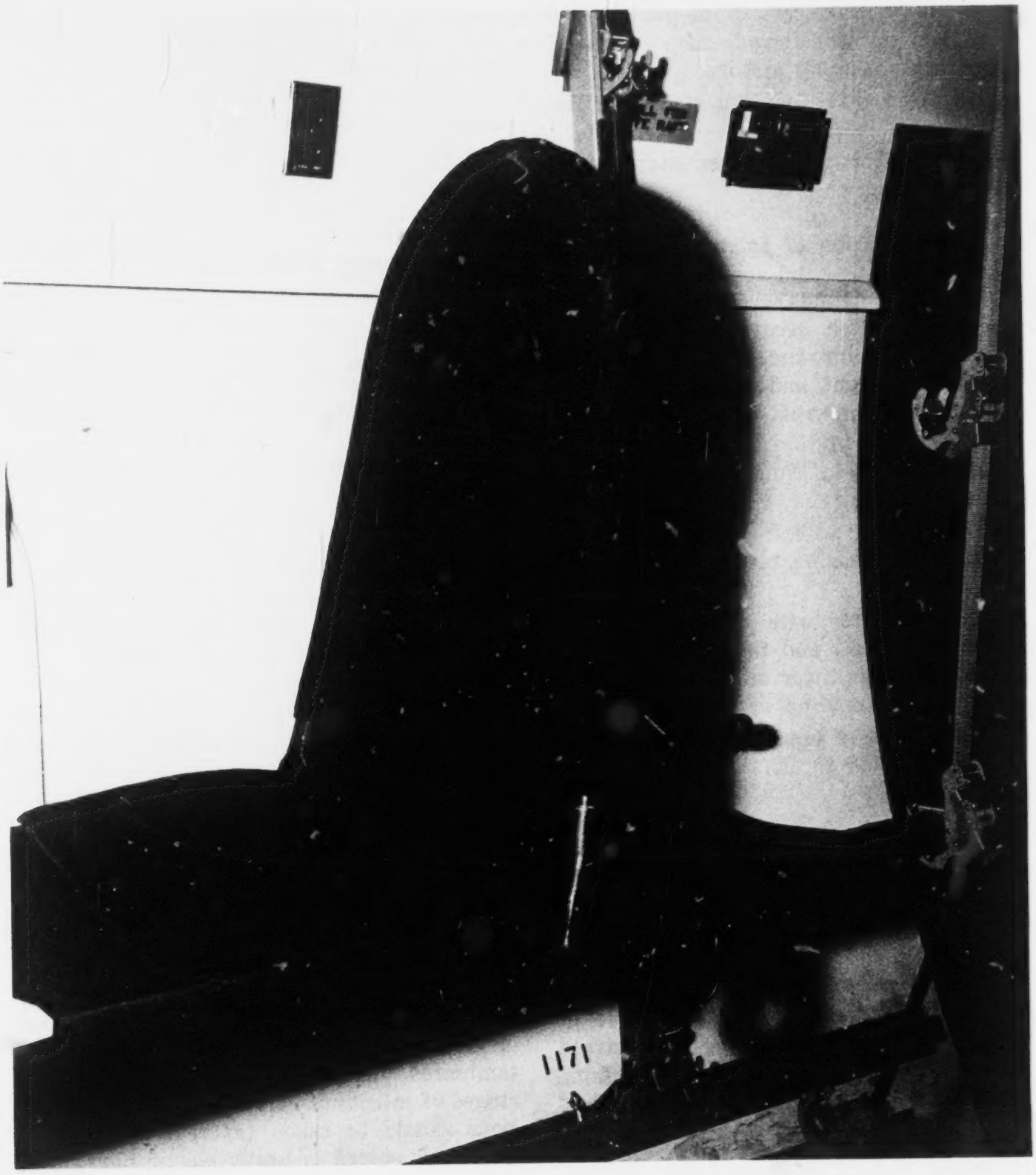

Figure 6-3. Litter Backrest With Canvas Cover.

(3) Place backrest in desired position (high or low Fowler's position).

(4) Cover with patient's bedding and replace pillow. Make certain the patient is in proper body position for adequate expansion of lungs and bending at hips.

(5) Keep litter-securing straps on the patient.

(6) Use plastic case over backrest for isolated patients.

6–8. Administration of Intravenous Fluids. To insure effective and continuous administration of I.V. fluids, great care must be taken to adequately secure equipment when moving the patient to the aircraft and loading him, while in flight, and when the patient is moved from the aircraft to the receiving facility. Remember to:

a. Protect stored fluid containers from breakage.

b. Secure arm well, preferably with an armboard. A magazine, blanket, etc., may be used.

c. Protect bottle with padding (ABD's, paper towels, etc.) and tie it securely to a stable part of the litter or suspension strap but allow easy reading of bottle markings.

d. Put a piece of tape on bottle indicating medication added to it, the date, and the time.

6–9. Blood Pressure. In the absence of an electronic device, a palpatory blood pressure is obtained in the airborne situation. This method is used because of the noise of aircraft engines. Only systolic readings can be obtained. A patient needing blood pressure determinations in flight should have it checked on the ground preflight to have a baseline with a variation of ten points from the auditory or palpatory method. Procedure for the palpatory method is:

a. Apply cuff to arm.

b. Put finger on pulse.

c. Pump up cuff till pulse disappears.

d. Release cuff slowly. The point where pulsation is felt again is the systolic reading.

6–10. Isolation Technique. When patients with contagious diseases are transported on routine flights, special precautions must be taken. All crewmembers should be briefed that such patients are aboard and where they are located in the aircraft. Care must be taken to avoid making the patient feel embarrassed, frightened, or ashamed. If he has not been given a thorough explanation as to why he is isolated, a member of the medical crew should explain the reason to him. Points to remember in practicing isolation technique aboard the aircraft are:

a. Establish the immediate area around the patient as an isolated area; remove from the area all medical supplies and equipment not required in the care of the isolated patient and restrict traffic to a minimum through the area.

b. One medical crewmember should be assigned to care for the isolated patient so several crewmembers are not contaminated at the same time.

c. Establish safe hand washing facilities. If the rest room facilities are used, the medical crewmember rendering patient care will need assistance to open the door and to pour the necessary solution.

d. Attach paper bag lined with a plastic bag to litter on the outboard side of aircraft within easy reach of the patient, and provide a large paper or plastic bag in the isolated area for collection of all disposable items.

e. When possible, a disposable bedpan should be used. Otherwise, use a metal bedpan stored in a large plastic bag when not in use. Place a bedpan liner in the pan and put the used liner and contents in a wax-lined bag for disposal. Place that bag in a larger, clean paper bag and mark it "contaminated." For patients in the contagious stages of infectious hepatitis, special precautions should be taken (excreta left in the container, stored in heavy plastic bags, and off-loaded with the patient). If there are two latrines, one may be set aside for use by these patients. At the end of the flight, the latrine area is sprayed with a disinfectant. Plastic bags containing urine or stools are not

placed in the aircraft latrine, because most flight line sewage disposals cannot handle such material and become clogged.

f. At en route stops or at termination, limit the number of personnel boarding the aircraft to essential personnel.

g. At the termination of the mission, all articles of medical equipment and supplies used in the care of the patient or in the area of isolation are considered contaminated. Separate these items into two groups for cleaning and sterilization and handle as follows:

(1) Place contaminated, reusable supplies and linens in paper bag, seal and mark "contaminated." Autoclave or decontaminate as indicated.

(2) Collect individual bags used for waste disposal and other disposable items, place in large paper bag, mark "Contaminated-Burn."

h. When decontamination of interior of the aircraft is required, it is accomplished as follows:

(1) Clean the contaminated areas of the interior surface of the cabin, including walls, floor, and exterior surfaces of permanent fixtures. The solution to be used varies from unit to unit. Often, spray germicides are used. If Wescodyne solution is used, the correct mix is 3 oz. Wescodyne to 5 gal. of water.

(2) After initial cleaning, it is desirable to air the aircraft, for a period of 3 to 4 hours, by opening all doors and windows. This is not mandatory and the period may be shortened or eliminated in the event the aircraft is needed for an urgent mission.

6–11. Air Sickness. This may happen to anyone at any time. Symptoms are pallor, perspiration, nausea, and cold, clammy skin.

a. **Causes.** These may be a hot, stuffy cabin, turbulence; visual stimuli, disagreeable ordors; or other airsick patients.

b. **Prevention.** Control temperature, e.g., regulate heat in cabin, request a cooling system if the aircraft is to be on the ground for a long time in hot weather.

c. **Treatment.** Oxygen.

SECTION B—UNUSUAL OCCURRENCES

This section briefly describes general procedures to follow when certain unusual events occur in flight. Only the major points are stressed, and each aeromedical evacuation technician should familiarize himself with his own unit's operating instruction on handling such events.

6–12. Death in Flight. If a patient creases to breathe, note the time and request the aircraft commander to proceed to the first scheduled landing at a military installation. Request that a physician meet the aircraft to officially pronounce the patient dead and sign the death certificate. Once this is accomplished, complete the necessary records and have the body removed from the aircraft. All medical records, property, and baggage are off-loaded with the deceased. Make a complete report of the death, listing the time of death, and the care given. Be thorough and concise. Remember, if the aircraft lands at a domestic commercial airport, the local authorities (particularly the coroner) must be notified and permitted to follow procedures required by the laws of that particular state.

6–13. Unscheduled Stops. A change in weather or aircraft mechanical trouble may necessitate such a stop. If there is no Air Force hospital located where an unscheduled stop is made, other military or civilian facilities may be used. Remaining overnight with patients at a civilian hospital is a last resort as it is extremely expensive. If there is no medical military facility available, contact the home station or, in the United States, the Aeromedical Evacuation Control Center for future instructions, if possible. Receiving many unexpected patients may be a hardship on any hospital, especially a small one. Normal off-loading procedures are followed and

the medical records are turned over to the hospital authorities. The senior medical crewmember is responsible for:

a. Insuring that all medical crewmembers have adequate quarters and facilities.

b. Keeping patients informed of the reason for the delay and the estimated departure time.

c. Insuring that medical crewmembers provide nursing care to the patients in the hospital if the hospital staff is unable to do so.

6–14. Deterioration of Patient's Medical Condition in Flight. If a patient's condition deteriorates seriously during flight, the aircraft commander should be advised of the situation and asked to land at the nearest military medical facility capable of support. He should be requested to radio ahead for a medical officer to meet the aircraft as well as for any special equipment needed on landing. The physician decides whether or not to deplane the patient. If he decides the patient must deplane, all of the patient's medical records, property, and baggage are offloaded with him. All pertinent information is entered on the patient's records.

6–15. Restraining Patients in Flight. Occasionally, a patient becomes combative and potentially dangerous to himself and others in the aircraft. Should such a patient need restraints applied in flight, it is important to inform him why the restraints are going to be applied and to have available adequate help to restrain him. To apply wristlet and anklet restraints properly:

a. Insure that the patient cannot get hold of any part of the restraining device.

b. Have the patient lying in the supine position with arms at sides.

c. Apply padding, then cuff wrists. The padding is used so the cuff will not irritate the patient and also to provide a better fit for the cuffs. In applying the cuffs, the brass loop on the outside of each cuff is inserted through the slot permitting best fit to the patient's wrist.

d. Thread the strap through the brass loop in the direction of the patient's feet, making sure the outside of the strap is next to the cuff.

e. Bring the strap around in a semicircular fashion, and thread it through the loop end up toward the patient's head in the case of the left wrist.

f. Bring the strap under the patient's left arm and under the back, locking the restraint in place on the right side. (See figure 6–4a.) The patient should have enough freedom that he can touch his face, hold a magazine, help himself to food, fluids, etc., but not so much that he could ease the strap over his head.

g. Apply padding and the larger cuffs to the ankles in a similar manner but begin by dropping the buckle of the strap over the edge of the litter by the patient's right ankle, then place the strap under the ankle and thread it through the loops in the same manner and direction as done with the patient's wrist. The strap then goes under the left ankle.

h. Lock the second and third strap together and thread the third strap through both stirrups.

i. Lock the third strap to the second on the left side. The patient needs enough freedom for his feet so he can turn from side to side but cannot throw his feet over the edge of the litter (see figure 6–4b).

j. Locks on restraining devices must be checked frequently during the flight because these can be picked by patients.

6–16. Patients Refusing to Complete Trip by Air. If a patient refuses to complete the flight, request that a medical officer meet the aircraft at the next stop. A military patient can be forced to continue a flight and the physician makes the decision as to whether this should be done. In such cases, record the physician's name, rank, and serial number in the patient's records. A nonmilitary patient should sign a release.

6–17. AWOL Patient. When a patient is AWOL the following procedures are applicable:

Figure 6-4. Applying Restraints.

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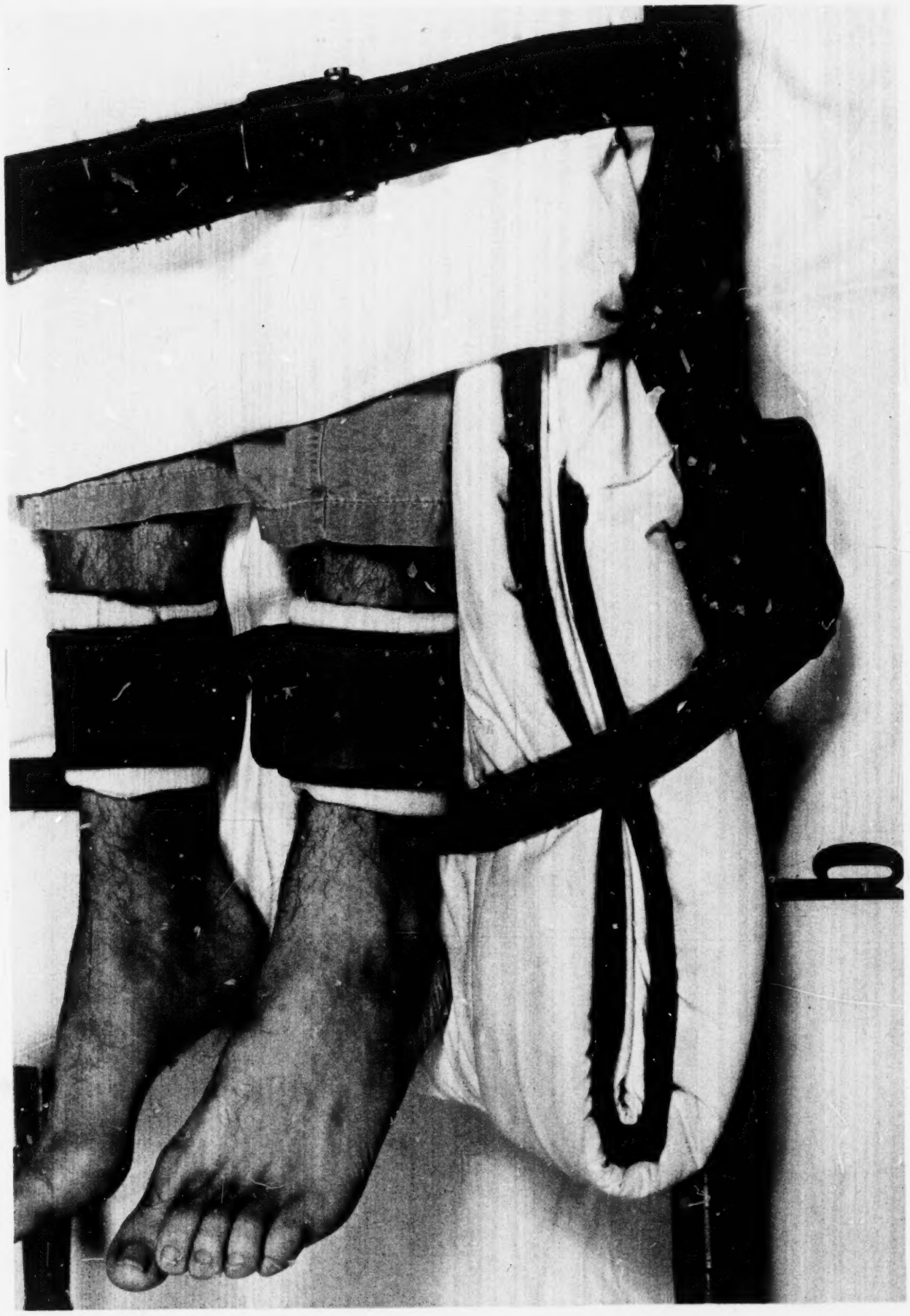


Figure 6-4. Applying Restraints. (Continued.)

2092

a. If a military patient is AWOL, notify the military police at the base of occurrence and destination hospital personnel.

b. If a civilian patient is AWOL, notify the originating and destination hospitals.

c. Off-load records at the military base of occurrence or destination hospital or, if neither of these locations is practical, return the records to the patient's home unit.

d. Report the incident to the squadron AEOO. Make note of the incident in the patient's records.

SECTION C—PATIENT CONDITIONS REQUIRING SPECIAL ATTENTION

The major points in care of patients, apt to present special problems in flight, are discussed in this section. The details of nursing care of such patients are in AFM 160–34.

6–18. Patients With Seizures. If a walking patient has a seizure, remove him from his seat and place him on the floor where he will neither fall nor harm himself with shrap objects. Use blankets or pillows to protect the patient's head from being banged severely. Prevent tongue injury by using a padded tongue blade. Do not forcibly restrain the patient's convulsive movements as it might cause a fracture. During the seizure, observe the patient carefully to see if he turns his head in a particular direction and whether only one or both sides are involved in the stiffening or jerking phases of the seizure. Note the size of both pupils; the direction of the attack; the inability to speak; whether the patient sleeps after the attack; if there is incontinence of urine or feces; and length of unconsciousness (if any). As soon as the convulsion has stopped, check to be sure the patient has not "swallowed his tongue" (the tongue falling back in the throat, blocking the pharynx), and that he does not have excess mucus or secretions in his throat. Record observations to aid the physician in his diagnosis.

6–19. Colostomy Care. Colostomy drainage may be increased at altitude so these patients require close observation. Many patients being transported have temporary colostomies, which are neither regulated nor irrigated and need dressing changes frequently. Patients infected with hookworm will exude worms from the colostomy. When rendering colostomy care, be tactful and gentle and afford the patient privacy, as it is often a distasteful, embarrassing experience for him. To dress the colostomy, remove any skin ointment with soap and water. Dry the area around the stoma thoroughly. Tincture of benzoin may be used to toughen the skin and to ensure that the colostomy bag adheres to the skin. If there are no disposable bags available, use several thicknesses of ABD pads to cover the opening. Usually pads are held in place with Montgomery straps which should be changed if they become soiled.

6–20. Surgical Problems of the Chest. Patients with chest injuries, who have had chest surgery or a spontaneous pneumothorax, may be transported with closed underwater drainage or with a plastic flutter valve. Each must be closely watched for respiratory distress. In the event of a rapid decompression, such patients will need prompt attention and treatment to prevent further serious damage.

a. **Closed Underwater Drainage.** Correct handling of underwater chest drainage is essential. The usual setup is one bottle underwater seal drainage without suction. The bottle must be tied securely to a litter stanchion. In securing the bottle, it is important to permit observation of the small amount of water that will be drawn up into the tube on inspiration and the bubbles of air or drainage fluid seen in the water on expiration. Place adhesive tape on the bottle showing the level of the water. When the tube is clamped close to the chest, the bottle can be emptied and the amount of drainage measured by emptying to the level of the water and noting the difference. Normally this is not done in

flight unless ordered by the physician. The connecting tube from the tube in the chest to the underwater seal drainage bottle should be long enough to allow free motion yet not be excessive in length. There should be a hemostat with rubber tips secured to the patient's litter or pajamas, in case the bottle is accidentally tipped or knocked over and the tube must be clamped (off) quickly to prevent air from entering the chest cavity. Because the bottle must always be lower than the chest, a third person must be utilized to carry the bottle when moving or unloading the patient. These patients must not be placed on the lowest litter of the ambus or ambulance, nor are their chest tubes to be clamped off while they are being transported from the hospital.

b. **Plastic Chest Drainage Valve.** Figure 6-5a gives an example of a chest drainage valve. Figure 6-5b shows a typical chest drainage set up with the valve.

6-21. Hypoxia. The classic symptom of hypoxia is cyanosis, which is difficult to detect in an aircraft because of poor lighting; any cyanosis (bluing of the lips, fingers, ear lobes, etc.) might be quite advanced by the time it is detected. Other symptoms are rapid pulse, increased respiration, dimming of vision, tunnel vision, apathy or euphoria, headache, and restlessness. Such symptoms indicate a need for supplemental oxygen.

6-22. Inflight Eye Care. As with all patients, doctors' orders should be carefully checked to insure proper care of these patients in flight. Factors to be considered in caring for patients with eye diseases at altitude are:

a. Traumatic or surgical eye cases may have air in the globe and must be flown at low altitude or in a pressurized cabin to prevent the air from expanding and causing additional injury to the eye.

b. Hypoxia produces dilation of retinal and choroidal vessels above 10,000 feet. Cases with an intraocular hemorrhage should be maintained on oxygen above 4,000 feet.

c. Altitude itself does not have any affect on the intraocular tension. However, hypoxia will cause a slight rise in intraocular tension, so oxygen should be administered in those cases of glaucoma or elevated intraocular tension.

d. The retina has the highest oxygen demand of any tissue in the body. For retinal or choroidal disease cases, oxygen should be administered above 4,000 feet altitude.

e. Many eye patients may be ambulatory. However, if there has been recent intraocular surgery or a recent intraocular wound, or if any blood can be seen in the anterior chamber, even a speck, these patients should be made litter cases. In caring for the patient in flight, extra care must be taken to prevent putting any pressure whatever on the globe of an injured or operated eye. In cases where the cornea is lacerated, ointments should never be used. They may enter the eye through the laceration causing permanent scarring of the cornea. If in doubt, use drops only.

f. Unconscious or heavily sedated patients should be closely observed to insure the eyes are not left open; this could result in drying of the cornea and corneal abrasions. To prevent this, methylcellulose drops may be instilled or ointment may be used to cover the cornea, provided there are no lacerations of the eye; eye shields may also be useful.

g. Patients with both eyes patched usually become disoriented in flight. Unusual sounds and movements will disturb them. Reassurance is helpful but sedation may be necessary.

h. When possible, consult with an ophthalmologist concerning patients with eye problems before departure.

6-23. Amputations. In transporting these patients on a litter, *do not* place a pillow under the stump either in a thigh or lower leg amputation because of the danger of flexion contraction at the hip. Observe patients with fresh amputations for possible shock or hemorrhage. Because of exposed nerve endings, these patients often have great discomfort during movement as well as from aircraft vibrations. Handle them with

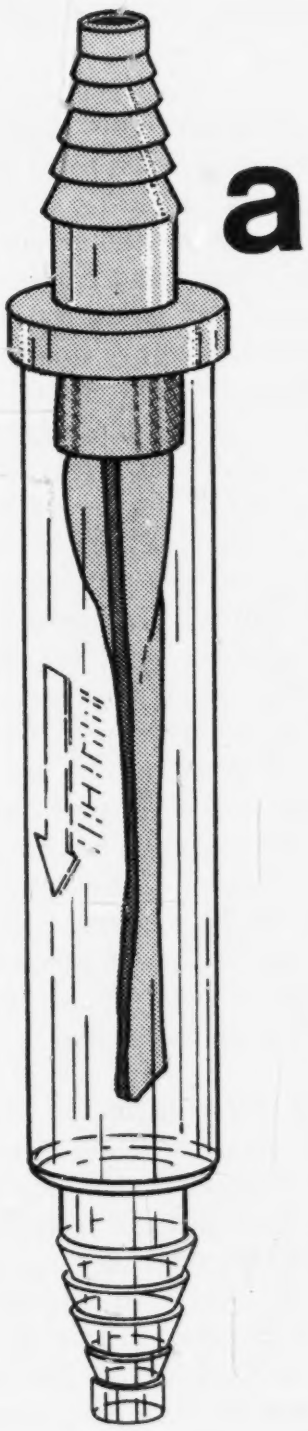


Figure 6-5. Chest Drainage Valve.

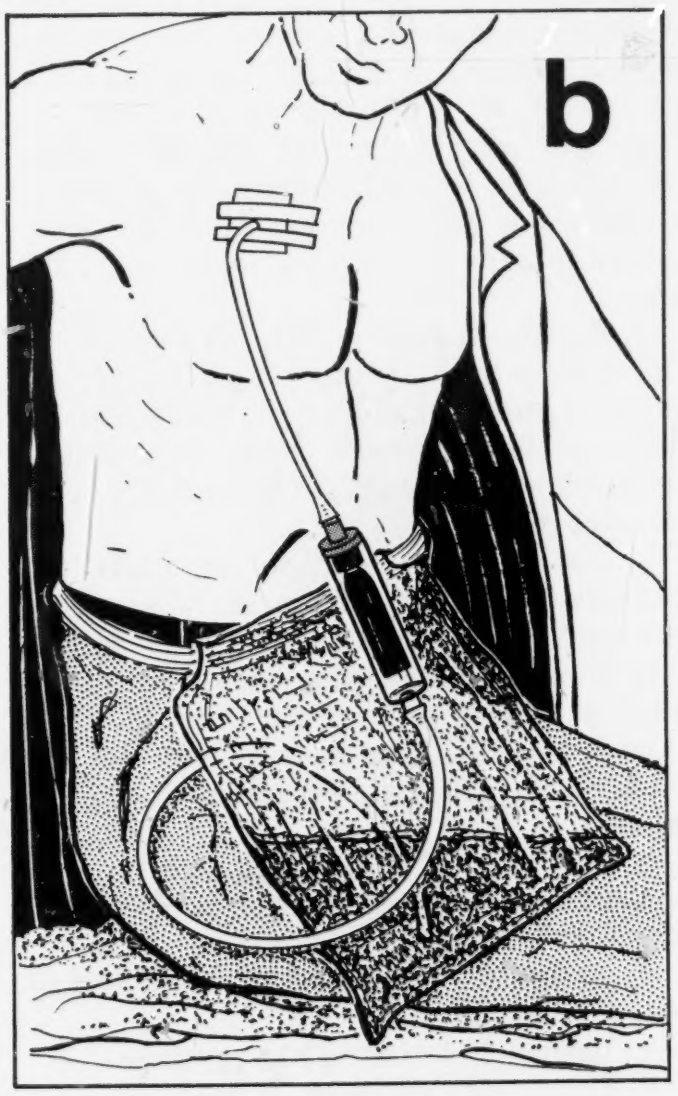


Figure 6-5. Chest Drainage Valve. (Continued.)

care. Properly maintain skin traction if applied.

6-24. Burns. Since a burn patient usually tolerates transportation better within the first 48 hours, such a patient is usually evacuated while his burns are fresh. However, the patient should be stabilized before being transported by air. Observe the patient for respiratory obstruction and embarrassment. Tracheostomies are not recommended as frequently as in the past, but if there is a possibility of one becoming necessary in flight, it should be done before takeoff. Always have a tracheostomy set available. Briefly, the additional considerations concerned in care of the burn patient in flight are:

a. Relative humidity (3 to 25 percent) on board some high altitude aircraft dries out mucosal surfaces and thickens tracheal secretions of patients who have undergone a tracheostomy. The "artificial nose" helps correct this problem.

b. Use humidified oxygen in flight for patients with large burn areas. Because of the serum loss from the blood, the patient may develop a hemo concentration with a resulting stagnancy hypoxia. The blood is thicker and circulates more slowly. The humidified oxygen supersaturates the hemoglobin.

c. For long flights, a seriously burned patient should be transported on a Stryker frame and turned every 2 hours.

d. Accurate recording of intake and output is imperative.

e. Reverse isolation may be required.

f. These patients need a great deal of emotional support.

g. If dressings need to be reinforced in flight, they should not be applied in a circular manner around extremities.

h. Patients must be observed carefully for shock.

6-25. Surgical or Traumatic Abdominal Wounds. These require careful observation at altitude as the possibility of bleeding is increased and drainage from open abdominal wounds and colostomies may be profuse due to gas expansion and the absence of sphincter control. Watch for abdominal distention as it increases discomfort and adds stress to the suture line of postoperative patients. If distention is present, gentle suctioning should be done.

6-26. Head Injuries. The main threats at altitude to patients with head injuries are: turbulence, which can cause motion sickness with resulting nausea and possible vomiting and aspiration; decreased partial pressure of oxygen, as many of these patients already have an oxygen deficiency due to the injury; and the decrease in the ambient pressure as patient ascends to altitude, which can cause an increase in the intracranial pressure due to gas expansion. If the aircraft is nonpressurized, 100 percent oxygen should be given from the ground up, through the entire flight. If the cabin is pressurized and can be regulated to ground level, it may be necessary to give supplemental oxygen. Vital signs and level of consciousness should be checked frequently. All observations must be carefully recorded. Positioning of these patients is most important. Many physicians order the head of such a patient to be elevated slightly. The pilot should be advised when a patient with severe head injury is aboard as propellers should not be reversed, on landing, with this type patient on the aircraft.

6-27. Spinal Cord Injuries. If a patient has cervical cord injury, a flight surgeon should be consulted regarding the requirement for a respirator. Respiratory complications are very possible in these patients as the respiratory center is located in the brain stem. Patients on a Stryker frame should be secured tightly and observed for airsickness. Aspiration would be dangerous! These patients need constant observation. As a safety measure, tape should be placed over the two release pins on the Stryker frame when not in use. This will prevent pins from vibrating loose and causing an unexpected turning of the frame. Added security is gained with a litter strap placed

under each end of the frame, then over the top of the exercise bar, as shown in Figure 6–6a, or four litter straps, one placed at each corner of the frame and around the base with equal tension, as shown in figure 6–6b.

6–28. Technique of Tracheostomy Care. This is extremely important under any circumstances, but especially important at altude. At all times the tracheostomy patient's chief hazard is obstruction of the airway. Because of its importance, care of the tracheostomy is reviewed here.

a. Care of Early Tracheostomy (Initial 24 to 48 Hours):

(1) During the first few days the patient is extremely restless. He will be unable to speak. Bronchial secretions are profuse and slightly blood tinged and frequent coughing may occur. Respirations may sound wet and wheezy. Frequent suctioning and strict aseptic technique are required. During this early stage, patients should be under constant surveillance. When the patient coughs, secretions and mucus plugs should be quickly wiped from the opening, before they are reinspired. Use gauze squares or cellulose tissues (Chix) rather than facial tissue which has lint.

(2) The inner cannula of the tracheostomy tube should be removed for cleaning at least every 2 hours whenever active bleeding or excessive secretions are present.

(3) Tracheostomy dressings are changed frequently during the first 1 to 2 days since they soil readily during the stage of increase secretions. Use a 4 X 4 dressing with a slit; apply gently without loosening the tracheostomy tube tapes.

b. Later Care of Tracheostomy Patients:

(1) After the initial period, secretions tend to dry and thicken due to loss of the humidifying function of the upper respiratory tract.

(2) The inner cannula is removed and cleansed at least twice every 8 to 12 hours.

(3) The surrounding temperature ideally should be about 70°F.

(4) Humidity should be high and extra moisture delivered over the opening. When oxygen is administered to the trachea, it must be humidified. If there are no humidification devices available, moist gauze placed over the tracheostomy opening may be effective. The gauze must be kept wet.

(5) Dressing should be replaced daily, or more often if required.

c. Tracheostomy Suction:

(1) Remember, the presence of a suction catheter in a tracheostomy tube reduces the patient's breathing area. The catheter should be inserted and removed gently and quickly. A "Y" valve or a comparable substitute must be utilized when suctioning a tracheostomy.

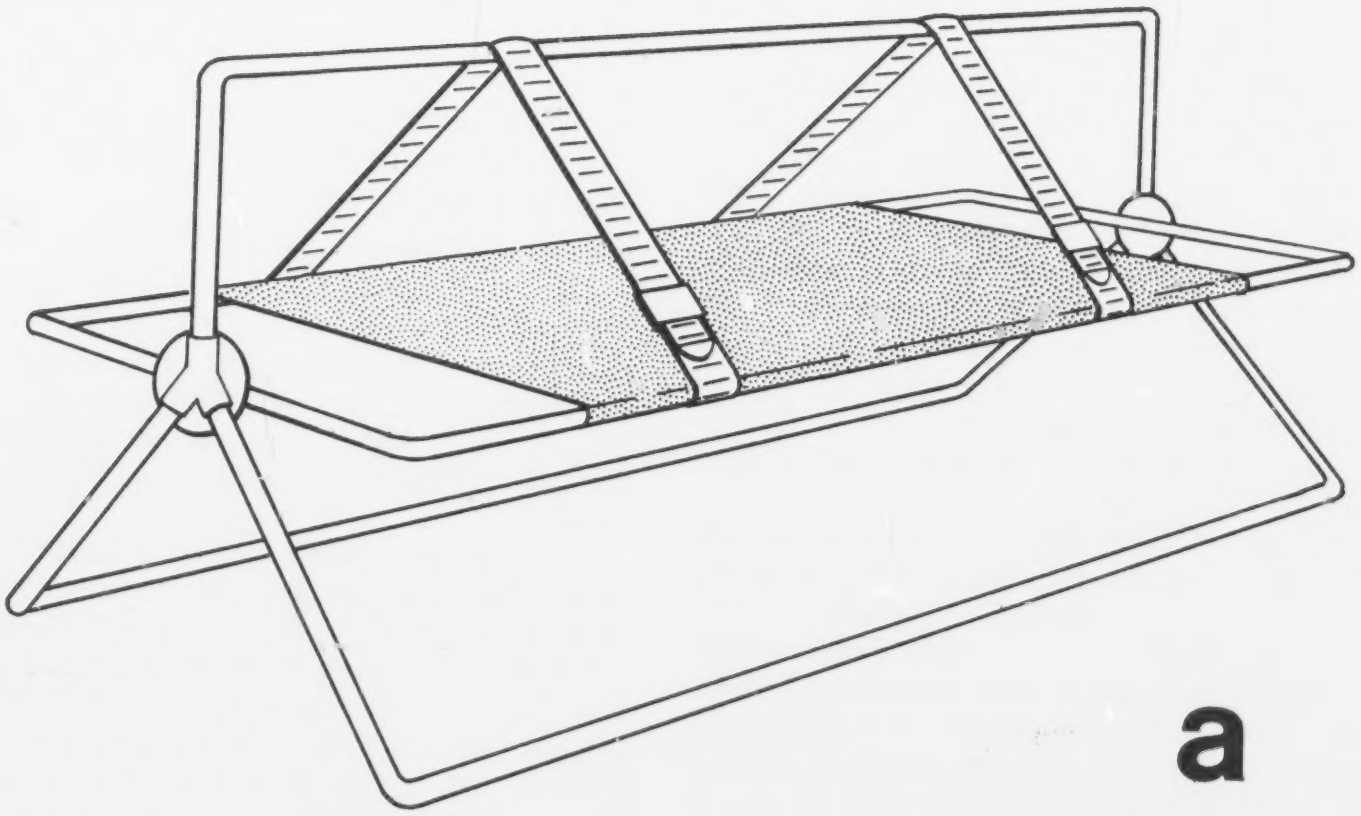
(2) Grasp catheter approximately 6 inches from the open tip. The "Y" tube must be open. Insert the catheter into the trachea about 5 or 6 inches. Occlude the "Y" tube and carefully withdraw the catheter. The catheter may be rotated at the time of withdrawal. Avoid poking and jabbing at the trachea. If the catheter attaches while it is being withdrawn during suctioning, release the suction by removing thumb from "Y" tube. This prevents damage to the mucosa. Suctioning should be continued for only a few seconds at a time. If one suctioning does not clear the airway, repeat the procedure as needed, allowing brief rest intervals. If the mucus is thick, 3 to 5 drops of sterile water or saline are instilled into the trachea before resumption of suctioning.

(3) Suctioning is first done with the face in the anterior position. Subsequently, turn the head to the right and repeat suction; this gains access to the left main stem bronchus. Follow with the head in the third position, to the left, to engage the right main stem bronchus. Suctioning with head turned laterally is a very important adjunct to insure complete tracheal upper bronchial clearing.

(4) Avoid catheter contact with hair, body, or bed. Keep it clean. Place catheter in a sterile towel when not in use.

d. Care of the Cannula:

(1) Procedure for cleaning inner cannula.



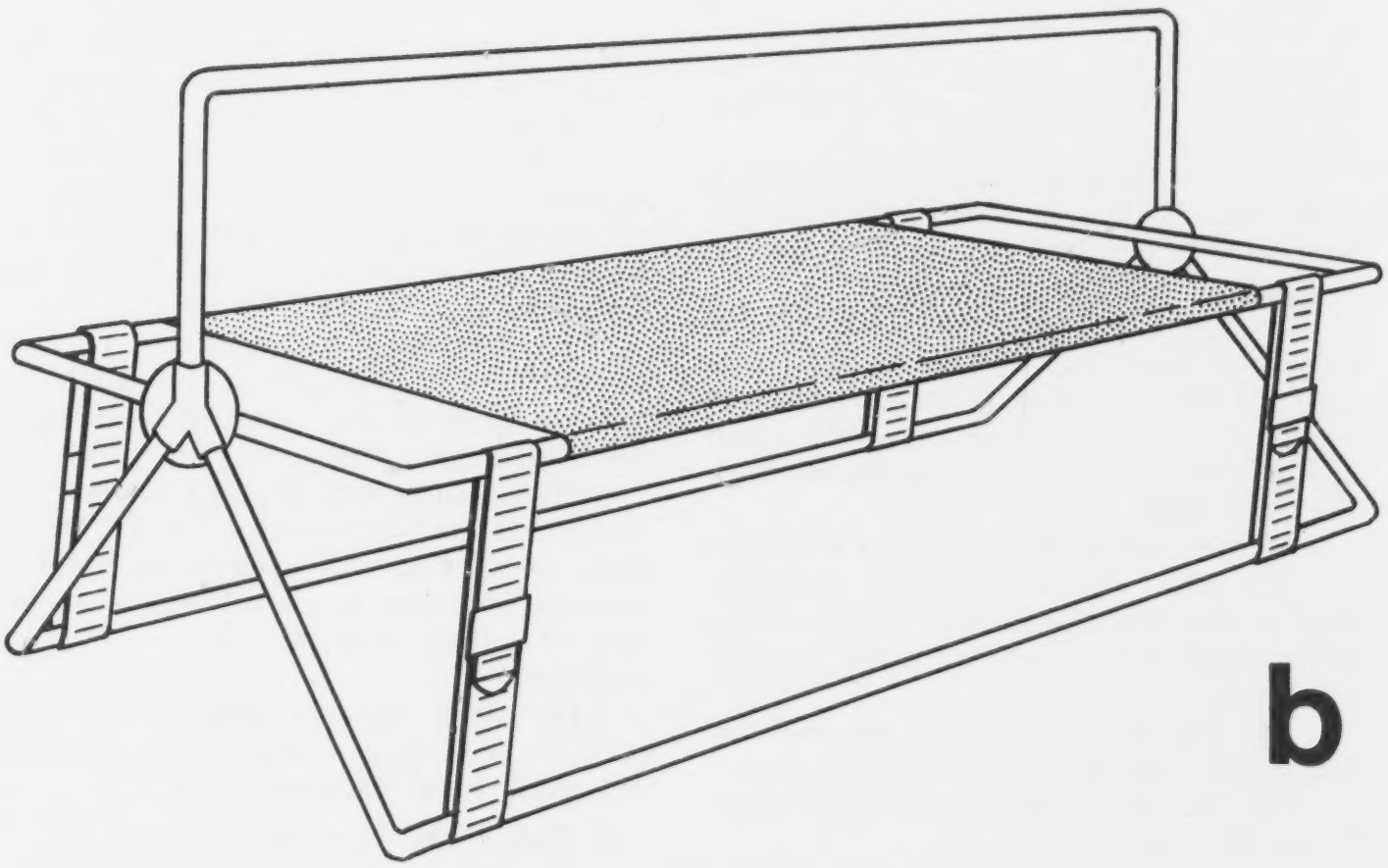


Figure 6-6. Alternate Use of Litter Straps.

(a) Release the lock (turn to the UP position).

(b) Remove the inner cannula.

(c) Rinse the cannula with hydrogen peroxide.

(d) Thread a 2 X 2 gauze pad through the cannula to remove secretions and encrustations.

(e) Rinse the cannula in saline and carefully reinsert.

(f) Lock the cannula in place (turn to the DOWN position).

(2) The outer cannula is not removed by nursing personnel unless this responsibility is delegated by a physician. This is not usually done until the 7th or 10th day following initial tracheostomy. It is important to keep the obturator on or near the patient since it is required to remove or reinsert the outer cannula.

SECTION D—AEROMEDICAL EVACUATION TECHNICIAN'S INFLIGHT AND IMMEDIATE POSTFLIGHT DUTIES

6–29. Responsibilities. Responsibilities of the aeromedical evacuation technician in flight before landing, during off-loading, and before leaving the aircraft are broad and they vary in each unit. To provide an example of such responsibilities, this section contains an extract of a checklist from TO 1C–131A–1CL. The aeromedical evacuation technician's responsibilities are not limited to these items and each unit has set up additional guidelines for all occasions. This checklist is as follows.

IN FLIGHT

a. **Seat Belt and No Smoking Signs.** Whenever the seat belt and no smoking signs are illuminated, make sure the instructions are obeyed. In addition, report cabin secure to the aircraft commander whenever the seat belt sign is illuminated after having been off.

b. **Patient Comfort Items.** Distribute magazines, blankets, pillows, etc., as required. Dispense coffee, water, etc., as requested.

c. **Nursing Duties.** Perform nursing duties as directed by the flight nurse, light cigarettes for phychiatric patients, and assist patients to and from the latrines as necessary.

d. **Inflight Meals.** Serve inflight meals as directed by the flight nurse. Feed or assist patients as necessary.

BEFORE LANDING

a. **Patients.** Prepare patients for off-loading by making litters neat, make sure each patient has his personal belongings, etc.

b. **Latrines.** VACANT.

c. **Loose Equipment.** SECURED.

d. **Seat/Safety Belts.** FASTENED.

e. **Cabin Secure.** REPORTED.

f. **Administrative.** COMPLETED. Prepare all forms, records, and receipts that will be required during next stop.

OFF-LOAD

a. **Handcarried Baggage and Coats.** DISTRIBUTED (#2 medical technician). Make sure handcarried baggage and coats have been distributed to patients/passengers who are off-loading.

b. **Patient Reaction Questionnaires.** DISTRIBUTED (#2 medical technician). Distribute to those patients off-loading.

c. **Weather Curtain.** CLIMATIC. (#2 medical technician). Install only when weather is bad or cold.

d. **Supervise Activity Near Aircraft.** COMPLETED (#1 medical technician). EXIT through the front door and direct firetruck, ambulance, and other vehicles to proper position near aircraft, and give clear signal for opening litter loading door.

e. **Escape Chute.** DISCONNECTED. (#2 medical technician.)

f. **Litter Loading Door.** AS REQUIRED (#2 medical technician). If door is to be opened, use litter-loading, door-operating instructions.

g. **Patient Loading Ramp.** POSITIONED AS REQUIRED (#1 medical technician).

h. **Patients/Passengers.** OFF-LOADED. Patients and passengers will be off-loaded in the order directed by the flight nurse.

i. **Baggage.** OFF-LOADED. Only for those patients/passengers off-loading.

j. **Special Equipment.** OFF-LOADED. As directed by the flight nurse. Litters, pads, and equipment exchanged if required.

BEFORE LEAVING AIRCRAFT

a. **Medical Equipment.** SECURED. Either locked up or turned in.

b. **Cabin.** POLICED. Magazines returned to kit, trash picked up, contaminated or soiled linen off-loaded, etc.

c. **High-Pressure Oxygen.** CHECKED. Off-loaded if pressure is less than 1,000 p.s.i.

d. **Patient Loading Ramp.** REMOVED. Only if at RON station. At home station ground personnel will do this.

e. **Litter Loading Door.** CLOSED. Only if patient loading ramp has been removed.

f. **Aircraft Discrepancies.** REPORTED. Report all aircraft discrepancies to aircraft commander.

SECTION E—BRIEFING PATIENTS PRIOR TO LANDING

It is important to brief patients when arriving at en route, RON, or destination stations and to remind deplaning patients and passengers to remove all personal articles from the aircraft. Each should check carefully to insure that such belongings are not left on the aircraft. Additional information to be given at stops follows.

6-30. Briefing at en Route Stations. Details to be covered are:

a. Name of base, location, time, temperature, weather, and change of date (if applicable).

b. Safety procedures. (Keep seat belts fastened until aircraft comes to a complete stop and engines are turned off. No smoking during ground operation.)

c. Procedures for passengers.

d. Approximate time at station.

e. Friendly goodbye to patients deplaning and a reminder to check carefully that they have not left personal articles aboard the aircraft.

f. Transportation arrangements to the hospital.

6-31. Briefing on Arrival at RON Stop. Repeat instructions in paragraph 6-30 that are applicable. In addition, patients should be told that they are not to leave personal articles aboard the aircraft and that transportation will be provided to RON facility.

6-32. Briefing on Arrival at Destination Airfield Stop. Repeat applicable items from paragraph 6-30. In addition, for oversea returnees, give:

a. Customs reminder.

b. Agriculture inspection reminder.

CHAPTER 7

BAGGAGE, SUPPLIES, AND EQUIPMENT

This chapter discusses areas of aeromedical evacuation for which the aeromedical evacuation technician has full responsibility. Proper baggage management, effective supply procedures, and knowledgeable equipment operation are essential components of the aeromedical evacuation process. As these procedures vary in different units, examples of major procedures are described here.

SECTION A—PATIENT BAGGAGE MANAGEMENT

Effective baggage management is essential to smooth functioning of the aeromedical system. Patients are generally very concerned about the location and availability of their personal belongings. The aeromedical evacuation technician is a key figure in the control of baggage and he must be familiar with rules and regulations governing its handling. AFR 160-113, *Patient's Identity Tag, Patient's Baggage Tag, Patient Evacuation Manifest and Patient's Unaccompanied Baggage*, provides instructions for the use of Department of Defense forms in the movement of patients by military common carrier.

7-1. Baggage Limitations. Baggage onboard aeromedical flights is limited by both weight and type as follows:

a. **Weight.** Patient baggage weight is limited to 66 pounds, although the medical facility commander may authorize up to 100 pounds for an Armed Forces patient. When excess is authorized, it must be shown in the patient's orders.

b. **Types.** Patient baggage is divided into three types. These types are:

(1) *Hand-Carried.* The patient may hand-carry a small bag with toilet articles, etc., that may be required at an RON stop. Weight of this bag is included in the total authorized weight.

(2) *Stowed.* Baggage other than hand-carried is stowed in the baggage compartment and should not exceed 34 X 24 X 30 inches (about the size of a footlocker). Cardboard boxes are acceptable if sturdy enough to withstand rough handling. Paper bags, hats, clothing on hangers, and other containers or items that could be easily lost or damaged are unacceptable. Such articles should be well packed in a sturdy container, sealed, and identified at the hospital.

(3) *Unaccompanied.* This is baggage which does not go along with its patient owner when he is moved in patient status. Such baggage is not accepted on aeromedical evacuation flights. The facility holding it should ship it by commercial transportation or other means in accordance with existing regulations.

7-2. Handling. Baggage is loaded on the aircraft according to the patient's destination; e.g., the baggage of patients getting off the aircraft first is loaded last. Passenger baggage may be loaded to the rear of the baggage section (out of the way). It is always segregated from patient baggage.

a. **Inbound Procedures.** Patients are deplaned first, then baggage is off-loaded. The baggage is transported to the secured storage area where it is assigned an inbound move-

ment number. This number is determined by the flight; e.g., for the tenth flight of the year 1968, the movement number would be IM-10-68. The number is entered on the patient and baggage manifests. A current file is kept of the baggage on hand. Once the inbound movement number is assigned, the baggage is separated according to the destination and the flight on which the patient will be departing.

b. **Outbound Procedures.** On notification of departure, a copy of the Patient Manifests are obtained from the AECC. If there is an inbound movement card on the patient, it is used. If the patient is originating at the station, an index card is prepared by the AECC, an outbound movement number is assigned to the baggage, and the index card is held on current file. The Patient Baggage Data, listing whether each departing patient does or does not have baggage, is then typed in triplicate. The number on the bag should correspond with the one on the baggage manifest. The baggage can then be loaded aboard the aircraft. The baggage man is responsible for obtaining the signature of a medical crewmember on the Patient Baggage Data prior to the aircraft's departure. He retains a copy of the form for filing and gives the other two to the aeromedical evacuation technician.

c. **Lost or Found Baggage.** When baggage or other articles are reported lost or found, a Lost or Found Article Report must be prepared. As an aid in preparing the form, figure 7-1 illustrates the types of baggage which may be readily identified. For lost baggage, the original is forwarded after 20 days to the appropriate baggage center with copies of all correspondence and a list of the contents of the baggage as described by the patient. Centers are located at 21st AF, McGuire AFB, NJ and 22nd AF, Travis AFB, CA. When baggage is found and returned to the owner within 20 days, all correspondence is retained by the originating station. A copy is kept on file in the patient baggage room and a copy is given to the patient.

(1) Communications concerning baggage and its shipment must be accomplished without delay. At overseas stations, the AECO obtains information concerning the patient's final destination through appropriate communication channels. Found baggage is shipped there in accordance with paragraph 8254, Joint Travel Regulations, or through means available to the base transportation officer.

(2) A daily inventory should be made of all baggage held in the patient baggage section. It is checked against the index card file, or with the originating or en route hospitals served by the baggage section to insure that all baggage is accounted for.

(3) If patient baggage that cannot be properly accounted for is found or if the patient failed to arrive at the off-load point as indicated on the patient manifest, inquiries must be started immediately to en route points requesting assistance in identifying or locating the baggage. Inquiries must be acknowledged within a 24-hour period. Copies of messages are filed with the applicable manifests.

(4) For found baggage, the original is forwarded to the appropriate baggage center the same day it is found, if an inspection of the articles does not reveal the owner's identity. When the owner is identifiable, the original manifest is retained for 10 days to enable tracer action to be taken. If a verified address of the owner is not available after 10 days, the form is forwarded to the proper baggage center.

(5) When ownership of found baggage cannot be established, it is disposed of in accordance with volume VI, paragraph 34, AFM 67-1, *Military Standard Requisitioning and Issue Procedures.*

(6) All passenger baggage should be turned over to the baggage section of the station concerned.

d. **Baggage Handled at Debarkation or En Route Points.** This may be baggage of (1) patients for whom the en route stop is the final destination and which must be off-loaded and transported to the destination hospital, or (2) patients whose movement within

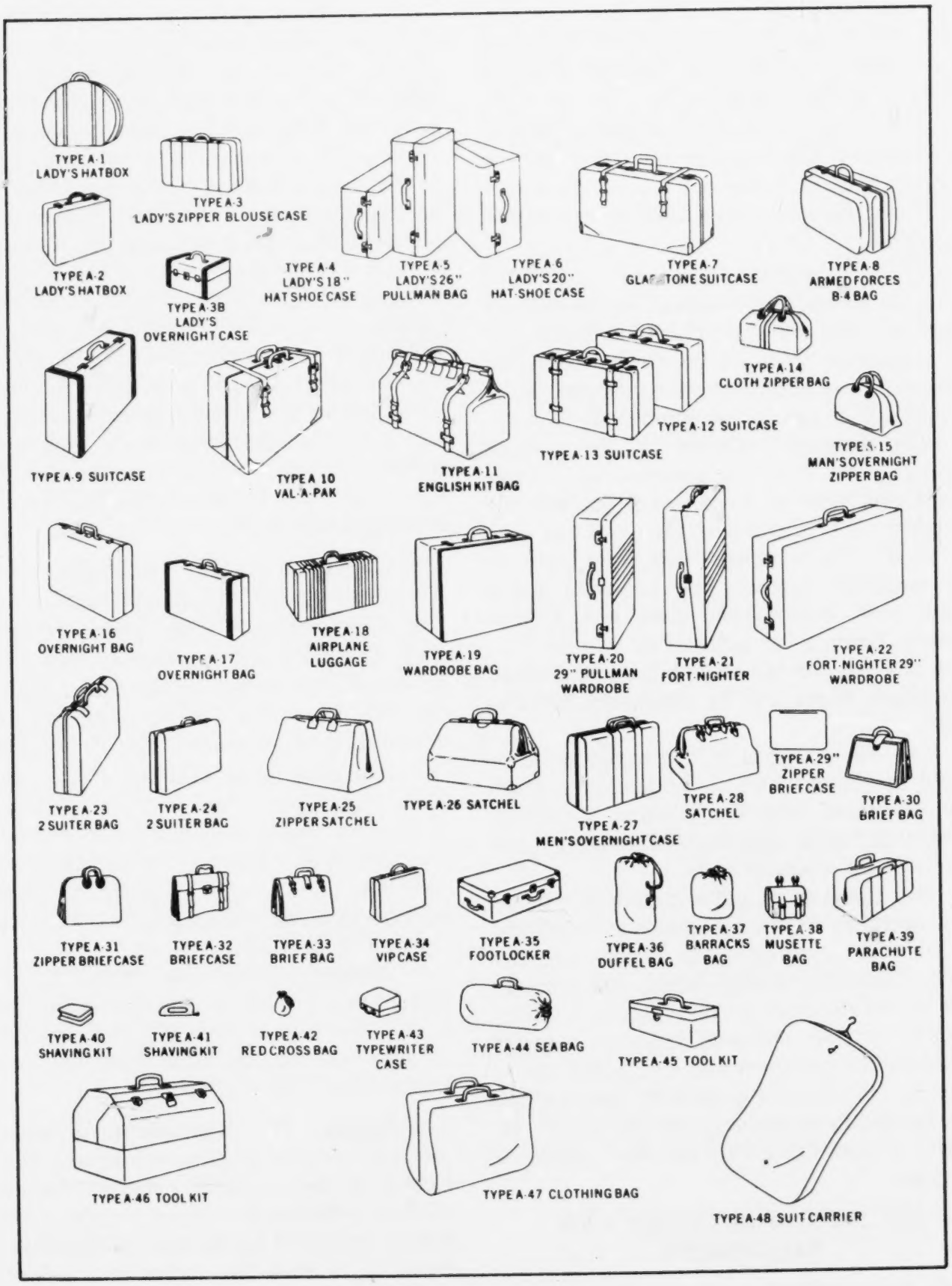


Figure 7-1. Types of Baggage.

the aeromedical evacuation system will continue and which must be stored in the patient baggage section pending further movement aboard another flight. When either of these types of baggage is received, the following procedures apply:

(1) At en route off-load point, personnel accepting the baggage sign the Patient Baggage Data and receive a copy of the manifest from the senior aeromedical evacuation technician.

(2) All patient baggage off-loaded from the aircraft is delivered to the patient baggage room. None is off-loaded directly to the ambulance transporting final destination patients unless administrative procedures described below can be accomplished.

(3) Baggage collected in the patient baggage room from an aeromedical evacuation flight will be inventoried against the manifest. The number of pieces of baggage or "N/B" (No Baggage) will be entered on the manifest opposite the patient's name when such information does not appear thereon. Baggage of patients or persons who were not transported aboard the aeromedical evacuation flight will be processed for disposal.

(4) The manifest will be assigned an inbound movement number and will be properly annotated with the inbound movement number and other data deemed necessary and will be filed alphabetically.

(5) Baggage of patients whose evacuation continues via the aeromedical evacuation system will be stored in the patient baggage room. Adequate storage space and security will be provided to prevent loss and pilferage. In storing patient's baggage, storage bins must be provided and identified alphabetically to facilitate orderly distribution. The foregoing procedures are varied for facilities processing relatively few pieces of baggage.

SECTION B—SUPPLIES AND EQUIPMENT

Every organization must have a supply system in order to function effectively. Thus, each aeromedical evacuation unit has its own supply section, completely independent from the base medical facility. Supplies for the unit are ordered directly from base medical supply. Usually, the OIC of supply is an MSC officer in the unit. It is an additional duty for him and his main involvement is signing for nonexpendable supplies charged to the unit. Ordinarily, an aeromedical evacuation technician is directly in charge of supplies and this is his primary job. Because it is such a demanding position, he usually flies on aeromedical evacuation missions only as an additional duty. Each aeromedical evacuation technician must familiarize himself with supply procedures in his unit. It is essential to his effective functioning, both on the ground and in flight. The technician loads aboard the aircraft all routine and special medical equipment, the flight nurse's kit, the manifest case, and any patient baggage.

7-3. Classes of Supply Items. Supplies are classified by cost and by life expectancy.

a. **Consumable Supply Items (Expendable).** These are items which are not durable in nature and cannot be reused for the same purpose. Examples of such items are drugs, adhesive tape, dressings, and X-ray film.

b. **Durable Supply Items (Nonexpendable).** These items have a life expectancy of 1 year or more, cost $10 or more, do not lose their identity, can be reused for the same purpose, and do not qualify as medical equipment items. Examples are blood pressure cuffs and stethescopes.

c. **Medical Equipment Items.** These are items having a life expectancy of at least 5 years; they cost at least $50 and retain their identity when in use. Such items are Stryker frames and Bird respirators.

7-4. Signing for Equipment. Frequently, medical equipment items accompany the patient from the originating medical facility. A medical crewmember signs for the items on a form prepared by the medical facility. It is essential to keep two copies of the form, so that when the patient is deplaned, the representative from the receiving facility can sign

for the item. A copy should be filed in the medical crew's own unit supply section. In the event that an aeromedical evacuation unit item (such as a litter used for a walking patient who becomes acutely ill in flight) has to be off-loaded with a patient, a medical crewmember must initiate the proper forms and paperwork and have the item signed for when the patient deplanes.

7-5. Routine Supplies and Equipment. The aeromedical evacuation technician must be thoroughly familiar with all supplies and equipment that are carried on routine flights He must also know who is responsible for loading these supplies and equipment and where they are located. The amount may vary with each unit, but the items are generally the same. Each unit formulates standard checklists which insure accurate supplying of the aircraft for each mission, and establishes procedures for checking and replenishing these items. The Flight Nurse's Kit is the nurse's responsibility; there are narcotics in it that are signed for by the nurse. At RON stops, the nurse is responsible for its safekeeping. The aeromedical evacuation technician is responsible for routine equipment and must check it before each flight. Typical items carried are:

a. Blanket sets. Quantity varies according to location and weather.

b. Therapeutic oxygen kits. Quantity varies according to demand.

c. Suction apparatus. This should be checked before each flight.

d. AMBU resuscitator.

e. Litters, 4 to 6. These may be necessary for walking patients who have to lie down.

f. Litter mattresses (for above).

g. Bassinette. It should be carried folded. It is used for both well and ill infants to make the trip more comfortable for both the baby and his attendant.

h. Pillow kit.

i. Medical supplies. Each unit will provide a list of items currently required.

7-6. Special Equipment. This is equipment taken only when requested or when its use is anticipated. Examples of such are the Stryker frame, Collins traction, incubator, and OB pack. The aeromedical evacuation technician must insure that all equipment needed on a flight is aboard and functioning.

SECTION C—SPECIAL MEDICAL EQUIPMENT

This section describes and illustrates the proper use, operation, and maintenance of medical equipment employed in the aeromedical evacuation system. Information contained in this section, that is related in any manner to the product of a manufacturer, is included only as an aid to the effective functioning of the aeromedical evacuation technician. It does not indicate an indorsement of the product described. It is essential that the technician know this equipment, how it operates, and how to perform simple inflight maintenance on it. A patient's life may depend on such knowledge.

7-7. Ambu Resuscitator. The AMBU resuscitator shown in figure 7-2 is used to provide air immediately to patients when spontaneous breathing stops and to assist other patients with respiratory difficulty.

a. **Operation:**

(1) Tilt head back, and lift jaw forward.

(2) Apply mask firmly to face, with narrow end on bridge of nose.

(3) Hold mask firmly against face with thumb and index finger keeping chin and head back with other three fingers.

(4) Inflate lungs by squeezing bag with other hand; watch chest rise.

(5) Release bag and let patient exhale. Bag will refill for next inflation. (Repeat every 3 seconds—1 second for inhalation and 2 seconds for exhalation.)

b. **General Information:**

(1) The maximum pressure obtainable from squeezing the AMBU bag is sufficient to overcome obstruction in the airway without causing damage to the lungs.

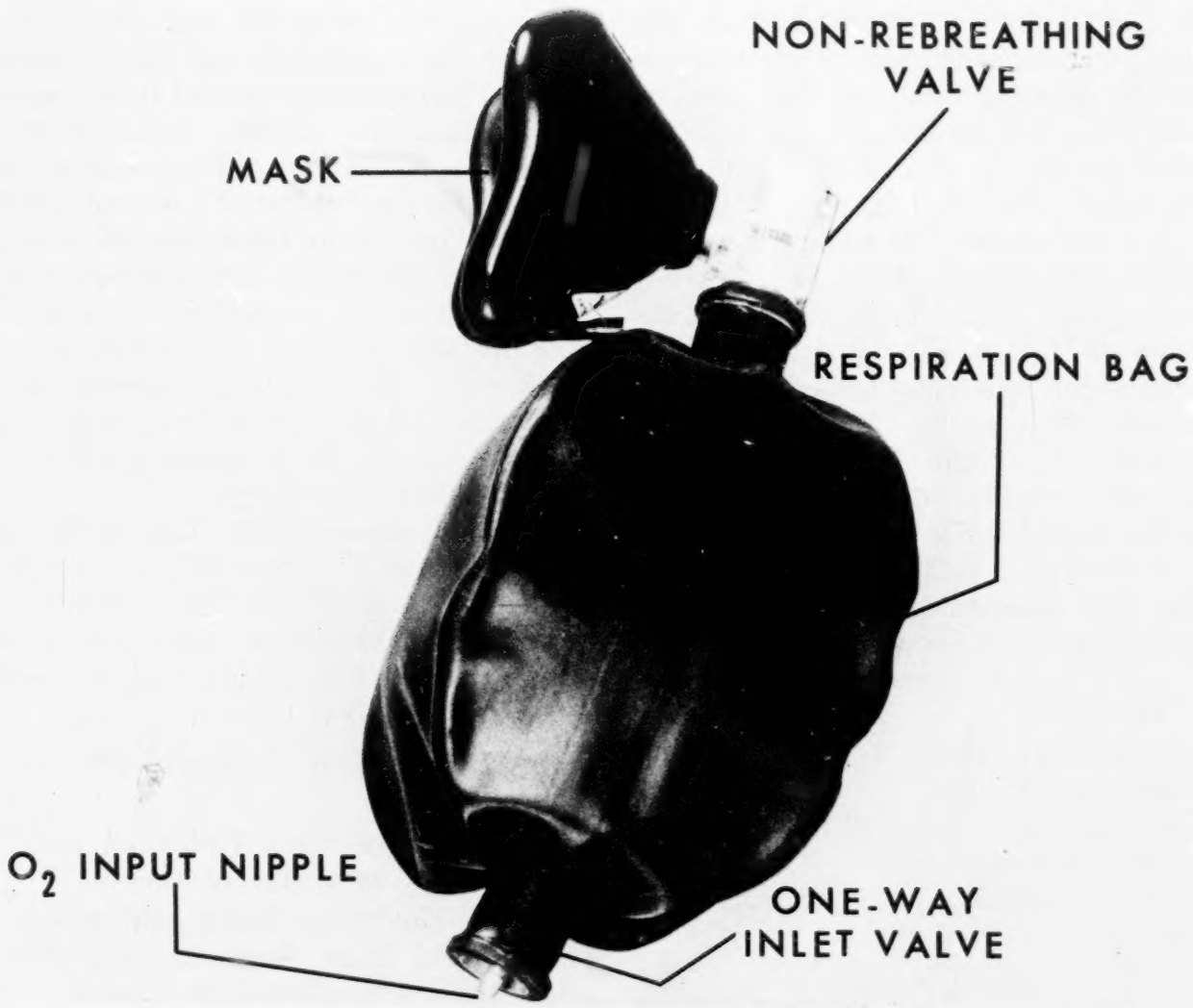


Figure 7-2. AMBU Resuscitator.

(2) Supplemental oxygen can be supplied through an O_2 input nipple located on the bottom of the bag.

c. **Cleaning Instructions:**

(1) Clean face mask with cloth dampened with alcohol or other chemical germicidal that will not damage rubber.

(2) Submerge nonrebreathing valve in chemical germicidal that will not damage Lexan. Valve may be autoclaved, if desired. Do not disassemble valve. After cleaning, dry valve by installing in AMBU bag and operating for a few minutes.

7-8. Ambu Suction Pump. The AMBU suction pump, shown in figure 7-3, serves three main purposes. First, it is used to provide an instant method of cleaning the mouth and throat of blood, mucus, vomitus, and other liquids. Second, it is used to clear airways on unconscious persons, enabling proper resuscitation or ventilation. And last, it may be used with a suction catheter and "Y" tube to maintain a clear airway on patients requiring suction (including tracheostomized persons).

a. **Operation.** Insert the catheter in nose or mouth of patient and pump bellows with foot, depressing the bellows 1/3 to 1/2 way down, using a constant rhythm. The pressure is controlled by covering the open end of the tubing with the thumb (completely covered for full pressure; partially covered for partial pressure, as in case of an infant). Continue as long as suction is needed.

b. **General Information:**

(1) The mechanical AMBU foot pump may be used immediately until electrical suction can be employed. Also, it is used as an emergency backup for electrical suction devices.

(2) Pumping the bellows creates sufficient suction to remove obstructing fluids.

(3) If trap jar should overflow, it is not necessary to discontinue operation since the aspirated liquid will enter the bellows and will automatically be emptied from the bellows with the next compression.

(4) The extra ball valve on the rubber trap jar serves as a spare in case the other becomes clogged.

c. **Cleaning Instructions:**

(1) Dispose of catheter and wash "Y" tube, metal tip, and trap jar in soap and water or a disinfecting solution.

(2) Since all flow is away from the patient, the rest of the pump need not be sterile. However, clean water may be drawn through the pump to wash it. If aspirated fluid has been drawn through the bellows, keep pumping until the clean water has thoroughly flushed out the bellows.

7-9. Armstrong Incubator. The Armstrong incubator, shown in figure 7-4, is used to provide oxygen, humidity, and heat to an infant.

a. **General Operating Instructions:**

(1) Install a 30-volt light bulb for 24- to 28-volt D.C. (aircraft or battery operation), or a 110-volt light bulb for 110-volt A.C. (household) operation.

(a) Disconnect cord from power supply.

(b) Remove front panel.

(c) Remove porcelain receptacle.

(d) Replace bulb according to aircraft current requirements.

(2) Put wet sponges and ABD pads in water reservoir to provide proper humidity. Avoid using water to eliminate the possibility of water spilling and burning baby in severe turbulence.

(3) Connect service cord plug to power supply. (If the power is on and properly connected, the green pilot light will illuminate.)

(4) To warm the incubator *before* placing the infant in it:

(a) Set red control dial at START. (The red light will now illuminate unless the room temperature is higher than the con-

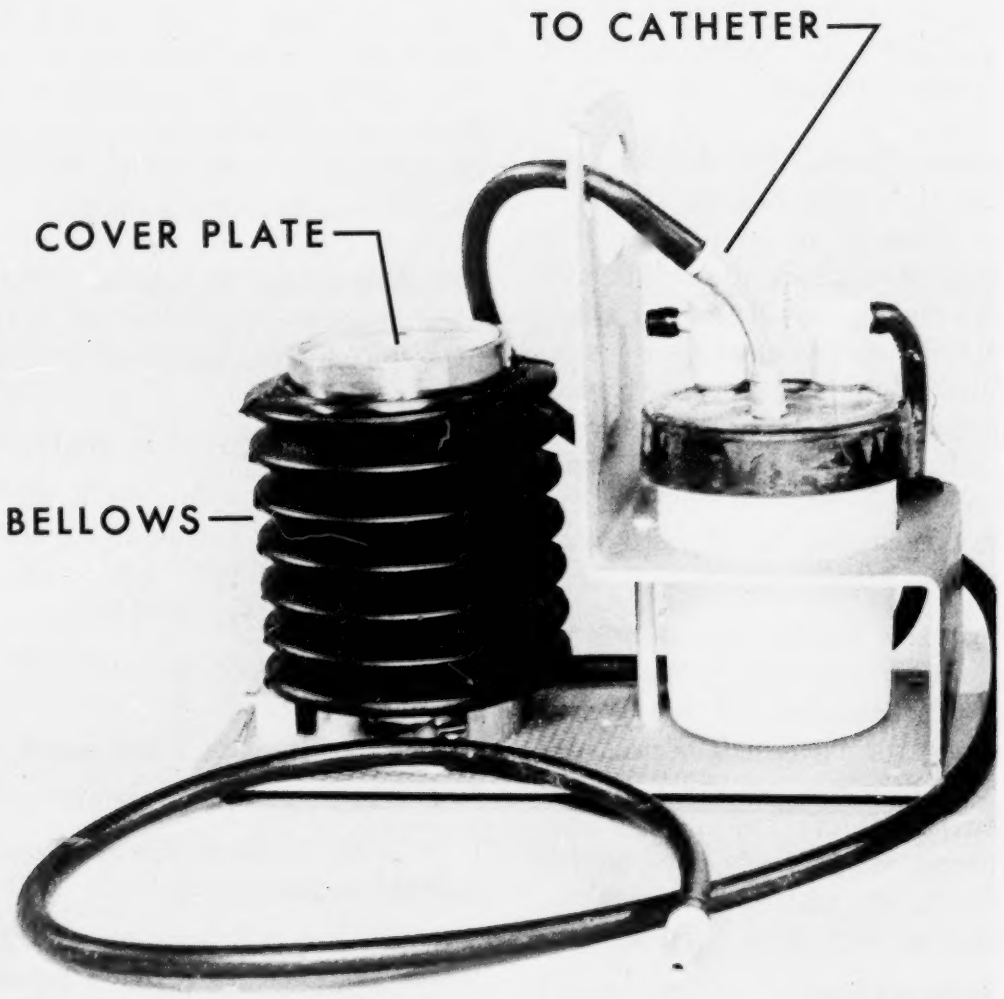
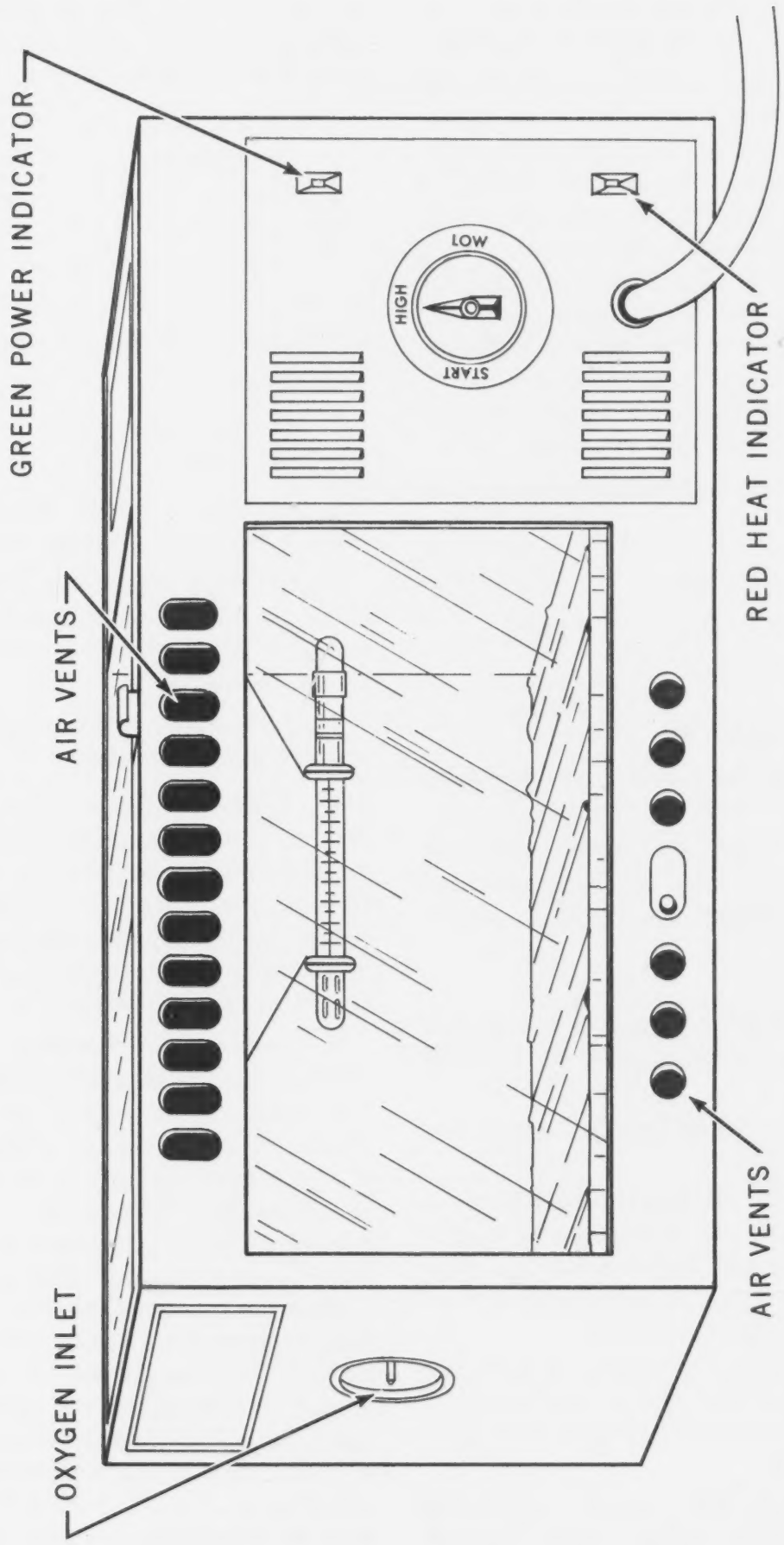


Figure 7-3. AMBU Suction Pump.


GREEN POWER INDICATOR
AIR VENTS
OXYGEN INLET
LOW
HIGH
START
RED HEAT INDICATOR
AIR VENTS

trol dial setting. If the red light doesn't illuminate at start, turn red control dial counterclockwise until the red light illuminates.)

(b) Close all ventilators and top lid of incubator. Watch dry bulb thermometer, and when it reaches approximately 5°F. higher than desired temperature, turn red control dial clockwise until light goes out; then, turn back (counterclockwise) slowly until the red light illuminates again. This will set the automatic thermoswitch and cause the incubator to hold desired temperature. Unless there is a decided change in room temperature, the inside temperature of the incubator will remain constant.

(5) Adjust top and bottom ventilator as follows:

Operation	*Top Vent*	*Bottom Vent*
Normal (85° to 92°F.)	Open full	1/4 open
Low temp. (80° to 85°F.)	Open full	3/4 open to full open
With oxygen	Closed	Closed

Note: The 5°F. that the incubator was overheated will be lost when ventilators are adjusted.

b. **Humidity.** With the water reservoir placed over heater and the top ventilator fully opened, humidity will be produced automatically.

c. **Oxygen:**

(1) For continuous cyanosis or repeated cyanotic attacks, use continually for 12 to 24 hours.

(2) Pipe in oxygen through oxygen inlet (see figure 7-4).

(3) Use 6 to 10 liters, depending on infant's condition. To check exact oxygen concentration use an oxygen analyzer. Four liters per minute will give a concentration of 55 to 60 percent in 20 minutes.

(4) Inside of the incubator, a diffusing shield is connected with the oxygen nipple to control the direction of the oxygen flow. This can be easily turned.

(5) The top and bottom ventilators must be closed when using oxygen for high concentration.

d. **Temperatures.** Avoid overheating baby. Try initial incubator temperature (dry bulb reading) as listed below together with recommended rectal temperature.

Infant's Rectal Temperature	*Incubator Temperature*
Below 96.5°	90°
96.5° to 97.5°	85°
97.5° or above	80°

If the infant's temperature persists below 96.5°, increase incubator temperature slowly.

e. **Cleaning:**

(1) Disconnect cord from socket. Coil and stow away.

(2) Empty water reservoir. Allow at least 1 hour for heating unit to cool.

(3) Wash and clean inside and outside of incubator including mattress with a mild solution of soapy, warm water or an appropriate disinfectant.

(4) Leave incubator cover open and allow to air dry thoroughly.

7-10. Artificial Nose. The artificial nose (figure 7-5) is an advanced type of heat-and-moisture exchanger, heating and fully humidifying the inspiratory air or gas. It filters coarse airborne contaminants from the inspired air, and is useful in the care of the tracheostomized patient.

a. **General Information.** Manually, the artificial nose takes 20 minutes to attain its full humidifying effect. Several drops of sterile distilled water or saline may be added to the patient side of the condenser (insert) if the elbow or tubing shows no evidence of moisture. (Some physicians prefer to add the fluid to the trachea instead of to the device.) Unless the tracheostomy is a very recent one, technique need be "clean" rather than "sterile." If oxygen is to be administered, it should be humidified and introduced into the open end of the artificial nose. If thick secretions collect, the condenser body and its adapters should be rinsed in sterile saline and the condenser element changed. A new condenser element should be used after 6 to

8 hours. Used inserts should be discarded. The artificial nose should not be used:

(1) When physicians advise against such devices.

(2) Where respirators and humidifying attachments are already in use.

(3) Where secretions are copious and relatively liquid, and where use of the nose will prove to be an obstruction and/or nuisance to frequent suction requirements.

(4) Whenever there is possibility of obstruction (by caked secretions in the condenser element).

b. **Principle of Operation:**

(1) In the expiratory phase, the patient's expired air, which is fully saturated at body temperature, enters the artificial nose. Here the water vapor is condensed and the heat is stored.

(2) In the inspiratory phase, fresh gas from the atmosphere enters the artificial nose at ambient temperature and relatively dry. When passing across the larger surface area of the condenser element, it is humidified by the previously condensed water, heated to body temperature, and purified, reaching the patient's airway in that condition.

c. **Assembly, Application, and Removal:**

(1) A complete unit nose assembly will consist of one body, three condenser elements (one for use and two for exhange purposes in flight), connecting tubing, elbow, and tracheal adapters. The artificial nose will be assembled into a single, continuous unit.

(2) To apply the unit to the patient, gently connect it to the inner cannula using the correct size tracheal adapter. (After application, it should appear as shown in figure 7-6.)

d. **Cleaning Instructions.** The elbow tubing and tracheal adapter should be cold sterilized only. The body may be boiled, autoclaved, or gas or chemically sterilized.

7-11. Bird Respirator (Mark 7, Mark 8, and Mark 10). The Bird respirator is a mechanical device used to adequately ventilate the lungs whenever distressed breathing requires mechanical help. It is also used for intermittent positive pressure breathing (IPPB) treatments.

Note: The structure and operation of the Mark 7 is presented to provide better understanding of the Bird respirators. The other respirators (Mark 8 and Mark 10) were built from the Mark 7 and differ mainly in additional attachments, the incorporation of negative pressure in the Mark 8, and the automatic flow accelerator in the Mark 10.

a. **Mark 7.** The Mark 7 respirator weighs 6 pounds and measures 5 inches X 5 inches X 8 inches. The respirator is operated by connecting its swivel inlet assembly directly to a regulator preset at 50 p.s.i for cylinder oxygen or compressed air.

(1) *Preparation for Use:*

(a) Connect the inlet assembly of the respirator to the gas supply. Insure that the various components are correctly and tightly assembled.

(b) Pull air-mix valve out and lock.

(c) Turn expiratory time control off.

(d) Set pressure control selector at 15. (Right side of respirator.)

(e) Set sensitivity control selector at 15. (Left side of respirator.)

(f) Set inspiratory flow-rate control to match pressure. (With the air-mix valve in to give 100 percent oxygen concentration, flow-rate must be increased.)

(g) Fill the 5 cc. nebulizer (shown in the breathing assembly) with either isotonic saline or tap water. If using for IPPB, a bronchodilator or mucolytic solution may be used. The nebulizer should never be dry.

(h) Apply breathing head assembly to patient, selecting the appropriate connections. Figure 7-7 shows an adult breathing circle for tracheotomy patients.

(i) If respiratory effort is absent or weak, use expiratory time control. Turn knob counterclockwise until desired respiratory rate is reached.

(j) Adjust controls for optional ventilation.

(2) *General Information:*

(a) The sensitivity selector on the left side of the respirator determines the amount of effort that will be required by the

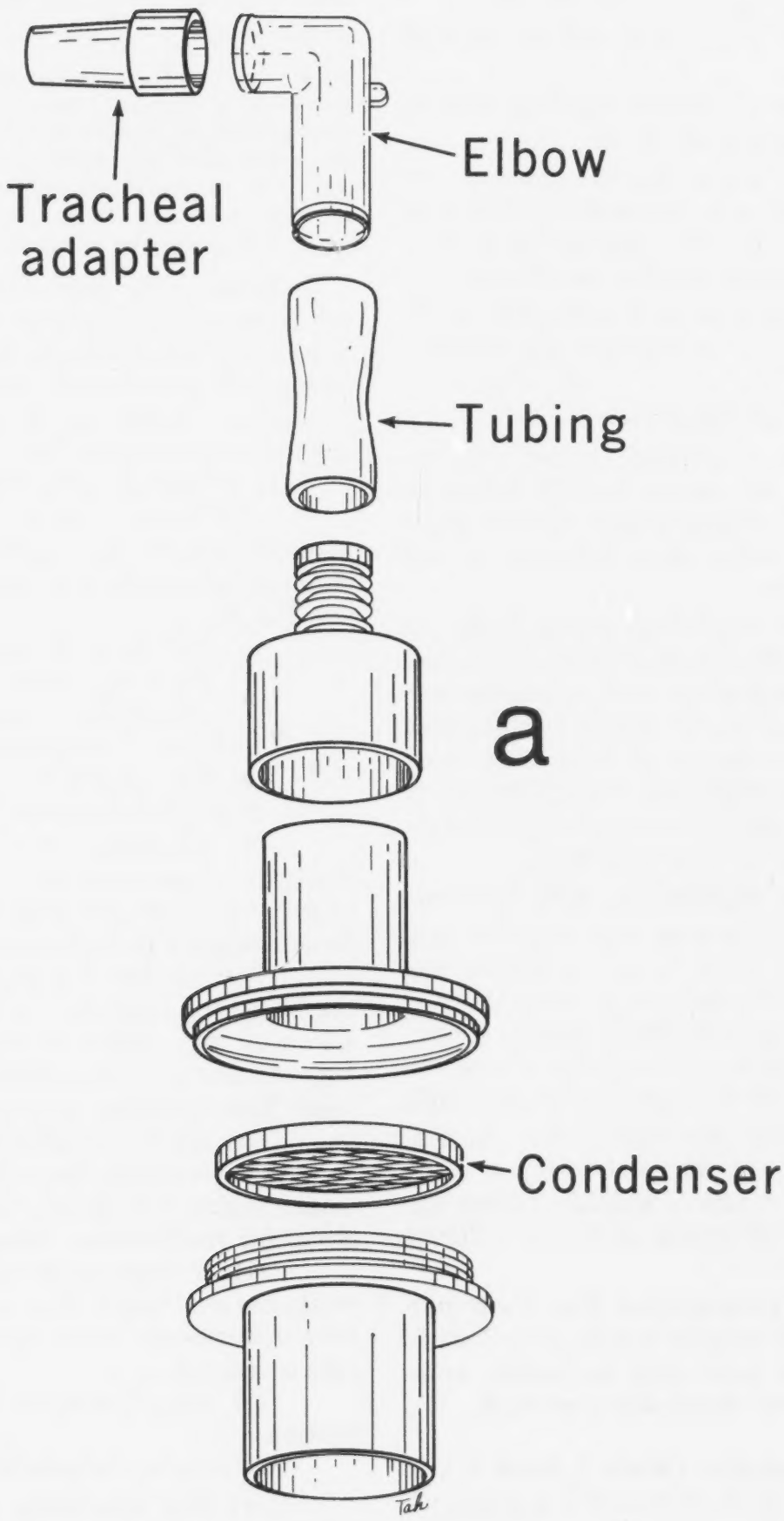


Figure 7-5. Artificial Nose.

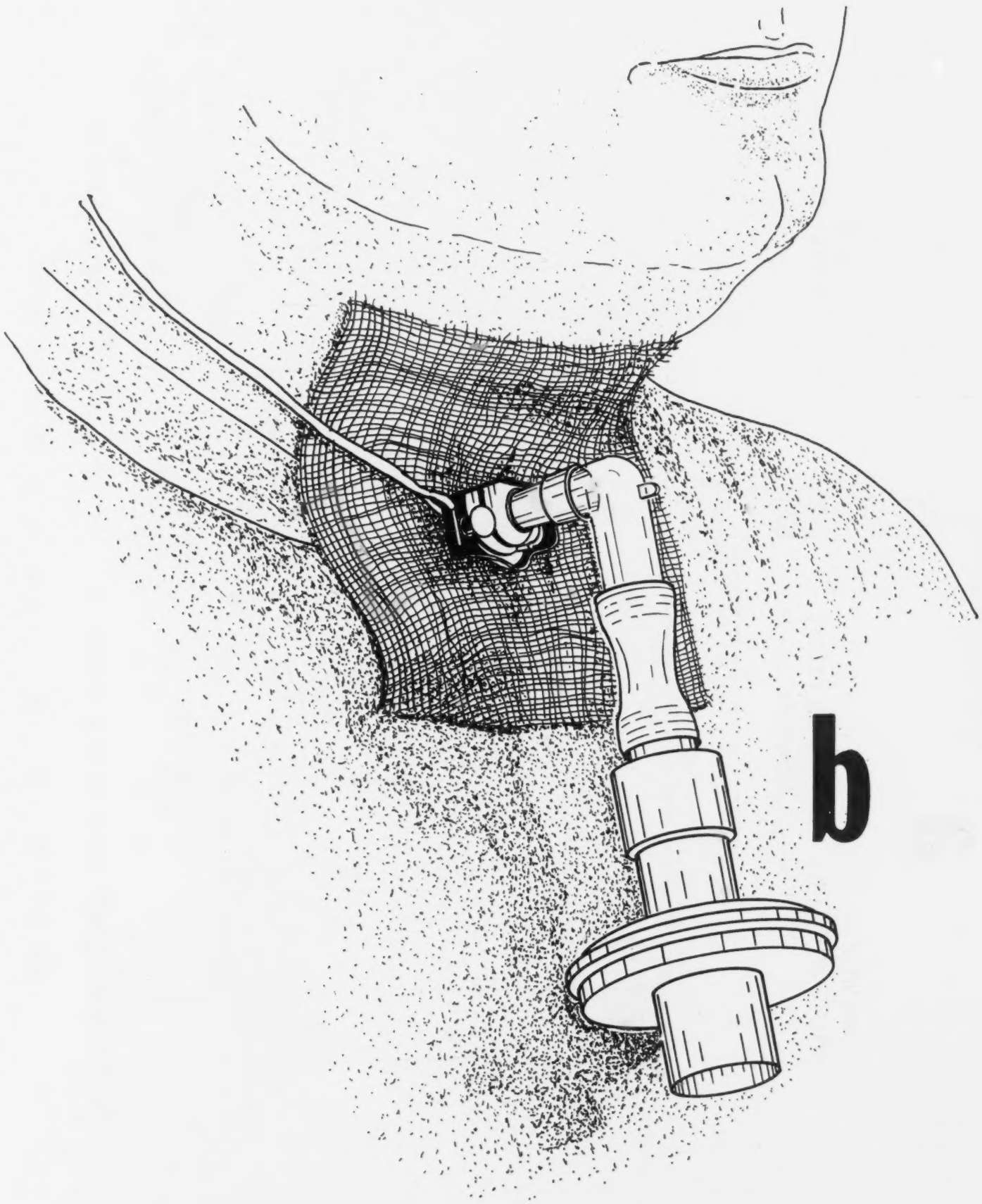
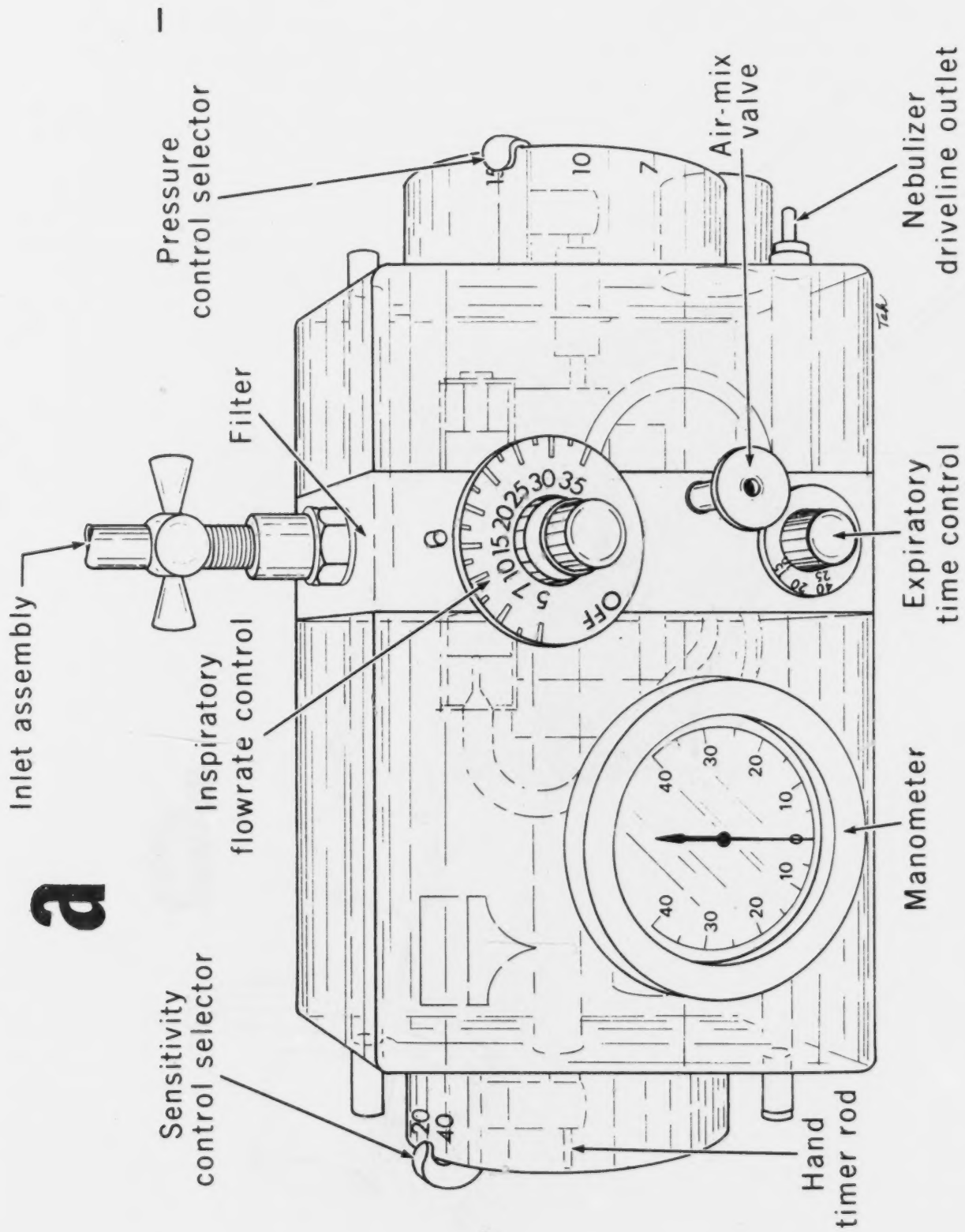


Figure 7-5. Artificial Nose. (Continued.)



NOTE: Manometer measures pressure and vacuum in centimeters of water.

Figure 7-6. Bird Mark 7 Medical Respirator and Breathing Assembly.

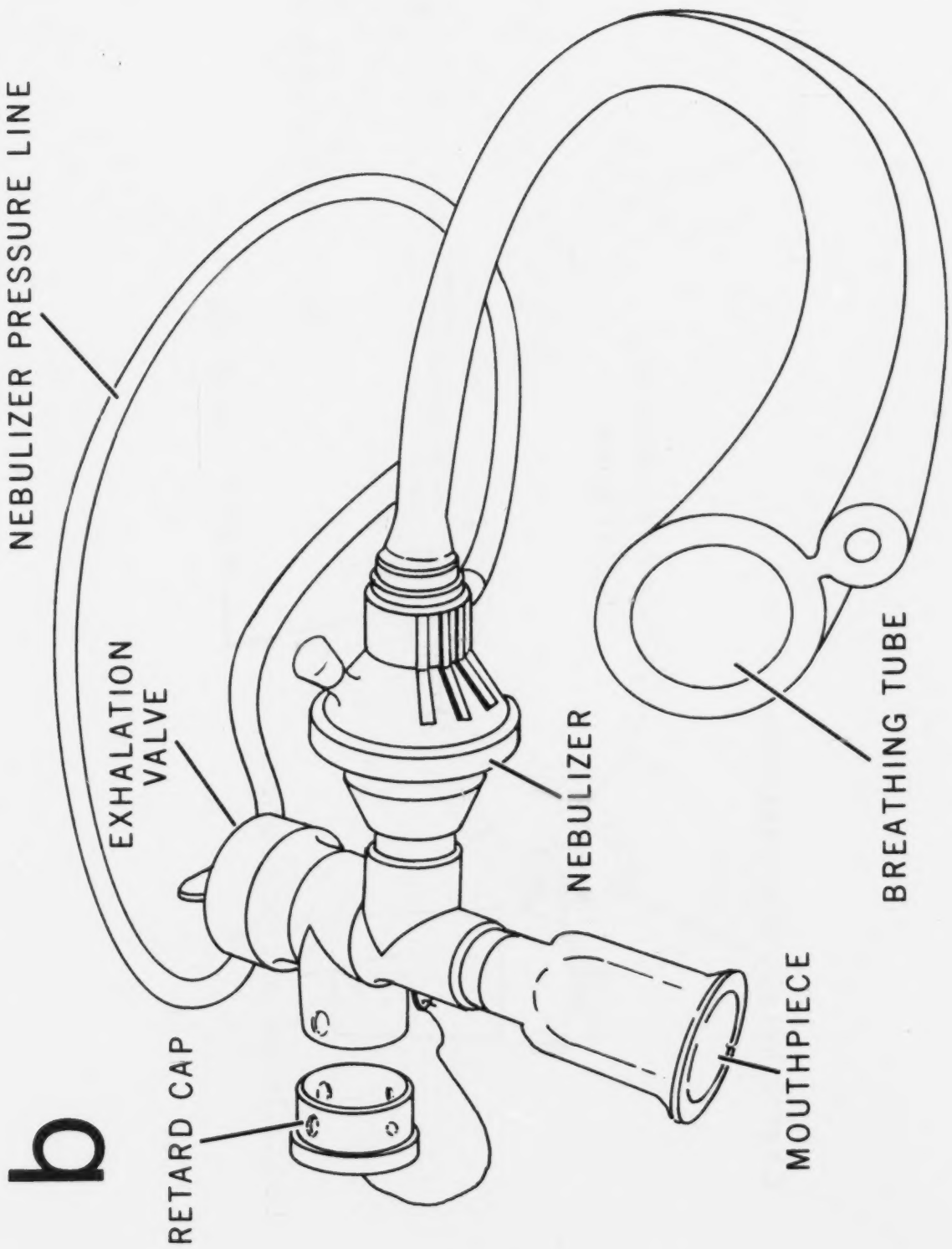


Figure 7-6. Bird Mark 7 Medical Respirator and Breathing Assembly. (Continued)

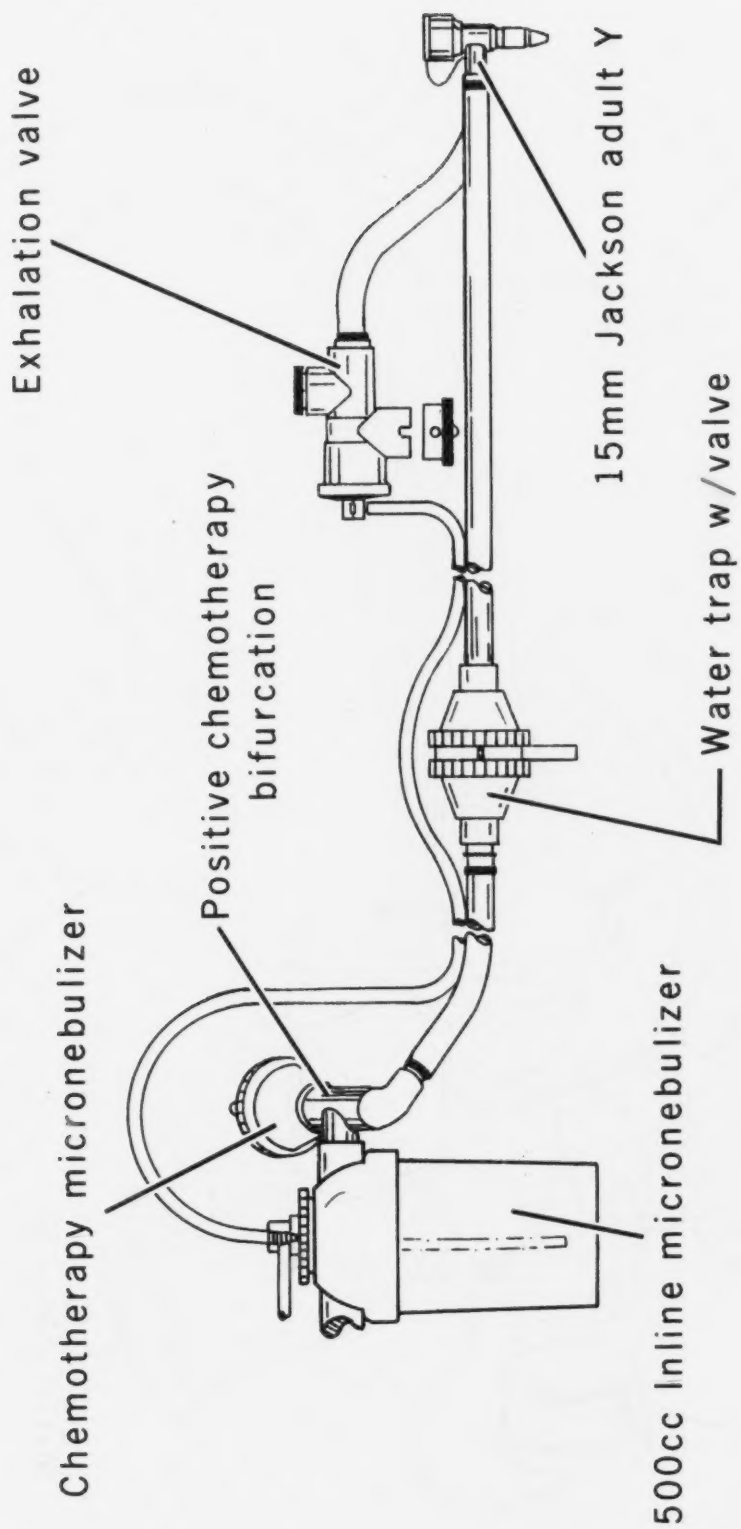


Figure 7-7. Adult Breathing Circle for Tracheotomy Patients.

patient to start the respirator. (The lower the number, the easier to start—the higher the number, the harder to start.) When set on 15, it should take 2 cm. of negative pressure (registered on water pressure gauge on right front of respirator) to trigger respirator.

(b) The pressure selector on the light side of the respirator regulates the amount of pressure that is delivered to the proximal airway—the higher the setting, the higher the pressure delivered. A setting of 15 should result in a reading of 15 cm. of water pressure on the manometer.

(c) Flow rate is not liter flow; it adjusts the inspiratory time and turns the respirator from off to on. The flow-rate control regulates how fast or how slow the oxygen flows into the lungs; the higher the setting, the faster the oxygen flows. The same amount of pressure is delivered at the proximal airway regardless of the flow-rate setting. The tidal volume of the patient will be determined by the balance of the pressure setting and flow-rate setting. Reducing flow-rate to lower numbers increases tidal volumes and allows for deeper inspirations.

(d) Expiratory time control regulates the time from the peak of inhalation to the start of the next inhalation and is used for apneic patients. The more the control is open, the faster the respiratory rate of the patient. Expiratory time should be longer than inspiratory time.

(e) To fill the 5 cc. nebulizer, remove it from the breathing hose and fill to line; solution will last approximately 15 to 20 minutes. For continuous nebulization when only the small nebulizer is available, insert a #27 gauge needle through red IV stopper of the nebulizer (figure 7–7) and connect to solution as for an IV set up. A better method of nebulization for long periods of time is by use of the 500 cc. Bird inline nebulizer shown in figure 7–8. It should not be filled with more than 300 cc., because in severe turbulence it will fall back into the machine. Medication for IPPB treatment is not to be put in this nebulizer. Distilled water should be used if possible to prevent plugging the nebulizer capillary from impurities of tap water.

(f) Figure 7–9 is a closeup of the metal Bird carrier and figure 7–9 shows the carrier in place with a Mark 7 respirator. The fittings are all standard oxygen fittings. The oxygen tanks are D-size, 95 gallon and are used solely during transportation of the patient from the medical facility to the aircraft. Once on the aircraft the power needed to operate the respirator will be supplied by the oxygen source in use for medical equipment on that particular aircraft. When the system is incorporated into the aircraft oxygen source, both the D-tanks must be turned off by use of the standard oxygen wrench attached to the carrier. The fittings to turn the D-tanks on and off are at the end of the tanks. Securing screws are used to hold the tanks in place and secure them to the regulator, which is adapted for use with high or low pressure oxygen. The drive line as it comes off the regulator to the machine delivers 50 p.s.i. of oxygen. The pressure release valve seal ruptures automatically if pressure should ever reach 3,000 p.s.i.

(3) *Checking Respirator Prior to Use.* When completely assembled and all settings are made, push hand timer rod (on left side of respirator) in to start the respirator. If the respirator fails to work, you should check the following:

(a) Gas supply and gauge.

(b) Filter on top of respirator, under inlet assembly.

(c) Nebulizer for leaks. NOTE: The inlet stem must point straight down and you should remove capillary and force air through small opening or jet.

(d) Non–rebreathing valve. (See figure 7–10.)

b. **Mark 8.** The Mark 8 is the same size and embodies all features of the Mark 7. The Mark 8 can be identified by the red center body which divides the two green compartments. The Mark 8 differs from the Mark 7 by the incorporation of a venturi capable of producing negative pressure in the breathing head assembly. The Mark 8 also

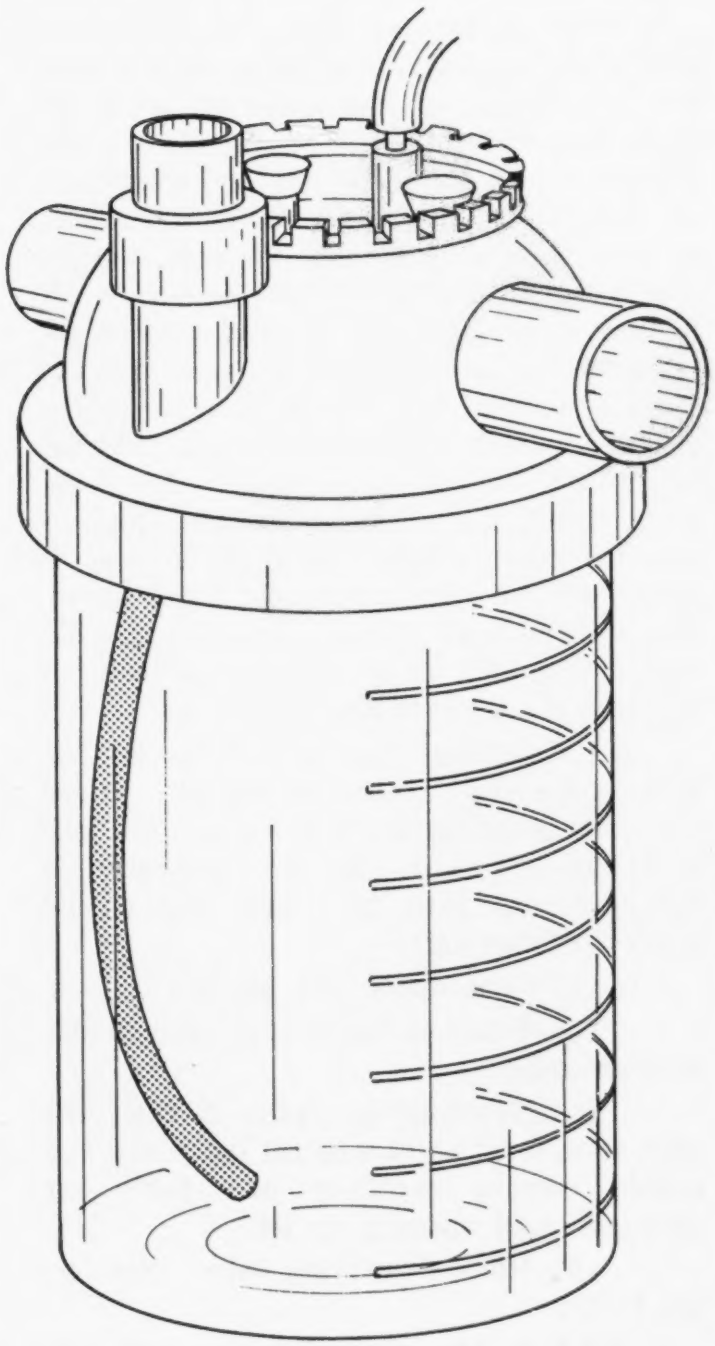


Figure 7-8. 500 cc. Inline Nebulizer.

has two additional controls; a negative pressure generator control (located on top of the respirator behind the inlet assembly), and a negative pressure selector and scale (also acts as the sensitivity selector when used as a Mark 7).

(1) *Preparation for Use.* Prepare the Mark 8 as you would the Mark 7 when negative pressure is not to be used. (Make sure negative pressure generator is off.) Follow the color codes when connecting the breathing, negative pressure, and nebulizer drive line tubes.

(2) *Preparation for Negative Pressure.* Figure 7-11 shows the breathing head assembly for negative pressure. Never use such pressure without specific instructions from a qualified physician. Follow the Mark 7 instructions, initiating positive phase, before incorporating the negative pressure, and then proceed as follows:

(a) Hold manual control (hand timer rod) out, temporarily, to restrain positive phase.

(b) Turn negative pressure generator on until manometer shows -3 cm. of water pressure in pink sector.

(c) Rotate sensitivity selector (left side of respirator) forward into the negative scale on the sensitivity ring until inspiratory effort is greater than -3 cm. of water pressure as recorded on the manometer (pink sector). *CAUTION:* High negative values could lead to bronchiolar collapse.

(d) Release manual control (hand timer rod).

(e) Adjust controls for optional ventilation.

Note: If respirators cycles prematurely or seemingly without reason (after releasing manual control), continue to advance indicator into negative scale until unwanted cycles are suppressed as in step (c). When negative pressure selector is on 3 in negative scale, a properly calibrated respirator should produce 15 cm. positive water pressure and -3 cm. of negative water pressure.

c. **Mark 10.** The Mark 10 is of the same size and weight as the Mark 7 and Mark 8. They can be identified by the yellow or gold center body that separates the two compart-

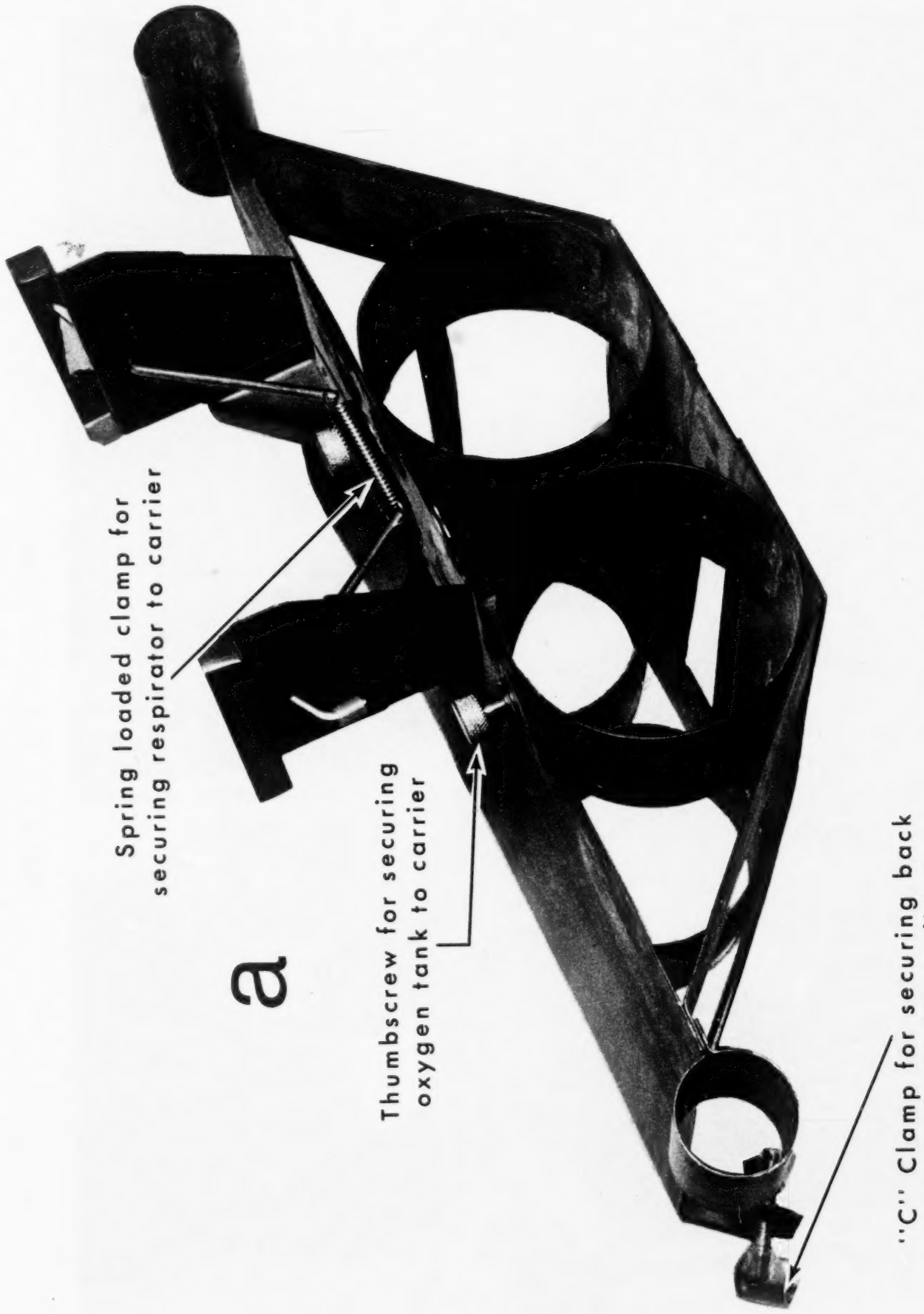


Figure 7-9. Bird Carrier.

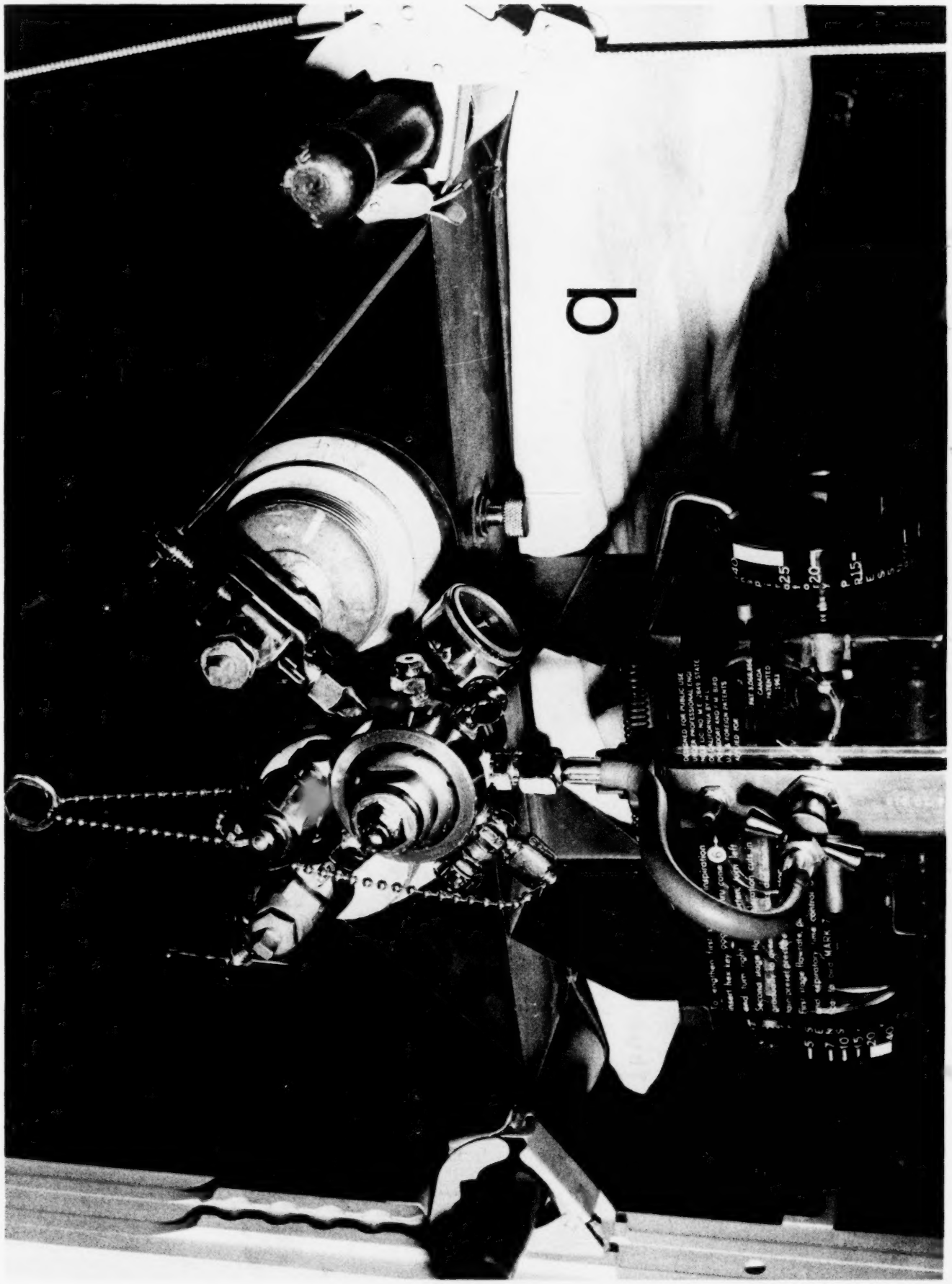


Figure 7-9. Bird Carrier. (Continued.)

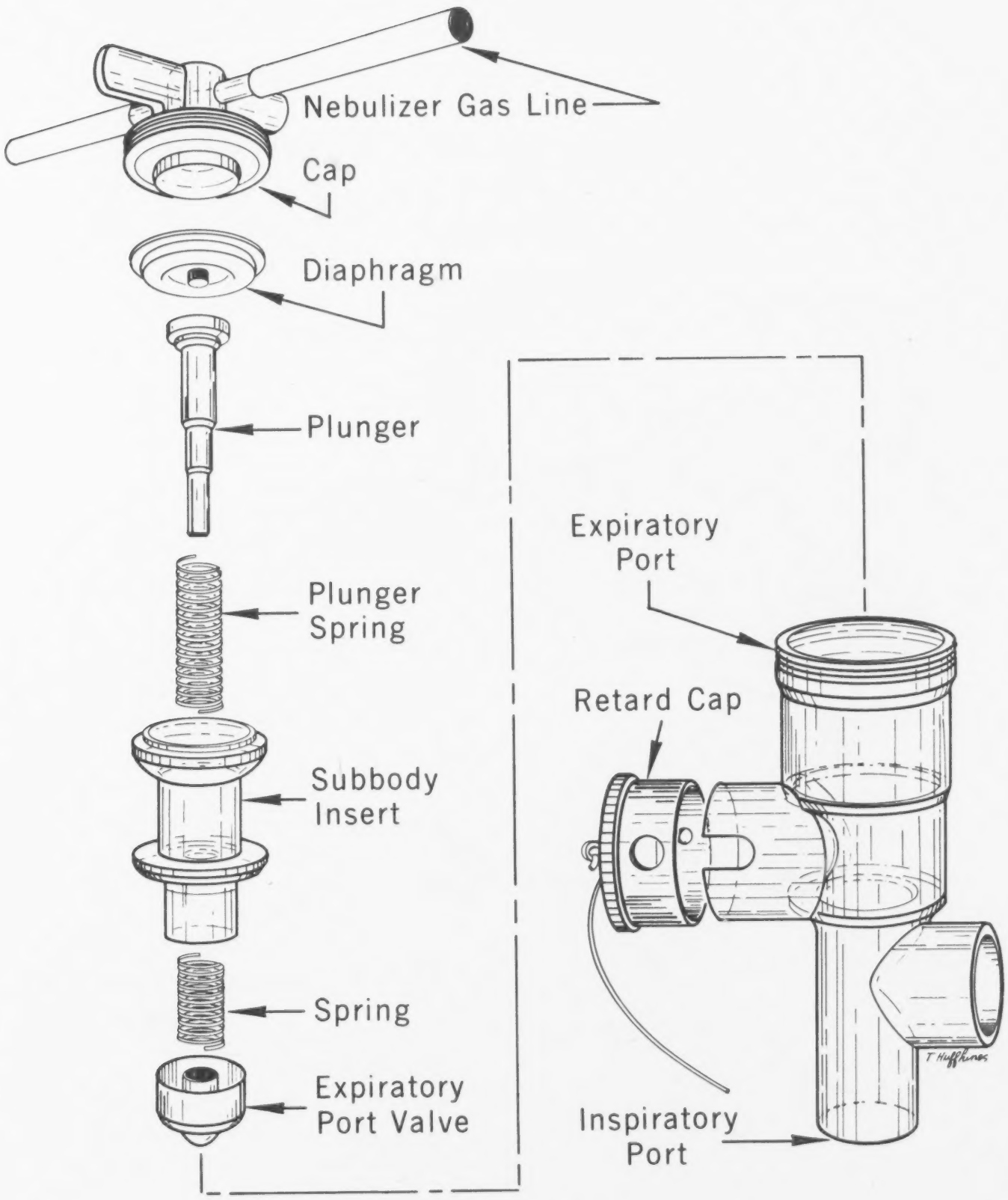


Figure 7-10. Non-Rebreathing Valve.

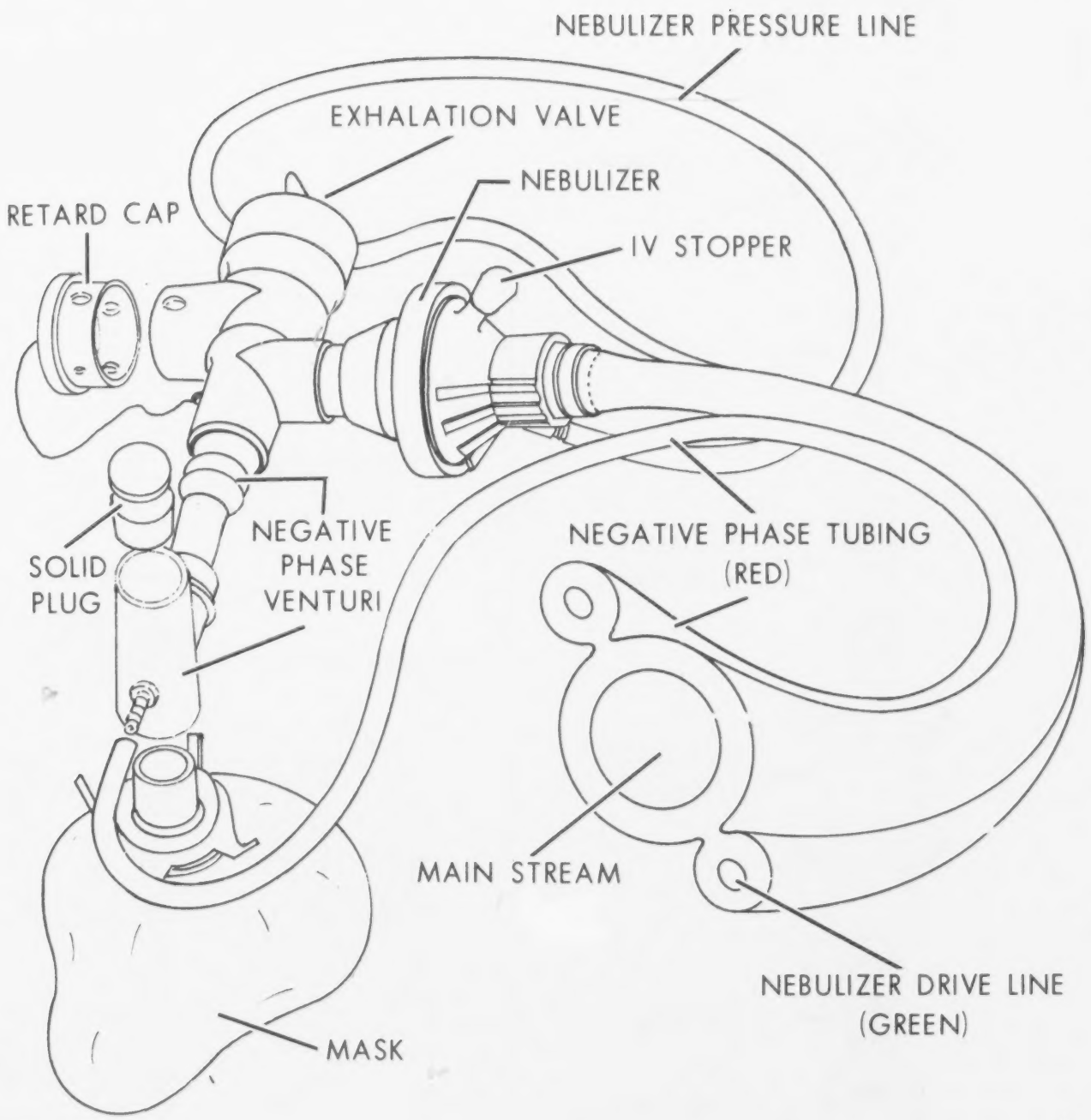


Figure 7-11. Breathing Head Assembly.

ments. The breathing tubes and head assemblies are interchangeable and the general configuration of the Mark 10 and that of the Mark 7 (figure 7-6) are comparable. The Mark 10 has a built-in automatic flow accelerator which enters the cycle after a predetermined time lapse (usually 4 seconds) which is designed to compensate for leaks. The time "lapse period" can be adjusted by inserting an Allen wrench into the opening on top of the respirator behind the inlet swivel assembly.

(1) *Preparation for Use.* Instructions of the Mark 7 respirator apply with the exception of the air-mix control, which is not present on the Mark 10. The air-mix is permanently slaved to deliver a mixture of ambient air and oxygen (if oxygen is the source of power for the respirator) in a percentage of 40 to 70 percent oxygen. One hundred percent oxygen cannot be given with the Mark 10, but by directing oxygen over the ambient air filter, it is possible to deliver nearly that amount.

(2) *Special Advantages.* Nuisance leaks around masks and tracheal cuffs can be overcome by a corresponding increase in flow-rate on all Bird respirators. The Mark 10 compensates for leaks of significant magnitude by the automatic flow acceleration which enters the cycle after a predetermined time lapse. When the pressure is reached before this lapse is completed, the flow accelerator is not influenced and does not come into operation but remains in readiness should a leak occur. The accelerated flow serves in two ways: First, the increased flow ventilates the patient; secondly, the audible increased flow serves to alert attending personnel.

d. **Care of Respirators After Use.** Wash all parts with soapy water and rinse. Use sterilizing solutions that are not harmful to plastic. After cleaning, store parts in plastic bag for future use. Be sure to have the respirator checked for proper calibration after each use.

e. **Other Facts to Remember.** The expiratory flow-rate can be retarded by using a cap with multi-holes over the exhaust port of the breathing head. (See figure 7-6.) This should never be used without a doctor's order. It is sometimes used to prevent bronchiolar collapse and to impede venous return to lungs (such as in congestive heart failure). You can accelerate expirators by using negative pressure (as with Mark 8). However, you should never use negative pressure except under supervision of a doctor. Negative pressure is used to increase pulmonary circulation (during shock) and in diseases where patients have difficulty forcing gases from lungs. You should also note that the respirator has a safety valve in case the gas supply fails. This allows room air to enter the system.

7-12. Carmody Aspirator (Figure 7-12):

a. **Purpose.** Portable apparatus designed to provide suction.

b. **Extra Equipment Needed:**

(1) Disposable suction catheters.

(a) Size 8 or 10 for children.

(b) Sizes 12 to 16 for adults.

(2) "Y" connecting tube.

(3) Extension cord with cannon plug female twist lock plug.

(4) Two 12-volt batteries in series for 24 volts (when battery operation is anticipated).

c. **Operation on Battery:**

(1) Connect plug on aspirator to battery.

(2) Turn off-on switch to "ON."

(3) Adjust amount of suction desired by turning vacuum control screw on side of glass bottle clockwise to increase and counterclockwise to decrease.

(4) Check amount of suction by dipping catheter in water and suctioning.

(5) Suction catheter is attached to bottle tubing with a "Y" connector to control suction.

Catheter should be inserted into trachea with "Y" tube open.

(7) For suction, close open end of "Y" connector with thumb. When open, no suction is produced.

d. **Operation on Aircraft Current:**

(1) Connect plug on aspirator to extension cord with common plug.

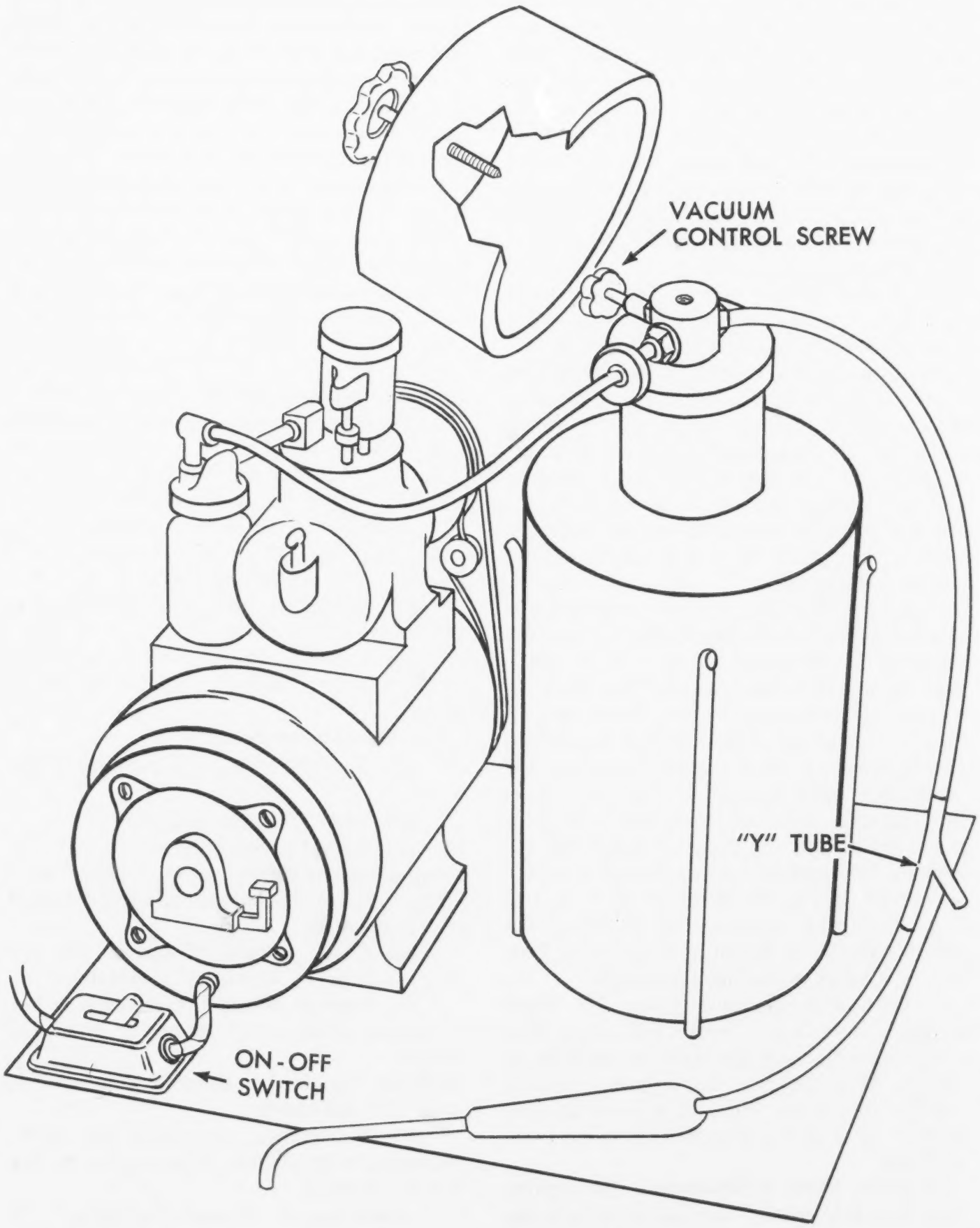


Figure 7-12. Carmody Aspirator.

(2) Connect cannon plug to aircraft electrical outlet.

(3) Remainder of operation is the same as paragraph c above, Operation on Battery.

e. **Cleaning.**

(1) Wash out glass bottle and tubing with mild solution of soap and water.

(2) Rinse well.

(3) Wash out glass bottle and tubing with an accepted disinfectant solution.

f. **Other Aspirators.** Other brands of aspirators are being introduced into the system. The operation and cleaning is basically the same as listed for the Carmody. Proper cleaning is essential to insure effective operation of any suction apparatus.

7-13. Traction Appliance, Scale Type, for Stryker Frame (Figures 7-13 and 7-14):

a. **Purpose.** A system devised for applying traction to the body while in transit; applied to a head halter, crutch field tongs, vinchi tongs, or buck's extension.

b. **Equipment:**

(1) Pulley assembly.

(2) Spring scale.

(3) The retaining adapter.

(4) Two elastic cords (Bungee).

(5) Cross bar.

c. **Installation and Operation.** The traction appliance can be used on a Stryker frame or Foster bed. Traction may be applied to the spinal column or lower extremities. Proceed as follows:

(1) Detach removable clevis from end of cable on pulley assembly and pass the cable through the orifice in the hub of the Stryker frame.

(2) Reattach the clevis to the ball on the cable and secure the clevis to the patient.

(3) The fitting housing the cable to the upper end of the pulley assembly is inserted into the hub of the Stryker frame and the assembly is secured to the diagonal portion of the runner by means of the "J" hook. (For application to Foster beds, attach the crossbar channel adapter to the bedstead approximately 6 inches from the top and secure the pulley assembly to the crossbar using the "J" hook.)

(4) Position the retaining adapter on the horizontal portion of the runner of the Stryker frame or frame of Stryker cart, when used, at approximately 4 feet from the pulley assembly and fasten loosely with the "J" hooks (on Foster beds, fasten the retaining adapter to the longitudinal rail). If 1 to 30 pounds of traction is desired, use one loop of elastic cord. Hook one doglead snap to the ring on the pulley assembly and the other to the ring at the top of the scale.

(5) Grasp the hand grip at the bottom of the scale and stretch the elastic cord, extending the scale toward the retaining adapter until the desired number of pounds of traction is reflected on the scale. At this point, slide the retaining adapter along the runner until the center notch is aligned with the ring at the bottom of the scale. Firmly secure the retaining adapter at this position and insert the ring into the appropriate slot on the adapter. If more than 30 pounds of traction is desired, use two loops of elastic cord. *CAUTION:* Be certain to reverse above procedure when removing traction from the patient.

d. **Maintenance.** All components and hardware used on the traction appliance are corrosion resistant. No maintenance should be required for this item other than occasional cleaning with a mild detergent.

7-14. Collins Traction—Litter (Figures 7-15 and 7-16):

a. **Purpose.** To provide a quick, simple means of applying traction to litter patients in an emergency situation.

b. **Uses:**

(1) Will replace weights when transporting patients.

(2) Device may be secured to a head halter.

(3) Can be used for traction for ankle and leg injuries.

c. **Equipment:**

(1) Two metal caps.

(2) Elastic cord (Bungee) with fixed loops on each end.

(3) "S" hook.

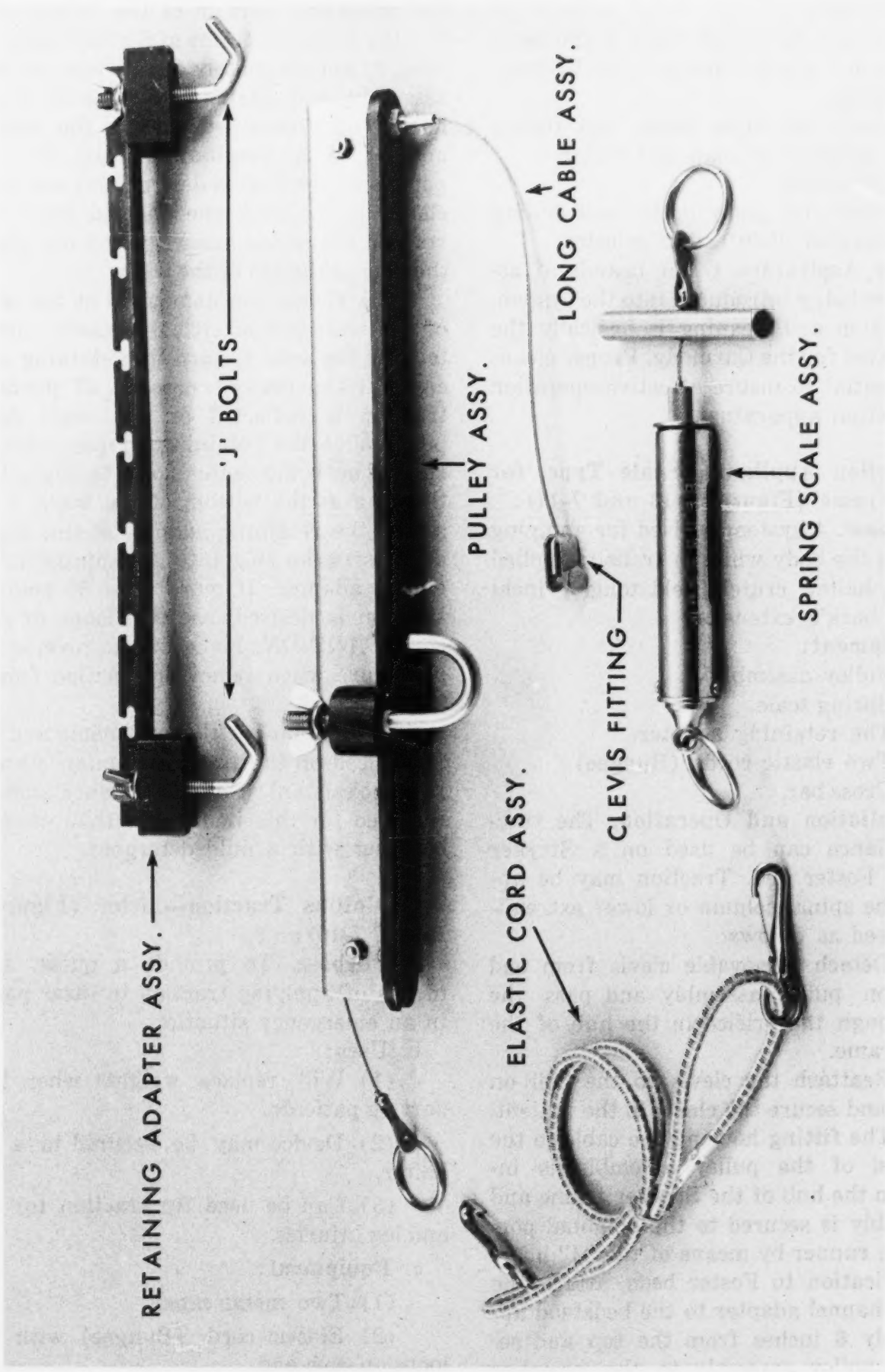


Figure 7-13. Traction Appliance.

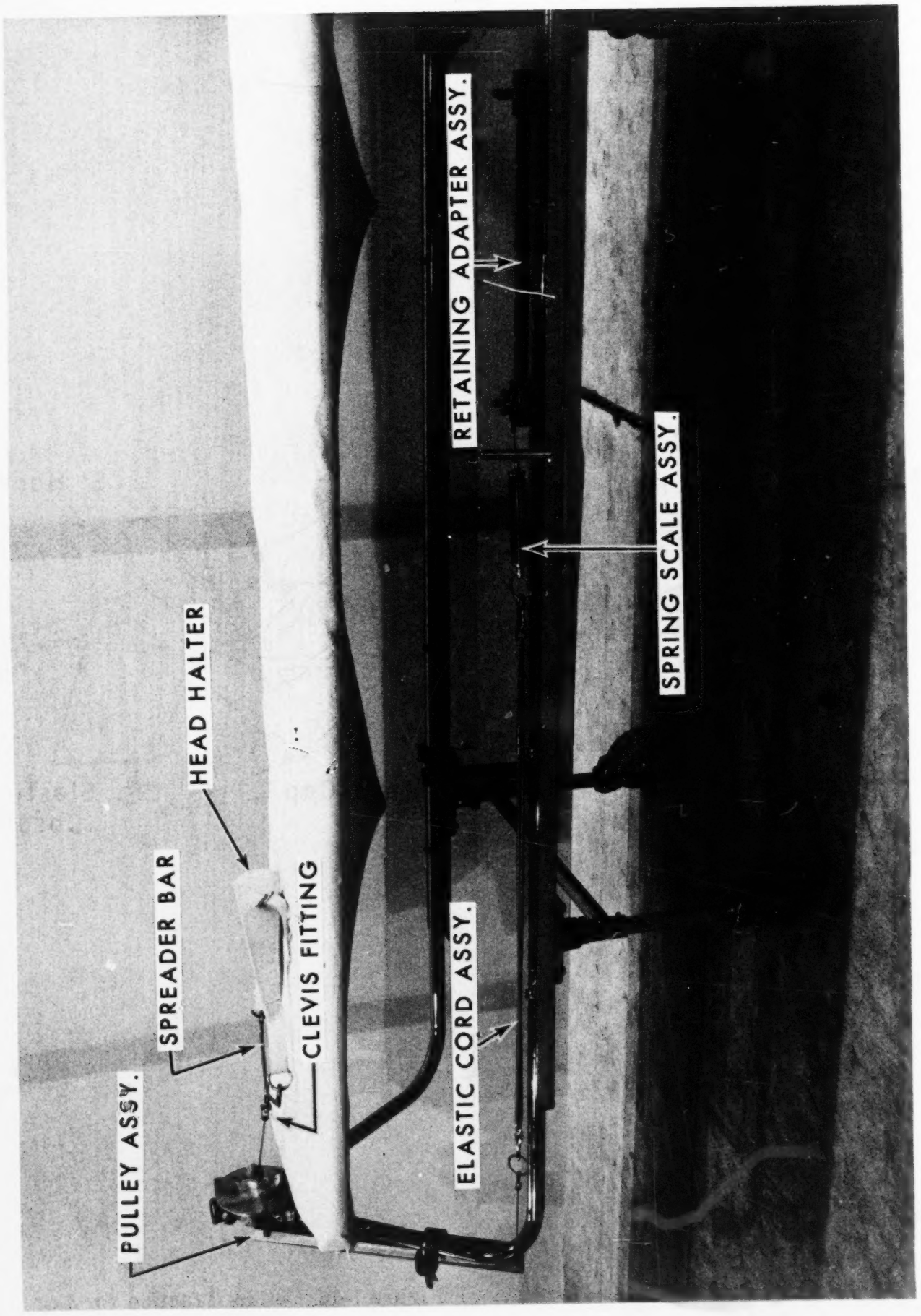


Figure 7-14. Stryker Frame With Traction Appliance.

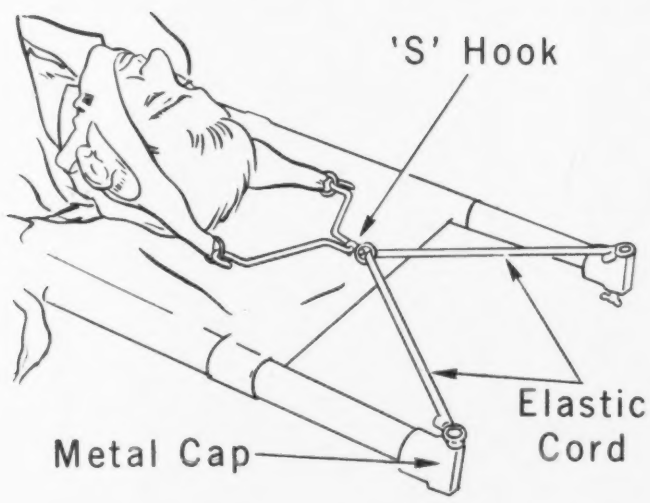


Figure 7-15. Collins Traction With Head Halter.

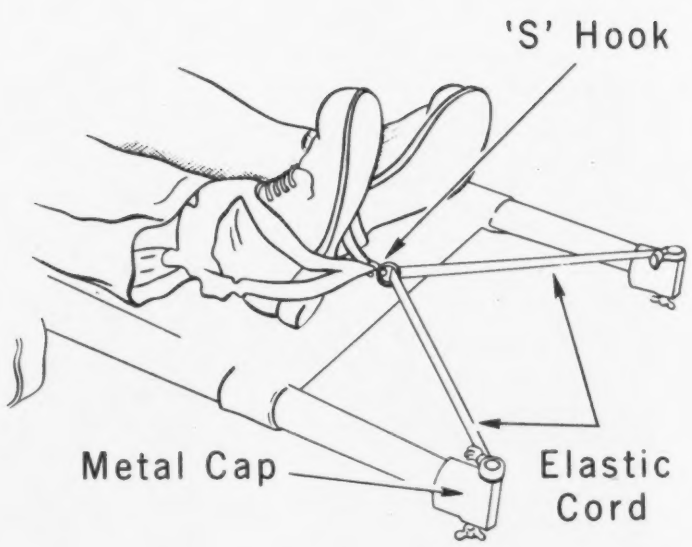


Figure 7-16. Collins Traction for Leg Traction.

d. **Operation:**

(1) Secure metal caps to ends of litter pole handles.

(2) Attach elastic cord by loop to metal caps.

(3) Attach "S" hook at head of litter to center of elastic cord.

(4) Other end of "S" hook attached to head halter or ankle hitch.

(5) Ten pounds of traction is obtained when the elastic cord is extended to the edge of the canvas.

e. **Care of Equipment:**

(1) Check elastic cord for elasticity.

(2) Carry extra elastic cords.

7-15. Stryker Turning Frame (Figure 7-17):

a. **Purpose.** To provide a safe and comfortable means for turning patients.

b. **Equipment Needed:**

(1) Overhead bar.

(2) Posterior frame.

(3) Anterior frame (not shown on diagram).

(4) Knurled lock nuts for attaching, releasing, and locking posterior and anterior frames to turning assembly.

(5) Round spacing nuts for adjusting distance between frames.

(6) Turning assembly to which frames are attached. Turning assemblies allow rotation, body thickness adjustment, removal, and reattachment of the posterior and anterior frames. The locking pin in the turning assembly is pulled out at each end to allow rotation of the frames.

(7) Face port frame.

(8) Foot support.

(9) Arm boards.

(10) Utility board.

(11) Rails, legs, cross braces, and casters. The casters are not attached aboard the aircraft except on the C-9.

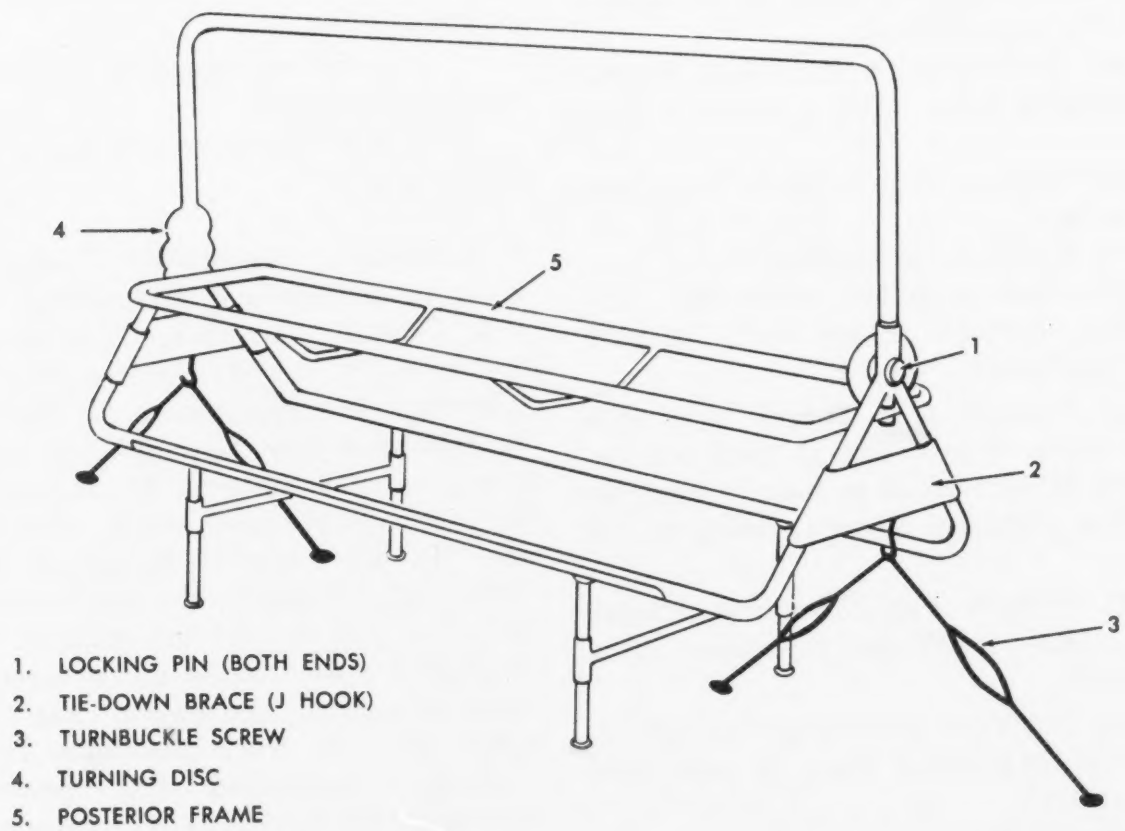


Figure 7-17. Stryker Turning Frame.

(12) Head traction and pulley attachment, if required.

(13) Securing brace, "J" hook, and turnbuckle brace to attach frame to floor of aircraft.

(14) Three pillows—one for each arm board and one for patient's legs when turning.

(15) Allen wrench. All allen set screws should be checked periodically in flight as the vibration of the aircraft might possibly loosen them.

c. **Operation:**

(1) *Placing the Patient on the Frame:*

(a) Place patient on the posterior frame.

(b) Insert arm boards in the sockets in the runners on each side.

(c) Place a pillow on each arm board.

(d) Attach the foot support by catching the hooks over the sides of the frame in a position that brings the canvas against the bottom of the feet.

(e) Insert the overhead bar and tighten the thumb screw securing it into place.

(2) *To Turn Patient:*

(a) Explain to the patient in simple, understandable terms what is about to happen.

(b) Remove foot support from posterior frame.

(c) Remove bed clothing.

(d) Place a pillow over the legs, lengthwise. Remove pillow from beneath head, if applicable.

(e) Remove arm boards and slide them in under frame, one at each end between the runners so as to make a continuation of the platform already resting on the cart.

(f) If there is an indwelling catheter in place, clamp it off and disconnect from the reservoir.

(g) Top knurled locking nuts are removed and the anterior frame is positioned over the patient.

(h) The face piece is adjusted to fit without undue pressure on the chin and head.

(i) The top knurled locking nuts are replaced and screwed tightly.

(j) Secure three litter straps around the frame at the level of the patient's shoulders, waist, and knees.

(k) Have the patient grasp his arms around the anterior frame, if able.

(l) Pull out round locking pin at center of each end of the frame and turn patient slightly. Release the lock and turn patient quickly and smoothly. It will lock automatically when patient is faced downward. Patient should be advised when turn is to take place.

(m) Release and remove posterior frame.

(n) Check to see that both ends are locked.

(o) Padded arm boards are placed in position.

(p) Reconnect the catheter.

(q) If difficulty is experienced in locking or unlocking, rock the frame a little.

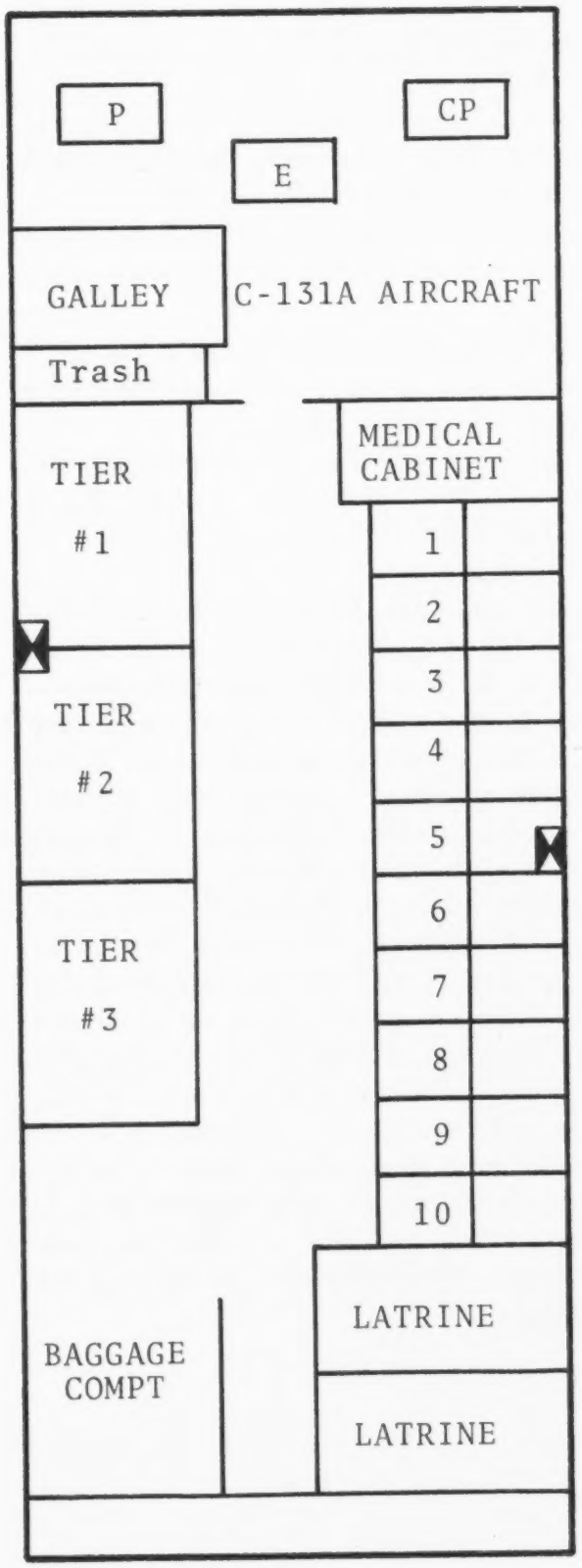
(r) Face support can be adjusted with straps at sides.

(s) Before applying frames, check them for firmness.

(t) To secure frame on aircraft, see illustration.

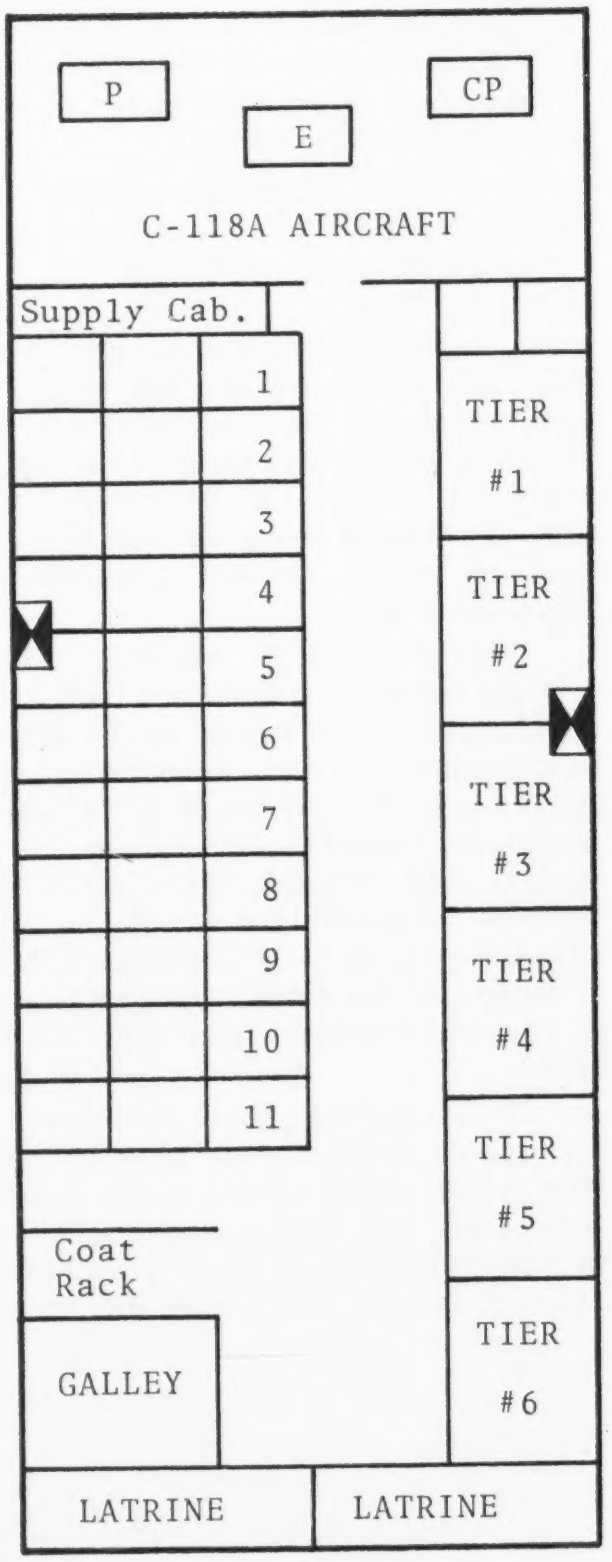
7-16. Medical Equipment Power Supply Aboard Aeromedical Evacuation Aircraft:

a. **C-131A Aircraft.** Twenty-four to twenty-eight volt D.C. electrical power for operation of an iron lung or other medical equipment is provided by two 1 1/4-inch, two-pronged receptacles for female cannon-type plugs in the main cabin. (See figure 7-18.) The aft outlet is located on the right cabin wall adjacent to the medical power control box. The control box contains a circuit breaker for each outlet and a three-position selector switch. The switch has ON AFT, OFF, and ON FWD positions. There is a 115-volt unregulated A.C. power outlet (household receptacle-type) located on the refrigeration unit in the galley area, but should not be used routinely since the refrigerator usually has to be disconnected.



— 24-28 Volt D.C. Outlets

Figure 7-18. C-131A Aircraft Electrical Schematic.



— 24-28 Volt D.C. Outlets

Figure 7-19. C-118A Aircraft Electrical Schematic.

b. **C-118A Aircraft:**

(1) Twenty-four to twenty-eight volt D.C. electrical power for operation of medical equipment is provided at the following locations. (See figure 7-19.)

(a) There is an eight-pronged, 1 3/4-inch receptacle for a female cannon-type plug located on the right cabin wall.

(b) There is a 1 1/4-inch threaded female receptacle for a two-pronged cannon-type plug located on the left cabin wall. Also, a *115-volt, 400-cycle* receptacle for a two-pronged twist lock-type plug is adjacent to the 1 1/4-inch, 24 to 28 volt D.C. receptacle. (In cases of emergency, the Armstrong Incubator with *110-volt, 150-watt* light bulb could be used.)

(c) A 24 to 28 volt D.C., 3/4-inch threaded female receptacle for a two-pronged cannon-type plug is located on the aft overhead panel in the crew compartment. Some C-118A aircraft have two 24 to 28 volt D.C. receptacles located on this panel. Also, on some C-118A aircraft, there are 115-volt, 400-cycle household-type receptacles located adjacent to the 24 to 28 volt outlet. (In cases of emergency, the Armstrong Incubator with a 110-volt, 150-watt light bulb could be used.)

(2) In addition, power for electric razors can be obtained from three household-type power outlets. There is one outlet in each of the two latrines and one outlet in the crew compartment. These outlets provide 110-volt, 60-cycle, A.C. power and were designed *ONLY* for electric razors. DO NOT USE FOR OPERATION OF MEDICAL EQUIPMENT.

c. **C-7A Aircraft.** The C-7A aircraft has two 28-volt D.C. twist lock outlets located overhead, one forward and one aft.

d. **C-9 Aircraft.** The C-9 aircraft has some specially adapted outlets of 110 volts A.C., 60 cycles.

e. **C-97G Aircraft.** This aircraft has a 24 to 28 volt D.C. outlet located on the right cabin wall at station 230.

f. **C-123 Aircraft.** The C-123 aircraft has eight 28-volt D.C. twist lock outlets. These are located four on each side forward of wheel well section.

g. **C-130 Aircraft.** The C-130 aircraft has seven 28-volt D.C. twist lock outlets. These are located three on each side (one each—forward, middle, and aft) and one near the winch control about waist high. Also, there are two 28-volt D.C., cannon plug outlets; one is located on the right side of the aircraft next to the forward twist lock outlet, and the other in front of the left jump door.

h. **C-141A Aircraft.** There are two 24 to 28 volt outlets in the forward area of the aircraft. They are both located on the right bulkhead forward of each of the therapeutic oxygen panels. There are numerous 115-volt, 400-cycle outlets, but the Armstrong Incubator is the only piece of aeromedical equipment that, with proper plug attachments, is capable of being operated on 115-volt, 400-cycle current. This source of current cannot be modified.

CHAPTER 8

SURVIVAL

The aeromedical evacuation technician must know and understand the principles and techniques of ditching, crash landing, survival, and rescue. Therefore, he should be thoroughly familiar with the regulations and manuals covering these areas as well as with the TOs aboard each aircraft giving explicit emergency instructions for that type aircraft. To further assist effective functioning in an emergency, some units formulate and place on the aircraft a list of duties and a seat position for each crewmember to assume during ditching or crash landing. Also, most aircraft carry a list of emergency procedures in the back of each seat. Be familiar with all these references—it is too late to start researching "do's and dont's" when an actual emergency occurs.

As there is so much material available on these subjects, this chapter only briefly discusses ditching, crash landing, and survival in relation to the aeromedical evacuation process.

SECTION A—PREPARING FOR EMERGENCIES

Proper preparation is an extremely important factor in surviving an emergency resulting in ditching or crash landing the aircraft. Lives of crewmembers and patients may be jeopardized by failure to anticipate and plan for such a possibility. Before takeoff of any aeromedical evacuation mission, each medical crewmember should have fixed in his mind a clear idea of what to do in the event of an emergency during that flight. Prior to departure on an overwater flight, the senior medical crewmember completes a ditching plan on a specially printed diagram of the aircraft or on the reverse side of the load plan. This should indicate the patients for whom each medical crewmember is responsible as well as the seat and emergency exit each individual should use in case of ditching. All personnel concerned review and initial the plan once it has been coordinated with the aircraft commander.

8-1. Notification of Emergency. Should ditching or crash landing become imminent, the aircraft commander gives a signal of six short rings on the emergency bell. A signal of one long ring on the alarm bell means brace for impact. If there is no bell system, notification is given through the aircraft intercom system. If time permits, the aircraft commander calls the senior medical crewmember forward and explains the emergency or sends a representative back to notify the medical crew. If there is not enough time, he signals that danger is imminent. Upon this signal a medical crewmember is sent forward to find out what the emergency is and how much time there is to prepare for impact. Ideally, a complete briefing is then given to keep the patients informed of the emergency and to reassure them. If necessary, a condensed briefing is used or patients are advised of the situation in small groups as they are prepared. Continuing to inform and reassure the patients throughout the emergency situation aids in reducing panic and confusion. Honesty is essential and patients should be told:

a. There is an emergency and every effort is being made to correct the difficulty. (Don't try to hide information. If, for example, an engine is on fire, they can see it too!)

b. Radio signals are being sent out by the pilot and help, such as a ship or another plane, is on the way (if this is the case).

c. There is ample survival equipment on board and the crew is well-trained in its use.

d. All should follow directions and stay in assigned areas. Everything possible is being done to insure their survival.

e. They are to use exits to which directed.

f. If it is a ditching emergency, leather shoes or those with metal cleats or high heels must be removed. Also, instruction in donning lifejackets should be repeated.

8-2. Preparing for Impact. Upon receipt of warning, all sharp objects, such as pens, glasses, and insignia should be removed and collected. Ties, collars, and other tight clothing should be loosened and cigarettes put out.

a. **Litter Patients.** Those who can safely sit up and assist themselves are moved to empty seats. The remaining litter patients are moved to lower litter tiers (feet forward) if possible. Blankets or pillows should be folded and arranged protectively about the face and head, and patients instructed to grasp litter poles for additional support.

(1) *Patients Positioned Feet Facing Forward.* Place one litter securing strap high under armpits, another just above the knees, and tighten them.

(2) *Patients Positioned Head Forward.* These patients should be turned around if time permits. Otherwise, move them down on the litter until knees bend over the edge. Put a securing strap under their armpits and one at their knees, and tighten both.

b. **Infants.** Infants remaining on litters or in incubators are secured and protected in a manner similar to litter patients. Use additional straps and padding as needed to afford maximum protection. Infants in arms or in a bassinet are padded with blankets, etc. to maintain an upright position and secured in a rearward facing seat next to an adult.

c. **Seated Patients.** Seats should be locked in the full upright position, with seat belts fastened. Instruct the patients further according to the direction seats are facing.

(1) *Rearward Facing Seats.* Fasten seat belt, plant feet firmly on the floor, and press head against the headrest with hands gripping the armrests for additional support. If an individual cannot brace his head firmly against the seat back, hands should be grasped behind head for protection.

(2) *Forward Facing Seats.* Clasp hands under the knees and bend forward with head between the knees. Patients unable to lean forward, such as a pregnant woman or one in a back brace, should lean against the back of the seat.

d. **Special Patients.** Those in Stryker frames, body or spica casts, or other special equipment should be additionally protected with pillows or blankets and carefully secured.

(1) The patient on a Stryker should have the top on the frame, with extra padding, tightly secured with three straps.

(2) A spica cast may need crossbars severed to permit egress.

(3) A patient in a respirator should have oxygen shut off before impact.

(4) Infusions should be discontinued.

(5) A passenger or nonpsychiatric walking patient should be assigned to assist and sit next to each of the Class 1A and 1B patients. All restraints are removed unless, in the opinion of the senior medical crewmember, the patient may impede or injure others, in which case all but hand restraints are removed. Class 1A and 1B patients who are overly agitated may be administered a dose of the prescribed sedative if at least one hour has passed since administration of last dose.

e. **Lifevests.** They are donned when ditching is anticipated. Litter patients are assisted in donning theirs by crewmembers or designated walking patients. Lifevests to accommodate all personnel on board are carried on all overwater aeromedical evacuation flights. The appropriate lifevest is in place for each occupied seat, and in an accessible location for each litter patients. Vests are carried as indicated below.

(1) *Adults.* A sufficient number of MB-1 casualty life preservers to accommodate all adults plus 10 percent. The MB-1 is the standard lifevest for aeromedical evacuation missions. If there are not enough, the LPU-5/P will be substituted for attendants

2134

or walking patients without casts or encumbrances, on the same basis as the MB-1.

(2) *Children.* A sufficient number of MB-1 lifevests to accommodate children between age 18 months (or 30 pounds) and 12 years (or 100 pounds) plus 10 percent.

(3) *Crew.* LPU-5/P preservers will be carried for the crew.

SECTION B—EXIT AND SURVIVAL

Exit from the aircraft should start as soon as the aircraft comes to a complete standstill and must be done in an orderly fashion to prevent panic and confusion. Walking patients, except those assigned to help other patients, should leave the aircraft first. Remaining patients will then be quickly assisted out of the aircraft. Off-load as much equipment and supplies as possible to aid in survival.

8-3. Exit Upon Crash Landing. Aircraft transporting patients should have a fire-resistant escape slide, which on most aircraft is secured near the main escape hatch during flight. After jettisoning the door and securing the slide to the deck, the slide is thrown to the ground; two crewmembers climb down the emergency rope exit and support the slide in extending position from the ground. Evacuate as quickly as possible, because of danger of fire and explosion. General guidelines in accomplishing effective evacuation of aircraft after crash landing are:

a. Patients must not hesitate at the opening. They will be assisted and pushed down the slide if necessary.

b. Patients who cannot be removed from litters are sent down the slide head or feet first, as circumstances dictate. Those who have been removed from their litters and are unable to move freely are best sent down head first so when they reach the bottom they can be grasped under the arms and dragged away.

c. Walking patients should be positioned at the bottom of the slide to assist in removing litter patients to a safe distance from the aircraft.

d. Assemble the group away from the aircraft and organize for survival.

8-4. Exit Upon Ditching. Steps to follow are:

a. Remove emergency exits.

b. Launch liferafts. These rafts are carried on the basis of one 7 man raft for every 5 patients, one 20 man raft for every 14 patients or a comparable combination.

c. Direct patients to assigned exits and into the rafts. Have walking patients help with litter patients. Remind all to inflate lifevests after leaving the aircraft and before boarding rafts.

d. The first person in a raft puts on the equalizer clamp. As people enter the raft, they aid others to enter. When each raft is full, shove off (after checking the aircraft to see that all the patients are out). Keep rafts tied to one another.

e. Cast off from plane to get away from debris and fuel. Stay in the general vicinity of the aircraft if it stays afloat so survivors can be easily spotted.

f. Put out sea anchor and organize for survival.

8-5. Survival:

a. **Knowledge and Use of Survival Equipment.** Since aeromedical evacuation missions are flown over many different geographical areas, it is essential that the aeromedical technician know how to provide shelter, water, and food; continue medical treatment; and be thoroughly familiar with the use and operation of survival equipment in the event of crash landing or ditching. Rescue might be a matter of minutes to hours to days to weeks, depending upon the situation. All crewmembers should be familiar with AFM 64-3, *Survival—Training Edition,* which provides the necessary information for survival in the major geographical areas, i.e., the Arctic, jungle, sea, and desert, that offer the greatest threat to survival. Instead of using parachute canopies and improvised equipment from the parachute as suggested in that manual, the same shelters can be improvised from sheets and blankets which are carried

aboard aeromedical evacuation aircraft. Aeromedical technicians should also familiarize themselves with AFM 64-5, *Search and Rescue—Survival,* which is a mandatory item in all survival kits, including accessory kits to the liferafts aboard aircraft. This manual should be followed closely in the survival situation.

b. **Basic Principles of Survival.** Most experts agree that successful survival is determined before the aircraft leaves the ground—it is a matter of being prepared, with the basic rule being "plan now to survive later." Experience has shown that crews that have worked together and planned for emergency fare better than those that have not. Survival requires hard work, determination, and a will to live. Aeromedical evacuation crewmembers must plan for not only their own survival, but also that of their patients whose lives may depend on their knowledge. To assure survival of self and patients, the aeromedical evacuation technician should:

(1) Be mentally prepared for the possibility that it could happen to him and that he is the most important link in his own rescue.

(2) Stay in good physical condition, because survival is hard work; it takes strength to organize for survival, build a shelter, and to crawl out of the shelter to signal rescue aircraft.

(3) Dress and pack appropriately for areas being flown over; e.g., take cold weather gear on the aircraft when flying to or over the Arctic.

(4) Check to insure that all necessary equipment is on board the aircraft, and that it is in good condition and in adequate quantity for the patient and passenger load.

(5) Keep calm and avoid panic.

BY ORDER OF THE SECRETARY OF THE AIR FORCE

JOHN D. RYAN, *General, USAF*
Chief of Staff

OFFICIAL

DWIGHT W. COVELL, *Colonel, USAF*
Director of Administration

VT 013 884
PUCEL, DAVID J., AND OTHERS
A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS. PROJECT MINI-SCORE.

MINNESOTA UNIV., MINNEAPOLIS. DEPT. OF INDUSTRIAL EDUCATION.
OFFICE OF EDUCATION (DHEW), WASHINGTON, D.C. DIV. OF COMPREHENSIVE AND VOCATIONAL RESEARCH
MF AVAILABLE IN VT-ERIC SET.
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DESCRIPTORS - *VOCATIONAL FOLLOWUP; *EMPLOYMENT PATTERNS; *AREA VOCATIONAL SCHOOLS; JOB SATISFACTION; EMPLOYER ATTITUDES; EDUCATIONAL BENEFITS; *DROPOUTS; *GRADUATES
IDENTIFIERS - PROJECT MINI SCORE; MINNESOTA

ABSTRACT - TO INVESTIGATE THE RELATIONSHIPS BETWEEN THE AMOUNT OF TIME AN INDIVIDUAL SPENDS IN A VOCATIONAL PROGRAM AND HIS SUBSEQUENT EMPLOYMENT STATUS, HIS SATISFACTION WITH HIS EMPLOYMENT, AND HIS SATISFACTORINESS TO HIS EMPLOYER, A SAMPLE OF CURRICULUMS OF TWENTY-FOUR AREA VOCATIONAL SCHOOLS WAS SELECTED AND THE CURRICULUMS WERE GROUPED INTO THREE CLUSTERS (TECHNICAL, SKILLED, AND CLERICAL). INFORMATION WAS GATHERED ON ALL APPLICANTS WHO APPLIED TO THESE CURRICULUMS BETWEEN SEPTEMBER, 1966 AND AUGUST, 1967. ANALYSES OF THE EMPLOYMENT DATA REVEALED SOME DIFFERENCES BETWEEN CLUSTERS. WITHIN THE CLERICAL CLUSTER, A GREATER PERCENTAGE OF THE GRADUATE AND NON-ADMITTED APPLICANT GROUPS WERE AVAILABLE FOR EMPLOYMENT THAN WERE THE DROP-OUT GROUPS. FEW DIFFERENCES WERE OBSERVED IN THE REASONS GIVEN FOR UNAVAILABILITY FOR EMPLOYMENT BETWEEN GROUPS WITHIN CLUSTERS. IN EACH OF THE THREE OCCUPATIONAL CLUSTERS THERE WAS A DIRECT CORRELATION BETWEEN THE AMOUNT OF VOCATIONAL TRAINING INDIVIDUALS RECEIVED AND THE RELATEDNESS OF THEIR EMPLOYMENT TO THEIR ORIGINAL OCCUPATIONAL OBJECTIVES. ANALYSES OF DIFFERENCES IN EMPLOYMENT SATISFACTION AND SATISFACTORINESS BETWEEN GROUPS WITHIN CLUSTERS REVEALED NO SIGNIFICANT DIFFERENCES. (AUTHOR/BH)

2137

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A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS

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VT 013 884
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PROJECT MINI-SCORE

DEPARTMENT OF INDUSTRIAL EDUCATION

University of Minnesota, Minneapolis, Minnesota

Project No. HRD 5-0148

2138

A COMPARISON OF THE EMPLOYMENT SUCCESS OF VOCATIONAL-TECHNICAL SCHOOL GRADUATES, DROP-OUTS, AND PERSONS NOT ADMITTED TO VOCATIONAL PROGRAMS

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Project MINI-SCORE
(Minnesota Student Characteristics and Occupationally Related Education)
Department of Industrial Education
University of Minnesota
July, 1971

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TABLE OF CONTENTS

	Page
ABSTRACT	v
BACKGROUND	1
PROBLEM	2
OBJECTIVES	2
METHOD	3
Population	3
Instrumentation and Data Collection	4
Population Description	7
RESULTS	11
Analysis of Employment Status Data	11
Analysis of Satisfaction-Satisfactoriness Data	16
SUMMARY	17
REFERENCES	21

2140

ABSTRACT

This Project MINI-SCORE sub-study was conducted to investigate the relationships between the amount of time an individual spends in a vocational program and his subsequent employment status, his satisfaction with his employment, and his satisfactoriness to his employer. In order to investigate these relationships, a sample of curriculums offered by the twenty-four cooperating post-high school Area Vocational-Technical Schools of Minnesota was selected and the curriculums were grouped into three clusters (technical, skilled, and clerical). Information was gathered on all applicants to the vocational schools who applied to these curriculums between September, 1966 and August, 1967. One year after those applicants who applied and were accepted to the curricula had graduated, all applicants to each cluster of curricula were sub-divided into four groups. The four groups were (1) graduates, (2) long-term drops (those who had completed half or more of their program), (3) short-term drops (those who completed less than half of their program), and (4) non-admitted applicants. Members in each of these groups, as well as their employers, were followed up by means of a mailed questionnaire.

Some initial differences were detected between the groups within each cluster on the population descriptive measures gathered upon application to the program. These differences were not considered to be large enough to seriously affect the study.

Analyses of the employment data, gathered through the follow-ups, revealed some differences between groups within clusters. Within the clerical cluster, a greater percentage of the graduate and non-admitted applicant groups were available for employment than were the drop-out groups. Few differences were observed in the reasons given for unavailability for employment between groups within clusters. In each of the three occupational clusters there was a direct correlation between the amount of vocational training individuals received and the relatedness of their employment to their original occupational objectives. It was assumed that at the point of application to a vocational program, the individual's occupational objective was to become employed in an occupation related to the training program to which he originally applied. Similarly, as the amount of training received by people decreased, the percentage of people employed in occupations related to their original occupational objective decreased.

Analyses of differences in employment satisfaction and satisfactoriness between groups within clusters revealed no significant differences. Amount of vocational training appears to have little influence on the employment satisfaction and satisfactoriness of individuals who are employed. This finding tends to indicate that individuals obtain employment in occupations which they find satisfying, and in which they are satisfactory, regardless of whether or not they have had vocational training.

BACKGROUND

Project MINI-SCORE is a six-year research project begun in 1966, and funded by the U. S. Office of Education. It is administered by two staff members of the Department of Industrial Education, University of Minnesota. The Project has the primary purpose of identifying criteria useful to counselors and others in counseling and admitting applicants to post-high school vocational-technical schools as they seek to pursue specific vocational-technical curricula.

Test data consisting of measures derived from six separate instruments and test batteries have been gathered on individual applicants to the Area Vocational-Technical Schools of Minnesota. The tests were: (1) the General Aptitude Test Battery (form B) (written portions only), (2) the Minnesota Vocational Interest Inventory, (3) the Sixteen Personality Factor Questionnaire (form C), (4) the Minnesota Importance Questionnaire (30 scale version), (5) the Vocational Development Inventory, and (6) the Minnesota Scholastic Aptitude Test. The data are being analyzed to determine which elements are useful in predicting success in full-time vocational-technical courses in the Area Vocational-Technical Schools of Minnesota.

The Project MINI-SCORE data bank has afforded an opportunity to conduct a number of sub-studies investigating the relationships among variables important to vocational educators. The sub-study is one of several published as well as unpublished studies that have been conducted (see Pucel, 1969; Pucel, and Nelson, 1968; 1969; 1970a; 1970b; Pucel, Nelson, and Wheeler, 1970; 1971; Pucel, and others, 1970).

PROBLEM

Vocational educators have long assumed that a greater percentage of those persons who have participated in vocational education would become employed, and subsequently more satisfied and better employees than those who did not participate in vocational education. The purpose of this Project MINI-SCORE sub-study was to investigate the effect of vocational education on the type of employment an individual obtains, an individual's satisfaction with employment, and the satisfactoriness of an individual as an employee. "Treatment" in this study was considered to be the amount of vocational training received by the students. Treatment, reflected through the sampling plan, was used to generate four treatment groups (graduates, long-term drop-outs, short-term drop-outs, and non-admitted applicants).

OBJECTIVES

The specific objectives of the study are stated below as major questions.

I. For each of three different occupational clusters (technical, skilled, and clerical) are there significant differences between (a) non-admitted applicants, (b) drop-outs who completed less than half of their program (short-term drop-out group), (c) drop-outs who completed half or more of their program (long-term drop-out group), and (d) graduates, one year after they graduated, in terms of:

   a. availability for employment (available for employment versus unavailable for employment)?

   b. reason for unavailability for those unavailable for employment?

   c. employment status for those available for employment?

II. For each of the four comparison groups above, utilizing only those who were employed, are there significant differences in terms of:

   a. satisfaction with employment?

   b. satisfactoriness to employer?

METHOD

Population

The population consisted of all persons who applied for admission to one of eight curriculums offered in the twenty-four cooperating Minnesota Area Vocational-Technical Schools between July, 1966, and November, 1967, for whom complete pre-enrollment data were available. Complete data included data gathered through the Project MINI-SCORE test battery, plus data on a number of personal and background variables. Most persons in the study population applied for admission and were tested during the 1966-1967 school year with less than nine percent of the sample tested after August, 1967. The eight curriculums were selected from those offered by the schools and grouped into three representative occupational clusters (technical, skilled, and clerical) based on previous Project MINI-SCORE grouping analyses. The curriculums selected and the clusters which were formed are as follows:

1. Technical Cluster:
   a. Electronics
   b. Printing and Graphic Arts
   c. Data Processing

2. Skilled Cluster:
   a. Drafting and Design
   b. Machine Shop
   c. Welding

3. Clerical Cluster:
   a. Clerical
   b. Secretarial

Except for data processing and welding, the curriculum in the technical and skilled clusters were primarily eighteen months in length. Both the data processing and the welding curriculums varied from school to school, ranging between nine and eleven months in length. The clerical cluster curriculums were typically nine months in length.

The population for each of the clusters consisted of three groups--graduates, drop-outs, and non-admitted applicants. Table 1 reports the number of persons in the final analysis groups, composed of those people who returned a completed follow-up questionnaire (see section on Instrumentation and Data Collection).[1] The percentage of returns varied among groups, from a low of 70.5 percent to a high of 90.8 percent. Based on information concerning further education obtained from the returned questionnaires, the non-admitted applicant group was reduced to "true" non-admitted applicants, which included only those who did not report having attended any public vocational-technical school between the time they originally applied for training and the time they were followed up. Approximately half of the group of supposed non-admitted applicants was lost.[2]

Returned questionnaires also indicated the number of months those persons who dropped out attended the vocational school before dropping. On the basis of these data, the drop-out group was divided into long-term drops (those who had completed half or more of their program) and short-term drops (those who had completed less than half of their program). Table 1 also reports the number of people in the final analysis groups who reported they were employed.

Instrumentation and Data Collection

Data gathered at the time of each subject's initial application included standardized test data and descriptive data.

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[1]Not all persons who were considered to have "complete data" had MSAT scores available. Therefore, the various analyses groups on the MSAT variable ranged from approximately 5 to 25 percent smaller than those reported for the other analyses.

[2]Two Minnesota area vocational schools were not among the cooperating schools in the study. They may have enrolled students tested at other locations and would not have reported the information. Also, the questionnaires were mailed after the graduate groups had been graduated for one year. During the approximately two to three years since they applied, many students originally not admitted due to space limitations were admitted.

The standardized test data included:

1. The written portions of the General Aptitude Test Battery (GATB, B-1002, form B) - 7 aptitude scales
2. The Minnesota Vocational Interest Inventory (MVII) - 9 "Homogeneous" scales
3. The Sixteen Personality Factor Questionnaire (form C) (16 PF) - 16 scales
4. The Minnesota Importance Questionnaire (MIQ) - 30 scales
5. The Vocational Development Inventory (VDI) - 1 scale
6. The Minnesota Scholastic Aptitude Test (MSAT) - 1 scale

Table 1

Number of Subjects in Final Analysis Groups

School Status	Number in final analysis group	Number in employed group
Technical cluster		
Graduate	114	47
Long-term drop	34	10
Short-term drop	57	26
Non-admitted applicant	73	31
Total	278	114
Skilled cluster		
Graduate	168	76
Long-term drop	50	22
Short-term drop	58	26
Non-admitted applicant	54	14
Total	330	138
Clerical cluster		
Graduate	158	116
Long-term drop	47	22
Short-term drop	46	16
Non-admitted applicant	69	32
Total	320	186

Information concerning the validity and reliability of these instruments have been reported in Project MINI-SCORE reports (Pucel, and Nelson, 1970a; 1970b) and in information distributed by the test publishers (GATB Manual, Sec. III, 1967; MVII, Clark and Campbell, 1965; 16-PF Handbook, 1962; MIQ, Weiss and others, 1964; 1966; VDI, Crites, 1969; MSAT, Berdie and others, 1962).

The descriptive data obtained included:

1. Area Vocational-Technical School applied to
2. Curriculum applied for
3. Age
4. Years of education
5. High school graduation status
6. Number of dependents
7. Marital status
8. Number of prior occupational changes
9. Amount of prior high school vocational training
10. Relatedness of prior high school vocational training to curriculum applied to
11. Amount of prior post-high school vocational training
12. Relatedness of prior post-high school training to curriculum applied for
13. Amount of work experience related to curriculum applied for
14 Amount of work experience unrelated to curriculum applied for
15. Sex

Besides gathering data on the students upon application, the schools provided information on the students who were accepted and who enrolled. These data consisted of the following:

1. Trade area accepted to
2. Area Vocational-Technical School accepted to
3. Whether the student left due to graduating or dropping out
4. If dropped out, reason for dropping
5. If changed curriculums after enrolling, curriculum changed to
6. Graduated or dropped out of new curriculum

The follow-up of all groups was conducted one year after the enrolled students graduated. As previously indicated, the return rates for the different groups ranged from 70.5 to 90.8 percent. Data gathered through the follow-up consisted of:

1. Additional training since graduation
2. Employment status after one year (employed in job <u>closely related</u> to curriculum originally applied for, employed in job <u>somewhat related</u>, employed in job <u>unrelated</u>, unemployed, unavailable for employment)
3. If unavailable for employment, reason for unavailability
4. If employed, is job full-time or part-time
5. If employed, number of months employed on present job
6. If employed, satisfaction with job (following three scales on <u>Minnesota Satisfaction Questionnaire</u> MSQ)
   a. intrinsic satisfaction
   b. extrinsic satisfaction
   c. general satisfaction

7. If employed, satisfactoriness to employer (following five scales on Minnesota Satisfactoriness Scale MSS)
   a. promotability - competence
   b. personal adjustment
   c. conformance
   d. dependability
   e. general satisfactoriness
8. Number of months rater knew employee

Population Description

An attempt was made to uncover any differences between the four comparison groups within each cluster which existed before persons entered vocational training by analyzing the information obtained upon application. The final four samples (graduates, long-term drops, short-term drops, and non-admitted applicants) were compared on the basis of one way analyses of variance of test measures gathered upon application. The comparisons were made separately for each of the three clusters to determine if the four groups within each cluster were initially similar. Those test variables on which the four groups within each given cluster differed significantly are reported in Table 2.

The technical groups were found to differ significantly on six variables (GATB G, N, K; MVII H-9; 16-PF G; MSAT), the skilled groups differed significantly on one variable (GATB P), and the clerical groups differed significantly on nine variables (GATB G, N; MVII H-1, H-4, H-5, H-7; 16-PF F; VDI; and MIQ company prestige) at the .05 level.

An examination of these differences indicated that intelligence as measured by GATB G and numerical aptitude as measured by GATB N do differentiate the four sample groups within the clerical cluster, with the graduates being somewhat superior. The same factors, plus the MSAT, differentiated the groups within the technical cluster with the long-term dropouts having somewhat higher scores. The groups in the skilled cluster were significantly different on GATB P (form perception) with the graduates having the lowest scores and the long-term drops

the highest. The remaining significant variables did not form patterns of interpretable differences.

Table 2

Variables on Which the Four Responding Groups Within Each Cluster Significantly Differed at the .05 Level

Technical	Skilled	Clerical
GATB G Intelligence	GATB P Form Perception	GATB G Intelligence
GATB N Numerical Aptitude		GATB N Numerical Aptitude
GATB K Motor Coordination		MVII H-1 Mechanics
MVII H-9 Outdoors		MVII H-4 Electronics
16-PF G Casual vs Conservative		MVII H-5 Food Service
MSAT		MVII H-7 Sales Office
		VDI
		MIQ 27 Company Prestige

Groups differences on a number of personal and background variables were also compared and are summarized in Table 3. The data were gathered at the time the individuals applied to the vocational programs.

Age The differences in age among groups for each cluster were not great. Apparently most students applied for entrance into the schools directly after high school.

Table 3

Descriptive Data on Responding Comparison Groups, by Cluster

Variable	Graduate	Long-term dropout	Short-term dropout	Non-admitted Applicants
Age: mean age upon application to the vocational schools (standard deviation in parentheses)				
Technical cluster	19.2 (3.5)	19.0 (3.4)	18.9 (2.1)	18.1 (2.4)
Skilled cluster	19.1 (2.6)	18.9 (2.9)	19.1 (2.4)	19.0 (4.8)
Clerical cluster	18.5 (4.1)	18.8 (4.6)	18.9 (3.9)	18.5 (4.1)
Sex: percentage of males in group				
Technical cluster	75.4%	85.4%	86.0%	58.9%
Skilled cluster	100.0%	100.0%	96.6%	98.2%
Clerical cluster	.6%	12.8%	8.7%	1.4%
Years of Education: mean number of years (standard deviation in parentheses)				
Technical cluster	12.1 (.5)	12.0 (.2)	12.2 (.5)	12.0 (.2)
Skilled cluster	12.0 (.7)	12.1 (.3)	11.9 (.8)	11.9 (.6)
Clerical cluster	12.0 (.5)	12.0 (.2)	11.9 (.4)	11.8 (.7)
High School graduate: percentage of persons who were high school graduates				
Technical cluster	98.2%	100.0%	98.2%	98.6%
Skilled cluster	95.8%	100.0%	89.7%	92.6%
Clerical cluster	98.7%	97.9%	93.5%	88.4%
Married: percentage who were married				
Technical cluster	6.1%	5.9%	5.3%	2.7%
Skilled cluster	7.7%	4.0%	5.2%	3.7%
Clerical cluster	3.2%	6.4%	4.3%	4.4%
Prior Vocational Education: percentage reporting high school and post-high (in parentheses) vocational education				
Technical cluster	34.2% (2.6%)	17.6% (.0%)	21.0% (7.0%)	38.4% (4.1%)
Skilled cluster	55.4% (4.2%)	46.0% (4.0%)	50.0% (3.4%)	40.7% (9.3%)
Clerical cluster	74.1% (1.9%)	70.2% (.0%)	58.7% (4.4%)	55.1% (1.4%)
Prior Work Experience: percentage of related and unrelated (in parentheses) work experience				
Technical cluster	9.7% (61.4%)	14.7% (70.6%)	19.3% (64.9%)	6.8% (67.1%)
Skilled cluster	6.0% (63.1%)	4.0% (56.0%)	22.4% (70.7%)	13.0% (68.5%)
Clerical cluster	13.9% (44.3%)	4.3% (40.4%)	15.2% (45.6%)	20.3% (40.6%)

Sex An investigation of the percentages of males and females in each of the groups in each cluster indicated that the groups in the skilled cluster were 100 percent male. The clerical cluster graduate and non-admitted applicant groups were almost totally female, although there were a number of male dropouts in the clerical cluster. The groups in the technical cluster contained a majority of males.

Years of education The overall mean number of years of education for each of the groups was approximately 12 years.

High school graduation Most of the people in each of the groups were high school graduates. The lowest high school graduation rate was found for the clerical cluster non-admitted applicants, with 88.4 percent.

Married Few people in the groups were married. The largest number of married persons was in the skilled cluster graduate group which amounted to 7.7 percent.

Prior vocational education Upon application, persons reported the prior high school and post-high school vocational training which they had received. Prior high school vocational education could include industrial arts, home economics, or any other courses an applicant considered to be vocational. The percentages of people in a group who took part in prior high school vocational education ranged from 17.6 to 74.1 percent, while the range for those who took part in prior post-high school vocational education was between zero and 9.3 percent. The data indicated that more persons who apply to the skilled programs tended to have participated in prior high school vocational education, while fewer persons who apply to the technical programs have participated similarly. Relatively few applicants to any of the clusters indicated they had participated in prior post-high school vocational education.

Prior work experience. There were few systematic observable differences in amount of related or unrelated prior work experience. Overall, few had related work experience while the majority (except for the clerical cluster, which reported about 40 percent) had unrelated work experience.

As shown above, there were some differences between the comparison groups when they originally applied for admission to the programs. Although none of the differences were considered serious enough to destroy the validity of the study, the reader should interpret the results of the study in light of these differences.

RESULTS

Analysis of Employment Status Data

The results relative to each objective are presented separately. Each objective is stated in question form and then related findings are discussed.

I-a. Are there differences among the four groups (graduates, long-term drops, short-term drops, and non-admitted applicants) within each of the three clusters (technical, skilled, and clerical) in terms of the percentage of people available for employment as contrasted with the percentage of people unavailable for employment?

Those people who were employed, or unemployed but desired employment at the time the follow-up was conducted, were considered available for employment. Those who were not employed and did not wish to become employed were considered as unavailable for employment. The number and percentage of persons who reported themselves as available for employment versus those who reported themselves as unavailable for employment are reported in Table 4. Differences in the percentages of people available for employment between the four groups within each cluster were analyzed using chi-square. The chi-square values yielded by these analyses within each of the three occupational clusters were as follows:

Technical cluster: $X^2 = 3.11$ ($.30 < P < .50$)
Skilled cluster: $X^2 = 3.60$ ($.30 < P < .50$)
Clerical cluster: $X^2 = 14.64$ ($.001 < P < .01$)

Only in the clerical cluster were significant differences between percentages of people available versus those unavailable for employment among the four groups found. The differences appear to be due to the fact that the clerical dropouts (both short- and long-term) were less available for employment than the graduates or non-admitted applicants.

Table 4

Occupational Status of Respondents by Cluster

	Graduate	Long-term dropout	Short-term dropout	Non-admitted applicants	Row Subtotal
Technical cluster					
Available for employment	68 (59.6%)	15 (44.1%)	35 (61.4%)	43 (58.9%)	161 (57.9%)
Unavailable for employment	46 (40.4%)	19 (55.9%)	22 (38.6%)	30 (41.1%)	117 (42.1%)
Column subtotal	114 (100.0%)	34 (100.0%)	57 (100.0%)	73 (100.0%)	278
Skilled cluster					
Available for employment	89 (53.0%)	27 (54.0%)	30 (51.7%)	21 (38.9%)	167 (50.6%)
Unavailable for employment	79 (47.0%)	23 (46.0%)	28 (48.3%)	33 (61.1%)	163 (49.4%)
Column subtotal	168 (100.0%)	50 (100.0%)	58 (100.0%)	54 (100.0%)	330
Clerical cluster					
Available for employment	138 (87.3%)	35 (74.5%)	29 (63.0%)	55 (79.7%)	257 (80.3%)
Unavailable for employment	20 (12.7%)	12 (25.5%)	17 (37.0%)	14 (20.3%)	63 (19.7%)
Column subtotal	158 (100.0%)	47 (100.0%)	46 (100.0%)	69 (100.0%)	320

I-b. Are there differences in reasons given for being unavailable for employment among the four groups within each of the three clusters?

Table 5 reports the reasons for unavailability for those who reported themselves as unavailable for employment. Military service accounted for approximately 80 percent of those unavailable in both the technical and skilled cluster. Unavailability because of being a housewife or because of pregnancy accounted for approximately two-thirds of those reported in the clerical cluster. Tests of statistical significance were not performed due to a large number of cells not having a sufficient number of observations. A review of the data shows few differences in reasons given for being unavailable for employment among the four groups in each cluster.

I-c. Are there differences among the four groups within each of the clusters in terms of the employment status of those persons available for employment?

Employment status was categorized into the following four categories: (1) employed in a job closely related to training, (2) employed in a job somewhat related to training, (3) employed in a job unrelated to training, and (4) unemployed. The expectation that the percentage of persons employed in a related job would increase as groups received more training was confirmed for all three clusters. Chi-square analyses were run on the data as presented in Table 6 for the technical and clerical clusters. Due to insufficient numbers of observations in some of the cells of the skilled cluster table, the data in the closely and somewhat related categories were combined; and the data in the unrelated and unemployed categories were combined before the analysis was run. All chi-square values were highly significant:

Technical cluster:	$X^2 = 44.60$	$(P < .001)$
Skilled cluster:	$X^2 = 42.09$	$(P < .001)$
Clerical cluster:	$X^2 = 57.10$	$(P < .001)$

As the amount of training increased, there was a tendency for the percentage of persons employed in related occupations to increase. In each cluster, a higher percentage of graduates were employed in closely related occupations than were members of the other three groups.

Table 5

Reasons Given for Being Unavailable for Employment, by Cluster

Reason given[a]		Long-term dropout	Short-term dropout	Non-admitted applicant	Subtotal
	Technical cluster				
Military service	37 (80.4%)	16 (84.2%)	19 (86.4%)	21 (70.0%)	93 (79.5%)
Further training	6 (13.0%)	1 (5.3%)	3 (13.6%)	7 (23.3%)	17 (14.5%)
Illness	2 (4.4%)	--	--	2 (6.7%)	4 (3.4%)
Housewife/pregnancy	1 (2.2%)	2 (10.5%)	--	--	3 (2.6%)
Column subtotal	46 (100.0%)	19 (100.0%)	22 (100.0%)	30 (100.0%)	117
	Skilled cluster				
Military service	70 (88.6%)	17 (73.9%)	22 (78.6%)	26 (78.8%)	135 (82.8%)
Further training	8 (10.1%)	6 (26.1%)	5 (17.9%)	5 (15.2%)	24 (14.7%)
Illness	1 (1.3%)	--	--	2 (6.1%)	3 (1.8%)
Housewife/pregnancy	--	--	1 (3.6%)	--	1 (.6%)
Column subtotal	79 (100.0%)	23 (100.0%)	28 (100.0%)	33 (100.0%)	163
	Clerical cluster				
Military service	--	1 (8.3%)	3 (17.6%)	4 (28.6%)	8 (12.7%)
Further training	3 (15.0%)	1 (8.3%)	2 (11.8%)	4 (28.6%)	10 (15.9%)
Illness	--	--	--	5 (35.7%)	5 (7.9%)
Housewife/pregnancy	17 (85.0%)	10 (83.3%)	12 (70.6%)	1 (7.1%)	40 (63.5%)
Column subtotal	20 (100.0%)	12 (100.0%)	17 (100.0%)	14 (100.0%)	63

[a]A fifth category, "other," was available, but was not used by this sample.

Table 6

Employment Status, by Cluster

Employment Status	Graduate	Long-term dropout	Short-term dropout	Non-admitted applicant	Row Subtotal
		Technical cluster			
Closely related	32 (47.1%)	6 (40.0%)	6 (17.1%)	2 (4.6%)	46 (28.6%)
Somewhat related	15 (22.1%)	5 (33.3%)	7 (20.0%)	13 (30.2%)	40 (24.8%)
Unrelated	12 (17.6%)	4 (26.7%)	20 (57.1%)	18 (41.9%)	54 (33.5%)
Unemployed	9 (13.2%)	--	2 (5.7%)	10 (23.3%)	21 (13.0%)
Column subtotal	68 (100.0%)	15 (100.0%)	35 (100.0%)	43 (100.0%)	161
		Skilled cluster			
Closely related	66 (74.2%)	10 (37.0%)	8 (26.7%)	4 (19.0%)	88 (52.7%)
Somewhat related	6 (6.7%)	1 (3.7%)	--	2 (9.5%)	9 (5.4%)
Unrelated	15 (16.8%)	15 (55.6%)	22 (73.3%)	13 (61.9%)	65 (38.9%)
Unemployed	2 (2.2%)	1 (3.7%)	--	2 (9.5%)	5 (3.0%)
Column subtotal	89 (100.0%)	27 (100.00%)	30 (100.00%)	21 (100.0%)	167
		Clerical cluster			
Closely related	88 (63.8%)	8 (22.9%)	10 (34.5%)	9 (16.4%)	115 (44.6%)
Somewhat related	26 (18.8%)	11 (31.4%)	5 (17.2%)	11 (20.0%)	53 (20.6%)
Unrelated	15 (10.9%)	7 (20.0%)	7 (24.1%)	18 (32.7%)	47 (18.3%)
Unemployed	9 (6.5%)	9 (25.7%)	7 (24.1%)	17 (30.9%)	42 (16.3%)
Column subtotal	138 (100.0%)	35 (100.00%)	29 (100.0%)	55 (100.0%)	257

Analysis of the Satisfaction-Satisfactoriness Data

Besides being interested in whether amount of training was related to a person being available for employment, the investigators were interested in studying the relationships between amount of training and a person's satisfaction with employment and his satisfactoriness as an employee. As indicated earlier, the Minnesota Satisfaction Questionnaire was used to measure the extent to which the individual was satisfied with his job. The Minnesota Satisfactoriness Questionnaire was used to measure the extent to which the individual was satisfactory as an employee.

Those respondents who were employed (closely related, somewhat related, unrelated) and whose employer returned a completed questionnaire were included in the analysis groups (see Table I for group sizes). Since only one-third to one-half of the initial respondents remained in the employed analysis groups after the unemployed and the unavailable for employment groups were removed, the analysis of variance originally conducted to determine if the four groups (graduate, long-term drop, short-term drop, and non-admitted applicant) were initially similar within each cluster were repeated for the employed groups. Table 7 reports those variables found to be significant. Although the groups were found to be significantly different on fewer variables than were the original respondent groups, similar variables were involved with similar between-group differences. Thus, the groups were considered to have been originally similar enough to continue the analyses.

II-a. and b. Are there differences among the four employed groups within each of the clusters in terms of their satisfaction with employment and/or their satisfactoriness as employees?

One-way analyses of variance were used to determine if there were significant differences among the four employed groups within each cluster on the satisfaction and satisfactoriness measures. The F-values, means and standard deviations are presented in Table 8. The results of the analyses within each cluster indicated

Table 7

Variables on Which the Four Employed Groups Within Each Cluster Significantly Differed at the .05 Level

Technical	Skilled	Clerical
GATB G Intelligence	MIQ 16 Social Status	GATB G Intelligence
GATB S Spatial	MSAT	GATB N Numerical
16-PF M Conventional vs Eccentric		MVII H-4 Electronics
MIQ-27 Company Prestige		MVII H-5 Food Service
		16-PF F Glum vs. Enthusiastic
		16-PF H Timid vs. Adventurous
		MIQ-27 Company Prestige

that there were no differences at the .05 level of significance in the satisfaction of students with their employment or their satisfactoriness as employees that could be associated with differences in amount of training.

It was hypothesized that the lack of differences associated with varying amounts of training might have been due to the initial group differences indicated in Table 7. Therefore, a covariance approach was used to try to remove the initial group differences from the analyses of differences in satisfaction and satisfactoriness. The application of the covariance technique resulted in the same non-significant findings as those obtained from the analysis of variance data.

SUMMARY

The purpose of this Project MINI-SCORE sub-study was to investigate the subsequent employment history and employment success of a sample of non-admitted

Table 8

Comparison of the Employed Groups Employment Satisfaction and Satisfactoriness for each of the Three Clusters. (F-Values, Means and Standard Deviations*)

Variable	Graduate	Long-term dropout	Short-term dropout	Non-admitted applicant	F-Value**
Technical cluster					
MSQ					
1. Intrinsic satisfaction	46.1(7.2)	46.8(6.8)	45.6(8.3)	46.8(8.4)	.12
2. Extrinsic satisfaction	20.2(5.4)	18.4(7.1)	20.6(5.5)	22.3(4.9)	1.57
3. General satisfaction	74.4(12.7)	73.7(14.4)	74.1(14.4)	77.4(13.5)	.43
MSS					
4. Promotability-competence	20.4(4.2)	22.2(5.0)	20.5(4.8)	21.4(4.7)	.63
5. Personal adjustment	16.8(2.9)	17.1(4.5)	16.6(2.5)	17.4(2.7)	.39
6. Conformance	15.8(2.7)	16.4(3.3)	15.5(3.1)	16.5(2.7)	.73
7. Dependability	9.9(1.8)	8.6(2.2)	9.2(2.1)	10.1(1.9)	2.38
8. General satisfaction	65.2(9.1)	66.5(13.3)	64.0(11.2)	67.7(10.0)	.69
Skilled cluster					
MSQ					
1. Intrinsic satisfaction	46.4(6.8)	44.9(9.8)	44.0(7.4)	48.4(7.6)	1.30
2. Extrinsic satisfaction	20.1(5.2)	21.5(5.0)	21.6(4.7)	22.9(5.7)	1.55
3. General satisfaction	74.6(11.9)	74.3(14.8)	73.6(11.6)	79.8(14.0)	.86
MSS					
4. Promotability-competence	20.3(4.4)	21.6(5.4)	20.4(4.9)	19.6(4.4)	.61
5. Personal adjustment	17.1(2.9)	17.1(3.7)	17.8(3.1)	16.7(3.1)	.43
6. Conformance	15.8(2.4)	16.1(3.4)	16.6(3.1)	16.1(3.4)	.62
7. Dependability	10.0(1.9)	9.9(2.3)	10.0(1.9)	9.5(2.3)	.29
8. General satisfactoriness	65.3(10.0)	66.8(13.6)	67.2(11.8)	64.2(11.8)	.33
Clerical cluster					
MSQ					
1. Intrinsic satisfaction	47.3(8.2)	48.0(9.9)	46.3(10.1)	46.6(9.8)	.18
2. Extrinsic satisfaction	21.2(4.8)	22.1(4.9)	20.6(6.9)	21.8(5.9)	.43
3. General satisfaction	76.4(12.9)	78.1(16.0)	74.1(17.8)	76.6(15.9)	.24
MSS					
4. Promotability-competence	21.1(4.7)	20.8(6.7)	19.8(7.6)	21.0(4.5)	.31
5. Personal adjustment	16.7(3.2)	15.8(4.8)	16.1(5.4)	16.9(2.9)	.58
6. Conformance	16.3(2.8)	15.9(4.6)	15.1(5.6)	15.9(2.9)	.58
7. Dependability	9.8(1.8)	9.2(3.0)	9.2(3.3)	10.3(1.6)	1.50
8. General satisfactoriness	66.1(11.0)	63.9(18.3)	62.4(21.2)	66.3(10.7)	.53

*Standard deviations are reported in parentheses.
**None of the F-Values were significant at .05 level.

applicants, dropouts, and graduates from Minnesota Area Vocational-Technical schools. Applicant and follow-up data were gathered on a total of 928 individuals from three occupational clusters (technical, skilled, and clerical). Each cluster contained a group of (1) graduates, (2) long-term dropouts (those who had completed half or more of their curriculum), (3) short-term dropouts (those who had completed less than half of their curriculum), and (4) non-admitted applicants. This method of grouping was selected to reflect the "treatment" which was length of time in the vocational program. The sample was described, and the three clusters were analyzed in turn to discover if group differences could be found on various employment-related measures of success.

Significant differences in the percentage of persons available for employment versus the percentage unavailable for employment were found among the four comparison groups in the clerical cluster. The differences appeared to be due to the clerical drops being less available for employment than the graduates or non-admitted applicants. No significant differences were found within the technical and skilled clusters.

For those who were unavailable for employment, there were few differences in the reasons for unavailability among groups within clusters. The technical and skilled cluster graduates who were unavailable for employment were more often in the military at the time of follow-up, and the clerical cluster graduates were more often unavailable for "housewife-pregnancy" reasons.

Differences were highly significant between groups available for employment within each cluster in terms of how related their employment was to the original occupational area they applied for when applying to the vocational school. As the amount of training received by groups increased, more people became employed in related occupations. A higher percentage of the graduate groups were employed in related occupations within each cluster than were any of the other groups.

An interesting, unanticipated finding was that approximately fifty percent of

those not originally admitted to the vocational schools eventually took part in some form of public vocational school training between the time they were not admitted and the time they were followed up.

Analyses of the differences in measured individual satisfaction with the job (scores on the MSQ) and individual satisfactoriness to the employer (scores on the MSS) between groups within the three clusters revealed no significant differences at the .05 level. These findings imply that no relationship existed between amount of training and the satisfaction a person has with his job or his satisfactoriness as an employee as measured by the MSS and MSQ.

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THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES.

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ABSTRACT - THE INTENT OF THIS PAPER IS TO HELP CLOSE THE GAP BETWEEN WHAT WE KNOW ABOUT WORK PERFORMANCE MEASUREMENT AND WHAT TEST DEVELOPERS NEED TO KNOW IN TERMS OF PRACTICAL GUIDELINES. THE FOCUS IS ON THE DEVELOPMENT OF WORK PERFORMANCE MEASURES AS THEY RELATE TO THE ON-GOING INSTRUCTIONAL SITUATION IN VOCATIONAL-TECHNICAL EDUCATION. FOR AN OBJECTIVE TO BE USED AS A BASIS FOR WORK PERFORMANCE MEASURE DEVELOPMENT, IT MUST HAVE ADEQUATE OCCUPATIONAL AND EDUCATIONAL VALIDITY. IT MUST BE DETERMINED WHAT BEHAVIORS ARE PRESENT WITHIN THE OBJECTIVE, WHAT THE OBJECTIVE IS ACTUALLY MEASURING, AND THE GENERAL WAY IN WHICH PERFORMANCE INFORMATION IS TO BE GATHERED BY EXAMINING WORK PERFORMANCE MEASURES. THE WORK SAMPLE MEASURE IS PROBABLY THE MOST RELEVANT FOR USE BY THE VOCATIONAL SHOP OR LABORATORY TEACHER. IN THE CONSTRUCTION OF WORK PERFORMANCE MEASURES, CONTENT VALIDITY IS OF SOLE IMPORTANCE, AND IN THE ASSESSMENT AND REFINEMENT OF THESE MEASURES FACE VALIDITY AND SEVERAL QUASI-CONSTANT VALIDITY APPROACHES MAY BE USEFUL. SOURCES OF MEASUREMENT ERROR AFFECTING RELIABILITY ARE ENVIRONMENTAL AND SITUATIONAL INFLUENCES, INSTRUMENTATION, SAMPLING, BEHAVIOR, AND REACTIVE EFFECTS. A RELATED DOCUMENT IS AVAILABLE IN THIS ISSUE AS VT 013 896. (GEB)

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THE DEVELOPMENT OF VALID WORK PERFORMANCE EVALUATION MEASURES[1]

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THE DEVELOPMENT OF VALID WORK
PERFORMANCE EVALUATION MEASURES

This particular paper was actually started several years ago when the authors first began giving serious consideration to the development of meaningful evaluation measures for use in vocational-technical education. After a rather exhaustive search of traditional measurement references yielded only meager amounts of information about work performance measurement, it was decided that other potential sources should be examined. Since that time a number of research papers and articles have been reviewed, several of which related to such diverse areas as orthopedic training and the behavioral effects of infectious diseases. As relevant information was being gathered, it became more and more apparent that a more general approach or scheme for work performance assessment was necessary. It was felt that the scheme should not merely take a "how-to" approach as is found in many of the current test development manuals. Rather, this scheme should actually relate to the issues of work performance measure validity and reliability in a meaningful manner.

Consequently, this paper is intended to close the gap between what we know about work performance measurement and what test developers need to know in terms of practical guidelines. Rather than merely interpreting what others may have said about validity and reliability, focus will be on the development of work performance measures as they relate to the on-going instructional situation in vocational-technical education. Initially, consideration is to be given to the alternatives which one might have in the development of work performance measures. Then, the factors which contribute to validity and reliability are examined. Lastly, the discussion deals with various approaches to the improvement of work performance measures based upon empirical evidence.

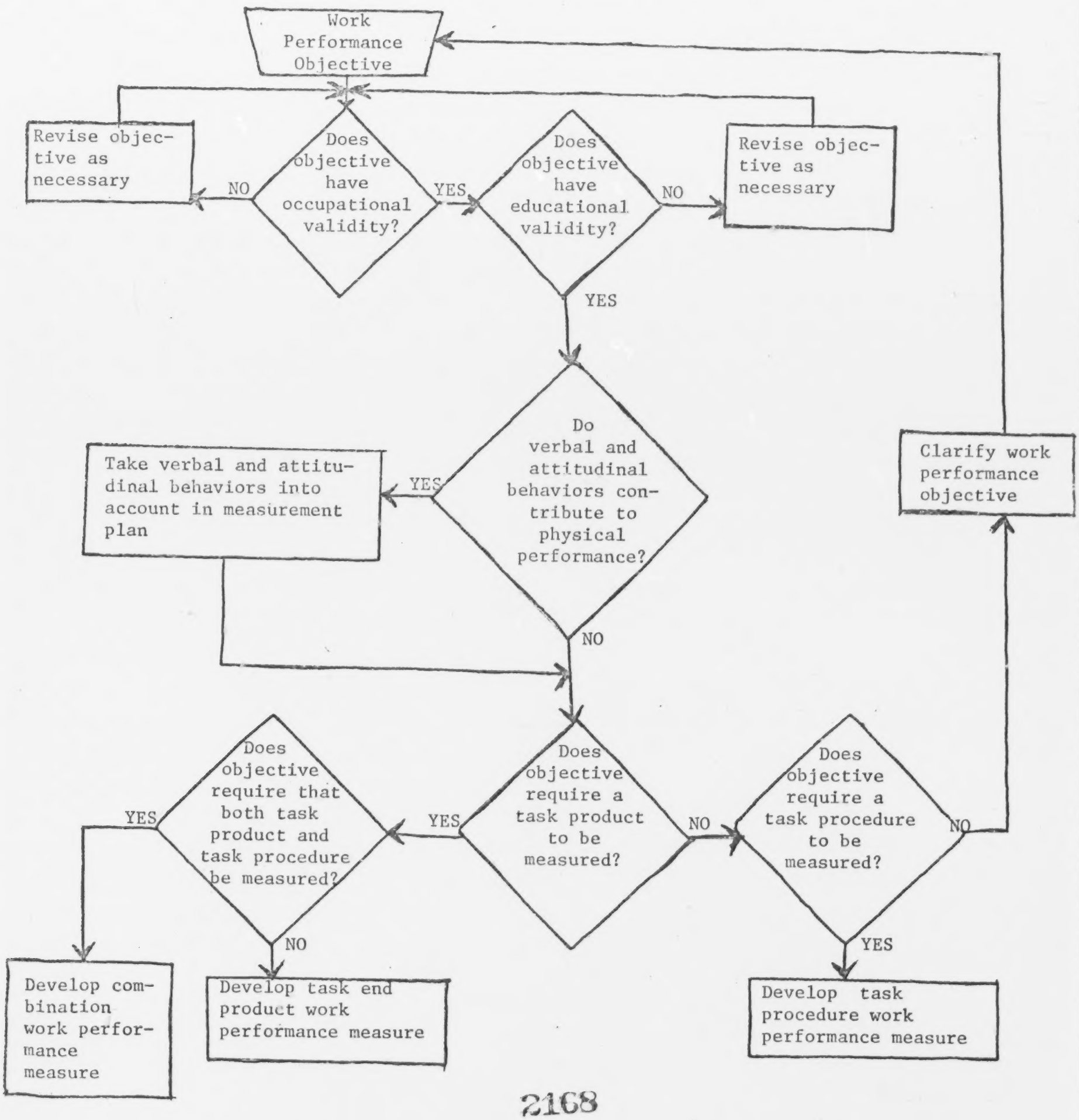
If one were to peruse the current measurement literature, it would be found that more and more thought is being given to the establishment of meaningful performance objectives. Since there are many sources of information with regard to the establishment of behavioral objectives, they will not be discussed in any detail. It should be emphasized, however, that before a work performance measure is developed, a valid and realistic

work performance objective must be available. Several questions may be asked with regard to an objective before it is used as a basis for work performance measure development. For example, does the objective describe the performance expected of the student at the end of the course? Does the student's performance at the end of the course approximate the performance required of the worker on the job? Does the objective describe student performance? Does the objective specify the conditions under which behavior is to be observed? Does the objective define standards the student should meet (Smith, 1964)? Once these questions have been examined and the test developer feels that he has adequately answered them, he may then proceed with the development of a work performance measure.

Although the construction of a work performance measure has been thought by many to be a relatively simple task, there are a number of questions which can be raised within the development process and decisions to be made which are contingent upon the answers to these questions. The diagram presented in Figure 1 attempts to represent this decision-making process. With a work performance objective as initial input, it should be first determined whether or not the objective has <u>occupational validity</u>. Occupational validity can be defined as the extent to which the objective specifies a competency which is essential to the particular occupation for which the student is being prepared. If the objective does not have sufficient occupational validity, then it should be revised so that this requirement can be met. If on the other hand, it does contain sufficient occupational validity, it should be then examined with regard to its <u>educational validity</u>. This aspect of validity may be described as the extent to which the objective fits meaningfully into the school environment. Since constraints such as student capabilities, prior experiences in school and out of school and student affective characteristics may influence the level, conditions, and description of a particular objective, the school environment does have a varying effect on the way that an objective might be stated. It is, then, necessary to give due consideration to educational validity. If the objective does not contain sufficient educational validity, it should be revised in an attempt to meet this standard.

FIGURE 1

Selecting Appropriate Work Performance Measurement Strategies



If, in fact, adequate educational validity is present, then the objective should be examined to determine what behaviors are present within it. The classification list developed by Harmon (1969) might well serve as a useful means to this end. Harmon identifies three basic types of performance objective behaviors (verbal, physical, and attitudinal) and indicates that some objectives do not fall in any of the three categories while others might involve two or more behaviors. It is, of course, up to the test developer to determine what behaviors constitute an objective. It should be kept in mind, however, that since a work performance measure is being developed, the primary behavior should be physical performance while verbal and attitudinal behaviors which contribute to this physical performance should be taken into account with the measurement design itself. For example, if an objective requires an electronics student to construct a prototype circuit and this task requires him to write a technical report describing why he reached the decisions that he did, the verbal behavior (explain an ordered set of sections) should be taken into account within the framework of the physical behavior (perform an appropriate skill action in a problem solving situation).

The next logical decision involves determining what the objective is actually measuring. If the objective requires only a task product to be measured, then a <u>task end product work performance measure</u> should be developed. This measure is used when the examinee's activity results in some sort of product which by itself is a record of what was done and how well it was done. Examples of this type of measure might be a typed letter or a filled requisition. If, on the other hand, the objective requires that only a task procedure be measured, then a <u>task procedure work performance measure</u> should be developed. This measure requires that the examinee's activity be recorded as each behavior actually occurs. The activity is usually recorded by means of a check list of some type. Examples of this type of measure might be starting an engine or tuning a transmitter. If, however, the objective requires that both task product and task procedure be measured it would be most appropriate to develop a <u>combination work performance measure</u>. With this measure both procedure and end product measurement are combined. It is usually administered if information is needed about the manner in which an examinee does the task as well as the quality of the final product produced.

Perhaps one of the basic differences between the task procedure and end product work performance measure stems from the need or lack of need for feedback at a certain point in time. For example, if an auto body repair instructor were desirous of knowing only whether or not a student had met a predetermined objective with regard to a completed straightening and refinishing job on an automobile fender, the end product measure would be sufficient. If, however, he were also concerned with the process which might affect the quality of a product over an extended period of time, serious consideration should be given to the examination of such things as the amounts of plastic, putty, and paint applied to the automobile at different times when the work was actually being accomplished. These particular activities might not be apparent in an initial final product evaluation, however, might show up as deficiencies several weeks or months later if the task were improperly performed.

Types of Work Performance Measures

After determination has been made of what the objective is measuring (procedure, end product, or combination) it is then appropriate to identify the general way in which performance information is to be gathered. This requires an examination of the various types of work performance measures. Wilson (1962) discusses three general types of work performance measures. These include operational performance measures, work samples, and ratings. Each of these general types of work performance measures differs in terms of the degree to which they represent an actual work performance task. Along a continuum represented by degree of departure from real work performance these three types of work performance measures may be found, first operation, then work sample, and finally rating. To an extent, this continuum may be likened to the concept of simulation.

Operational Performance Measures

There are five subgroups of measures in this category according to Wilson (1962): (a) tangible product measures; (b) measures of specific behavior elements; (c) gross performance measures; (d) inferred performance; and (e) malperformance. Each of these types of operational performance measures is observable and measureable in the regular job context without any special structuring of the job for measurement purposes.

Tangible product measures are designed to measure the characteristics of the product that the worker or student actually turns out. The range of products conceiveably could start with a brick wall and spread clear across the continuum to an oil painting. It is the product itself, whatever its nature, that represents the focus of measurement within this category.

Measures of specific behavior elements are the second category proposed by Wilson (1962) under the general heading "operational performance measures." The focus in this type of measure is upon the performance activity itself. The process of performing the work provides the domain of what is to be measured. Check lists of specific behaviors tend to be the most used and appealing way to construct this kind of measure. The use of the check list makes it possible to incorporate a considerable amount of objectivity into the instrument. What often occurs, however, is that the observer who is to complete the check list is left to make too many subjective judgments in evaluating the performance. The most common examples of behavioral check lists may be found in education where many approaches to recording teaching behavior are currently being utilized and refined.

A third type of operational performance measure is what are termed gross performance measures. Under this heading would be categorized any crude measure of performance. For a salesman, the dollar volume of sales during a specific period of time would represent this kind of a measure. Dollar volume of sales, although easily assessed, is only, however, an indirect effect of the salesman's performance. It is this indirectness that leads to much concern over the invalidity of these kinds of measures. Because of the indirect nature of the relationship it is possible that other intervening variables could have caused the dollar volume of sales reported by a salesman during a particular period of time. Another pertinent example would be the measurement of a chef's performance by counting the number of customers who eat at the restaurant in which he works during the course of a typical day.

Inferred performance and malperformance measures appear to have little relevance for the purposes of work performance evaluation in the school setting. What generally is found under these subcategories are a variety of situational variables which may have some indirect relationship with performance. The authors decided not to include a further description of these kinds of measures within the paper for that reason.

The Work Sample

This type of measure as Wilson states:

> ...is based on tasks, job-segments evolutions or any portion of the total work load that makes up a job and which might be judged to be important. Tests based on these samples may either be conducted in the context of the job using the regular machinery, equipment and space, or they may be based on simulators or test situations specially constructed to duplicate the task (Wilson, 1962, p. 361).

The work sample measure is probably the most relevant for use by the vocational shop or laboratory teacher. Although not an operational performance measure as described in the previous section, the work sample design fits well into the need for evaluating student performance in the vocational shop or laboratory. As indicated previously, the shop or laboratory is a simulated version of the actual work setting. It, therefore, seems logical to utilize a simulated work performance measure to meet the evaluation needs of the vocational student.

The evaluation of performance on a work sample task may be accomplished by the same measurement methodology as was proposed under the discussion of operational performance measures. It is possible that for specific tasks in the work sample form either the process or the product is of primary concern. Depending upon the particular focus of the measurement task, therefore, either the end product measure or the procedure method may be of use. In the following sections of this paper dealing with validity and reliability of work performance measures, we shall be generally referring to work sample as the appropriate vehicle toward which measurement in the shop or laboratory environment will be accomplished.

Ratings

Ratings as distinguished from the other types of measurement proposed in this section may be defined as "cumulative impressions or evaluations made by an observer and recorded at a time later than the observation." Because of the low validity reports of ratings utilized as evaluation of work performance, the authors have chosen to disregard this type of measure as not being relevant to the purposes of this paper. As Wilson (1962) has indicated, "However, though the history of rating studies is long, woefully little progress has been made in bringing rating methods to the point where they are of real major value as criteria in the field of training research today."

Validity of Work Performance Measures

As we all are well aware, a test may have as many validities as there are methods utilized in establishing such validities. Generally, each of these validities are categorized into one of four types: content, predictive, concurrent (criterion related), and construct. For the purposes of this paper, with its focus upon work performance evaluation measures, which of the four types of validity assessment are of primary concern?

Several authorities in the field have presented relevant opinions in this matter, a summary of which is presented below.

> A proficiency test may be considered valid if it discriminates between the proficient and non-proficient in a given skill, or better still, if it successfully discriminates among individuals with various degrees of the skill. While an aptitude test may have an indefinite number of validities, depending on the criteria which it predicts with varying degrees of success, a valid proficiency test must measure what it purports to measure. No other concept of validity is applicable;...(DuBois, et.al., 1954).

DuBois, et.al., go on to explore the applicability of four methods of assessing proficiency test validity: validity by direct judgment, work sample validity, class validity and curricular validity. The first is a content validity estimate while the second is an estimate of concurrent validity. The latter two may be categorized as quasi-construct validity types.

Glaser and Klaus (1962) have discussed the validity estimation of proficiency measures from a systems point-of-view. They state:

> A proficiency test, like all other tests, can be defined as a stimulus situation which has been constructed to evoke the particular kinds of behavior to be measured or assessed. In one sense, then, the validity of a test instrument is reflected in the degree to which the behaviors evoked provide a means for consistently differentiating among individuals according to their performance. In particular, a proficiency test can be considered valid if it discriminates among individuals presumed to range from no proficiency to high proficiency in a given skill. The validity of a proficiency test, then, is established by demonstrating that the test scores reflect differences in skill levels of the performance being assessed (Glaser and Klaus, 1962).

The focus of the Glaser and Klaus discussion is upon the importance of developing proficiency measures which discriminate between the skilled and

the unskilled. This may be accomplished by expert judgment (content validity) or by empirical methods (quasi-construct validity). Of primary concern is the measured behavior or class of behaviors that is evoked as a result of creating the stimulus situation.

The primary difficulty in dealing with the validity of performance measures for the vocational teacher is that he cannot attempt to measure performance in terms of the ultimate criterion of training outcomes, that of occupational proficiency. Of necessity, the shop or laboratory training condition is a simulation of the actual job condition. The usual validity question asked of an instrument designed to measure simulated task performance is, "How well can we predict performance on an actual task from performance on the simulated task?" Yet, is this the question of concern having described our general task? Obviously, not.

In the vocational shop or laboratory setting the emphasis of measurement is upon whether a particular student has or has not achieved a specific objective or set of objectives. Is the student able to perform a specified task within accepted performance standards, or not? An instrument designed to yield an answer to such a question should not be assessed in terms of its ability to predict any consequent behavior.

Yet a portion of our total responsibility since we are operating in the admittedly simulated environment of the shop or laboratory must focus upon predictability. We must attempt to collect information regarding the degree to which measured training outcomes predict actual job performance. Such information, however, is not only an indicator of the value of the instrument but also of the training objectives themselves. If a performance measure does actually distinguish between those students who have attained a particular performance objective and those who have not, its predictive validity is solely dependent upon the validity of the training objectives.

As suggested by Glaser and Klaus (1962):

> The proficiency test used at the completion of a training course...may establish the degree to which an individual has acquired knowledge about his job or has mastered the necessary skills. It does not demonstrate that the individual will perform effectively in the job situation. An individual with generally proficient skills may turn out to be an occupational failure....

At the outset of the validity discussion a question was posed, "Which of the four types of validity assessment are of concern in developing work performance measures?" On the basis of the previous discussion the authors support the following answer to that question.

1. In the construction of work performance measures content validity is of sole importance.
2. In the assessment and refinement of these measures face validity (a type of content validity) and several quasi-construct validity approaches may be found useful.

Constructing the Instrument

In order to construct a valid work performance measure to evaluate instructional outcomes it is necessary to be guided first by an adequate description of the behavioral outcomes to be measured. This relieves the test maker of the responsibility for establishing the domain of behaviors to be measured. Yet the task of adequately sampling that domain resides with the test maker. In the real world situation of the shop or laboratory it is the teacher who both establishes the desired behavioral outcomes and constructs the instrument to measure the extent to which the outcomes are achieved. A relief of responsibility on the one hand merely results in an increased responsibility on the other.

It is important, however, to maintain the distinction between these two activities, both operationally and conceptually. The measurement task is impossible to accomplish given an inadequate description of desired performance outcomes. The formulation of objectives provides the substance upon which the measurement technique operates.

Given the contemporary trend toward the micro-miniaturization of behavioral objectives in the instructional process, another fact of vocational shop or laboratory experience needs to be introduced at this point. Performance objectives as a rule are not formulated in terms of a singular unique behavior, but as a more generalized complex class of behaviors. The concept, then, of sampling a domain of performance behaviors is relevant even taken within an instructional situation where behavioral objectives provide an adequate focus for the instruction.

Given the time, expense, and effort devoted to the construction of work performance measures it is essential to ensure validity as the instrument is being constructed. To be considered are such questions as: (1) Is the

focus of the objective upon the output of the performance an end product? (2) Is the focus of the objective upon the means by which the output is produced the performance process itself? (3) Does the objective focus upon both the performance and the output of that performance? (4) What is the domain of performance behaviors to be measured by the instrument? (5) How may this domain of behaviors be adequately sampled? (6) Which performance behaviors within the domain are likely to differentiate between the more proficient and less proficient in terms of their performance?

Each of the above questions deals with an aspect which affects the content validity of a performance measure. Given the adequate construction of an instrument with these questions resolved in some manner, how can one be assured that he has, in fact, developed a measure possessing content validity?

Assessment of Validity

As mentioned previously in the validity discussion, DuBois, et.al. (1954), have introduced the notion of curricular validity, the extent to which the performance measure differentiates between the trained and untrained in terms of the relevant performance behaviors. Glaser and Klaus (1962) also have made reference to this methodology, but have not referred to it by name.

There are a number of appropriate experimental designs which may be utilized in establishing curricular validity. Generally, however, the process is to administer the instrument to a group who have not received training in the skill area sampled, and comparing its score with a comparable group who have received trianing. If one finds only chance differences between the performance of the two groups the validity of the measure is suspect. A number of examples of the use of this technique in establishing the validity of performance measures may be found in the literature (McGuire and Babbott, 1967; Siegel and Jensen, 1955; Swanson, 1970; Williams and Whitmore, 1959).

Although curricular validity appears to most appropriately fall into the general category of construct validity estimates, problems of interpretation arise as a result. A more meaningful description of the technique is given by Nunnally (1967) who refers to it as an empirical technique to provide circumstantial evidence as to the content validity of a measure. Interpreted in this way, a negative result would lead one back to the original questions posed in the construction of the instrument, and the adequacy with which the questions were resolved.

A more commonly used method of assessing the content validity of a performance is by what DuBois, et.al., refer to as "validity by direct judgment." The general process is to select a panel of experts to judge (1) whether the behaviors measured are an adequate representation of the domain of interest, and (2) whether the behaviors measured will discriminate between the skilled and the unskilled in the performance domain (Adams, 1964; Glaser and Klaus, 1965; DuBois, et.al., 1954).

Several problems are inherent in the use of this technique, among which are: (1) defining the necessary qualifications of the judges (experts in the performance area may not be experts in judging the degree of discrimination of a work performance task measure); (2) obtaining the services of a sufficient number of qualified judges; and (3) obtaining an adequate agreement among the judges. Adams (1964) has suggested that in order to overcome these difficulties the judges must be trained to provide the necessary degree of expertise.

A third source of evidence to assess the content validity of a work performance measure is one suggested by Nunnally (1967). It is the extent to which the measured performance "looks like" it measures the relevant domain of performance behaviors. McGuire and Babbott (1967) have commented on the importance of "face validity" as a source of improving the content validity of performance measures. Since their work dealt with simulation techniques in measuring problem-solving skills such a comment should be of importance to the vocational educator. Many simulated measurement techniques have recently been introduced in the vocational shop and laboratory, particularly in the electrical and electronics areas. The further one gets away from the actual performance situation in establishing the measurement conditions the less real the task appears to the student. Whether one actually can measure skills within a specified performance domain when the student does not perceive it as such is questionable.

Reliability of Work Performance Measures

As was previously noted, validity plays a very important role in the development of work performance measures. In fact, a test which lacks validity is completely useless no matter how reliable it might well be.

Therefore, it is of utmost importance to initially establish some index or indices of validity for a work performance measure. Then, if the measure shows promise based upon its validity, additional refinement with respect to reliability may well result in a substantial increase in test validity. It is within this context that reliability will be examined as it contributes to the development of work performance measures.

A basic and oft used definition states that reliability constitutes the degree to which an instrument measures consistently what it does measure (Lien, 1967, p. 34). In terms of work performance measure development, however, it is important to go beyond this basic definition. Serious thought should be given to the characteristics of a test which might cause it to be unreliable. The ideas proposed by Nunnally (1967, p. 172) which terms reliability as "the extent to which measurement error is slight, a measure is said to be reliable," seem relevant from a developmental point of view. That is to say, the test developer should control measurement error to the extent that the test indicates adequate reliability.

Instrument Development and Administration

What, then, are some of the primary sources of measurement error that might affect the reliability of a work performance measure? Although there are a number of sources, the principal ones include: (1) environmental influences, (2) situational influences, (3) test instrumentation, (4) sampling, (5) behavior complexity, and (6) examinee reactive effects (Glaser and Klaus, 1962). All of these measurement error sources can be controlled to a certain degree if appropriate effort is put forth during the test development and administration process.

Given that students can tolerate a great variability in environmental conditions, there is a point at which certain conditions may have an adverse effect upon the reliability of a measure of work performance. For example, the building trades student who is being tested on a cold winter day outside may not perform as well as he might if he were inside or if the weather was a bit warmer. If then it is appropriate to test a building trades student out of doors in the winter, all students should be tested in this manner. If, however, whether a person is inside or outside does not make a difference in the performance evaluation, it may be more appropriate to examine all students indoors. In addition to the effects which weather

might have on reliability, such conditions as noise and the presence of other students in the location where a test is being given may have an effect on the examinee's performance. It is, therefore, important to have adequate control over the environment to the extent that the student's performance will not be affected adversely. Since performance examinations require a student's "all out" effort, it is very important to control for any distractions that might occur during the testing session. Thought should be given to the selection of an administration site which is away from the main traffic in the shop or laboratory, and yet at the same time, not where the student will be forced to perform in an unrealistic setting.

Situational influences such as system or equipment instability may also contribute to the unreliability of a work performance measure. For example, a student whose task it is to find a trouble placed in a television set may, while making system checks, be adversely influenced if there is an electrical power failure. It is, therefore, important to have plans which cover such contingencies. Any equipment which is to be used should also be checked with regard to its reliability. As a piece of equipment is used over and over, its characteristics can change. This might, in turn, affect the way in which a student approaches or carries out his particular task.

A third source of measurement error is contained within the test instrumentation. A work performance measure typically includes examinee and examiner instructions, a check list or behavior record, and directions for arriving at scores on the basis of this record. All of these materials must be examined in terms of their objectivity. Lack of objectivity might easily result in unsystematic variability in scores given by different examiners, while incomplete student instructions might affect the student's score in a similar manner.

A fourth possible source of measurement error is the sampling process by which specific tasks are selected for inclusion in an instrument. As indicated by Jeantheau and Anderson (1966, p. 10) if the range of behavior sampled is small relative to the range of behavior in the operational situation, a restriction is placed on the variability of scores. It is important then to sample a wide enough range of behavior so that potential variability will be maximized. Of course, adequate sampling which results in added test length, has its own particular problems. Since a work performance measure is generally administered to a small number of students

at a time, the time for any one administration has to be limited if the instructor ever intends to complete his testing. Given the need for reasonable test length in measuring work performance, a compromise is usually reached in establishing the extent to which the domain of behaviors is adequately sampled. Smith (1965, p. 19) suggests that "if testing time is limited, and there is a choice between adding more items (or tasks) to cover the same objectives or covering more objectives with new items, the latter course is generally preferable."

A fifth source of measurement error deals with the complexity of the behavior which is to be evaluated. As Glaser and Klaus (1962) indicate:

> If the behavior being measured involves many dimensions of performance, the items included in the test instrument will necessarily be heterogenous. Since it is possible that an individual's proficiency level may fluctuate considerably from one dimension to the next, each component in each sense represents a somewhat different test.

When a measure is being developed, the developer should give thought as to whether or not the behavior is to be measured along different dimensions. For example, the traditional criteria of time or speed, quality, and procedure may possibly vary in three different directions in terms of measurement. Student A might complete a task in a minimum amount of time using an acceptable procedure and have a minimum quality product. Student B, on the other hand, might spend a great deal of the time using an inappropriate procedure and come up with a quality product. The question then is, "Do the various dimensions of behavior contribute to a composite performance score?" If, in fact, the dimensions do contribute, then they may be considered additive. On the other hand, dimensions which are not additive should be considered separate tests, and the results of these examinations should be interpreted accordingly.

A final source of measurement error consists of the reactive effects which an examinee might have to the testing situation. Such factors as lack of motivation, illness, fatigue, and the pressure associated with a performance test may all contribute to low performance, when the student otherwise might be able to perform satisfactorily. The examinee may also react unfavorably to the examination situation if it appears to be unrealistic. If the examinee does not realize how important simulator performance results are, then performance on the simulator might be affected. If, however, he is told or shown how simulator performance relates to performance in the work

environment, a more positive reaction to the testing situation might be developed. It is, therefore, imperative that the student be prepared physically and emotionally for any performance test.

Assessment of Reliability

After a work performance measure has been developed and administered, thought should then be given to the establishment of indices of reliability by empirical means. There are several approaches to obtaining an estimation of reliability. These include internal consistency, alternative forms, the split half approach, and the retest method (Nunnally, 1967, p. 210-216). It should first be noted that the alternate forms approach, although used extensively for published, norm referenced tests, is highly impractical within the context of a local vocational-technical program. It is very difficult to develop one test and establishing alternate forms of a test is even more demanding. Therefore, this approach to estimating reliability seems quite questionable from a practical point of view. The retest method, likewise, has serious defects. That is, experience in the first testing may influence responses in the second testing and, therefore, responses which are remembered in the first test will tend to be repeated on the retest. Moreover, an examinee will tend to repeat his behavior in much the same way he did from the previous time. This makes the observed correlation between testings higher than it might be in reality.

As was indicated previously, subjectivity can often result in unreliability. Indices of reliability with regard to recording and scoring of examination data should be, therefore, obtained. Although it is often unfeasible within the school environment, a trial application of the instrument can provide useful information in this regard. If several observers record information for the same examinees, inter-observer comparisons may be used to determine the extent of agreement in rating the same behavior (Jeantheau and Anderson, 1966). If there is a lack of agreement between observers, the reliability of the measure is low. If the observers tend to agree, then the measure may be considered reliable.

Another aspect of reliability which is often ignored is that of consistency across different scoring procedures. Test development procedures described by Lewy and McGuire (1966) specify that the important question is

whether or not variation in consistency across scoring procedures affects the rank order of students. They suggest the use of the Spearman rank-order correlation to assess the effects of scoring procedures (Spearman, 1904). In other situations, the test developer might be interested in changes in absolute level of performance. Under these circumstances differences in the mean and standard deviation of results obtained by different scoring procedures could be examined.

The classical way of thinking about measurement error is in terms of performance consistency on items within a particular examination. This aspect of reliability deals with homogeniety and is typically measured using the Kuder-Richardson reliabilities (Helmstadter, 1964) of which the K-R 20 is most frequently used. There are several prerequisites to using the Kuder-Richardson (K-R) approach. First, the examination should not measure more than one behavioral dimension. If the test is rather unidimensional, the K-R approach is then acceptable. However, if it is a multifactor measure, there is difficulty in identifying the extent to which performance inconsistencies result in error and to what extent they reflect intraindividual differences on the particular factors. A second requirement of the K-R approach is that the number of test items must be included in the formula. Since a performance measure may include steps or behavioral elements, these should substitute for items. But if the number of behavioral elements are variable, which is sometimes the case in a work performance measure, then the K-R 20 reliability formula is inappropriate.

A second measure of homogeniety which may be appropriate in certain instances is that described by Rabinowitz and Eikeland (1964). This approach establishes reliability for tests which have clustered items. Therefore, an examination which measures more than one behavioral dimension and has several behavior clusters may yield a meaningful index of reliability. The limitation which is also applied to this method involves the number of behavioral elements contained in a performance measure. Consequently, a test with a variable number of behavioral elements cannot be examined in an appropriate manner using the Rabinowitz-Eikeland approach.

A final measure of internal consistency which will be discussed is the Cronbach Alpha (Cronbach, 1951). Although often disregarded, Nunnally indicates that "Alpha is the basic formula for determining the reliability based on internal consistency" (Nunnally, 1967, p. 210). Perhaps the most

important aspect of Alpha is the manner in which it can examine the internal consistency reliability of a multiple score work performance measure. If the test developer can obtain information regarding the number of subsets of behavioral elements, the correlation matrix of these subsets, and the largest latent root of the correlation matrix, the extent to which part scores contribute to a composite score can then be determined. The advantages of using Cronbach Alpha with work performance measure data are obvious. If each subtest is regarded as an "element" of which the test is composed, useful information may be obtained about the interpretability of the composite score (Cronbach, 1951, p. 321). In this case, consistency among subscores may be taken into account and the problem of variation in the total number of elements is eliminated.

Measurement of Troubleshooting Performance

In order to exemplify some of the procedures and problems discussed in previous sections, the description of a work performance measure which has recently been developed for use in an ongoing research project will be discussed (Finch, 1970). The measure was designed to meet several unconventional requirements. First, it should evaluate a student's ability to troubleshoot (find troubles in) an automobile engine. Second, it should be appropriate for use with the automotive students of eight instructors in four Pennsylvania vocational-technical schools.

In view of the fact that the project was evaluating troubleshooting simulator effectiveness, the concept of content validity first came to mind. Initial discussions with the eight instructors revealed that the most appropriate index of effectiveness would be transfer to actual equipment. All eight persons agreed on this point. The objective then specified that

> The student will find two troubles placed one at a time in an otherwise operational automobile engine. The basic troubleshooting tools provided by the examiner will include a screwdriver, spark plug wrench, ignition wrenches, pliers, and a test light. There will be no time limit in which to find the troubles.

Since the instructors (who were also tradesmen) agreed that transfer to actual equipment was appropriate, it can be assumed that the educational validity was established to some degree. As an additional check of

educational validity, examination was made of the Standards for Automotive Service Instruction in Secondary Schools. This publication, which has been developed by the Automobile Manufacturers--American Vocational Association Industry Planning Council, specifies curriculum standards for automotive programs. It was indicated in this publication as one automotive curriculum objective "to develop an understanding of logical, step-by-step diagnostic procedures" (Standards, 1965, p. 17). On the basis of the foregoing information, educational validity was deemed adequate.

Although occupational validity was used as a partial basis for curriculum inclusion, it was felt that additional information should be obtained about the objective. An examination of the Dictionary of Occupational Titles (U.S. Department of Labor, 1965) revealed that a number of jobs in the automobile service area require a worker to have diagnostic capability, particularly with regard to automobile engines. Based upon this information the objective was deemed occupationally valid.

There was naturally some concern about face validity (the extent to which the instrument looks like it would measure what it intends to measure). Since the instrument was not administered by instructors, attention was directed toward the examinee. How would he react to the test situation? Observation of 45 students under similar conditions in a previous study (Finch, 1969) indicated that students reacted positively to the testing environment. It was, therefore, contended that face validity might be adequate for purposes of the present study. A field trial conducted after the present measure was developed also resulted in positive student reactions. It was on the basis of the foregoing that face validity was considered to be satisfactory.

Since the instrument was concerned with physical performance as described by Harmon (1969) (perform an appropriate skilled action in a problem solving situation) and measurement of verbal or attitudinal behaviors were not included, these factors did not need to be taken into account within the development scheme. It was then felt that determination should be made of whether the objective required task procedure and/or task end product measurement. Since the objective specified a rather dichotomous situation (either the trouble is found or it is not found) a decision was made to record the task procedure. In this manner, meaningful information

about a student's problem solving strategy could be gathered. A product measurement, on the other hand, would provide very little information with regard to instructional improvement.

The work performance measure required the examinee to locate two troubles which were representative of those an auto mechanic or an advanced automotive student might be required to find. One of the troubles was in the engine fuel system while the other was in the electrical system. Materials used in the examination administration consisted of observer's instructions, student's instruction, and a record of troubleshooting behavior. The behavior record was similar in design to the type developed by Fattu and Medley (1962). Its purpose was to record a student's sequence of actions as he attempted to find the troubles. The instrument was designed so that an examiner could accurately record observable behavior without even knowing if this behavior was correct or incorrect. A separate sheet was used to record student behavior for each trouble. Performance sub-scores were established based upon the analysis of data from a previous investigation (Finch, 1969). Interpretability of a composite performance score consisting of information checks made, noninformation checks made, and sequence followed was conducted. These three subscores yielded a Coefficient Alpha of .626. However, when only two subscores were included in the formula, (information checks and sequence) an Alpha of .889 was obtained. It was, therefore, felt that the noninformation checks subscore was lacking in terms of its contribution to the composite performance score.

Prior to its administration in the research project, an index of inter-observer reliability was obtained in a field trial situation. Nine high school auto mechanics students were asked to find a trouble in an otherwise operational automobile engine. The trouble was identical to one of those to be used in the project. A correlation between actual times recorded by observer A and observer B was .997, while the correlation for information checks was 1.0. Since the students' information check scores were converted directly from recorded information, it was felt that the correlations obtained were an accurate index of inter-observer consistency. The work performance measure which has been briefly described will, of course, receive further scrutiny as the research progresses.

We are presently concerned with some basic issues related to work performance measures which this paper has not discussed in any great detail. For example, what criteria may be meaningfully included within a work performance measure? How do these criteria relate to the personal characteristics of vocational-technical students? These and other questions will be examined after sufficient data have been gathered. As was previously indicated, this paper was started several years ago. We, of course, freely admit that the paper is not complete and may never reach completion. As more emperical means by which validity and reliability can be established and are made known, this paper than should become more and more comprehensive in scope. It is only hoped that the present information which has been provided will serve as a basic framework for the development of valid work performance evaluation measures.

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VT 013 917
EVALUATION OF CURRICULAR REQUIREMENTS FOR THE TWO-YEAR SECRETARIAL PROGRAM AT NEW MEXICO STATE UNIVERSITY, 1965-1969.

NEW MEXICO STATE UNIV., UNIVERSITY PARK.
COLL. OF BUSINESS ADMINISTRATION AND ECONOMICS.
NEW MEXICO OCCUPATIONAL RESEARCH AND DEVELOPMENT COORDINATING UNIT, SANTA FE
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ABSTRACT - THE PURPOSE OF THIS STUDY WAS TO EVALUATE THE CURRICULAR REQUIREMENTS OF THE 2-YEAR SECRETARIAL PROGRAM AT NEW MEXICO STATE UNIVERSITY. BASED ON QUESTIONNAIRE DATA COLLECTED FROM GRADUATES OF THE PROGRAM SEVERAL CONCLUSIONS WERE REACHED WHICH INCLUDED: (1) BROADEN THE SECRETARIAL CURRICULUM BY ADDING OFFICE MANAGEMENT, RECORDS MANAGEMENT, AND SECRETARIAL SUPERVISION AS EITHER REQUIRED COURSES OR SUGGESTED ACTIVITIES, (2) INCREASE THE CREDIT HOURS FROM TWO TO THREE FOR BUSINESS LETTER TECHNIQUES AND INCLUDE MORE GRAMMAR STUDY, AND (3) EXPAND OFFICE MACHINES EQUIPMENT TO INCLUDE ELECTRONIC CALCULATORS. A COPY OF THE QUESTIONNAIRE IS INCLUDED IN THE STUDY. (JS)

VT 013 917

EVALUATION OF CURRICULAR REQUIREMENTS FOR THE TWO–YEAR SECRETARIAL PROGRAM AT NMSU 1965–1969

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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2190

Evaluation of Curricular Requirements for The Two-Year Secretarial Program at New Mexico State University 1965-1969.

A Mini-Grant Research Project
Presented to
The New Mexico Vocational Education Department
Research Coordinating Unit

by
Eleanor Ann Heins
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June 1, 1971

2191

TABLE OF CONTENTS

CHAPTER	PAGE
I THE PROBLEM	1
Statement of the Problem	1
Limitation of the Problem	1
Need for Study	1
Assumptions	1
Objectives	2
Definition of Terms	2
II METHOD OF INVESTIGATION	3
Population Sample	3
Data Gathering Device	3
Analysis of the Data	3
III REVIEW OF THE LITERATURE	5
IV INTERPRETATION OF DATA	8
Evaluation of New Mexico State University Secretarial Curriculum	8
Evaluation of Suggested Curricular Additions	10
Weaknesses and Suggested Improvements in the Secretarial Curriculum	11
V CONCLUSIONS	14
Bibliography	16
Exhibits	18

LIST OF TABLES

TABLE	PAGE
Table 1	9
Table 2	10
Table 3	12
Table 4	13

CHAPTER I

THE PROBLEM

Statement of the Problem

The problem was to obtain an evaluation of curricular requirements for the two-year secretarial program at New Mexico State University by graduates of the program.

Limitation of the Problem

This study was confined to the present status of secretarial curricular needs as evaluated by graduates of the two-year secretarial program of New Mexico State University for the years 1965-1969.

The findings were limited to the population and situations of this study and could be generalized to other areas only as they approximate those of this study.

Need for the Study

These data were needed by the Business Administration faculty of the College of Business Administration and Economics of New Mexico State University as one factor in prognosticating curricular needs in their two-year secretarial program.

Assumptions

This study was made with the following assumptions considered:

1. An important characteristic of a free enterprise economy was its ability to bring about change.

2. Change in our economic environment was occurring rapidly.

3. When change occurred rapidly, an educational curriculum

needed to be evaluated as to its compatibility with the changing scene.

4. Concepts of secretarial training in use constituted the only valid criteria by which the constantly changing program of secretarial training could be evaluated.

5. Evaluations made by gainfully employed full-time secretarial graduates were valid.

Objectives

The objectives formulated for the study were:

1. To secure, by means of a questionnaire, evaluations of curricular requirements completed by two-year secretarial graduates of New Mexico State University that had been gainfully employed as full-time secretaries since graduation.

2. To tabulate suggested curricular changes suggested by the secretarial graduates.

3. To review appropriate literature concerning pertinent and appropriate prognostications of curricular needs.

Definition of Terms

Curricular Requirements. This term was used to describe courses listed in the New Mexico State University undergraduate catalogs, 1965-1969, as requirements for graduation with a two-year secretarial certificate.

2194

CHAPTER II

METHOD OF INVESTIGATION

Population Sample

Included in the group of 48 graduates of the two-year secretarial program at New Mexico State University for the years 1965-1969 were an unknown number of graduates that had been gainfully employed in full-time secretarial work since graduation. Of the 48 graduates, 37 graduates responded (77.29%) of whom 33 (68.75%) had been gainfully employed in full-time secretarial work.

Data Gathering Device

A questionnaire (Exhibit B) was developed to:

(1) evaluate each course offering in the secretarial curriculum completed by the secretarial graduate at New Mexico State University.

(2) evaluate the usefulness to the secretary of suggested course offerings.

(3) evaluate weaknesses in the secretarial curriculum at New Mexico State University.

(4) suggest courses or units of study that would strengthen the secretarial curriculum.

Analysis of the Data

Answers on the questionnaire were weighted as follows: small importance (2), average importance (3), vital importance (4), no opinion (1). The treatment of the statistical universe was delimited to the

usage of mean measurements. Computation of the arithmetic mean value of each item was obtained by adding the values of the respondents' answers and dividing the total by the number of respondents. An item having a mean value of 2.0 or lower was placed on a list to be considered for revision. An item having a mean value of 3.0 or above was placed on a list to be considered for adoption.

Two open-ended questions, one asking for weaknesses encountered by the graduates in their secretarial education and the second asking for suggested curricular additions, were classified, totaled, and percentages calculated.

If more than 20 per cent of the respondents mentioned a certain area for addition, the suggested course or unit of study was placed on a list for consideration as a curricular addition.

CHAPTER III

REVIEW OF THE LITERATURE

A review of the literature indicated that the changing labor market, the impact of research and development, and the computer have had a direct bearing on the training of office personnel.

The first question considered was whether there would be a market for secretaries in the next ten to twenty years. From the projections of the U. S. Office of Labor, office workers led the list of white-collar workers needed in the next 20 years. Dwight R. Crum, Deputy Director, Division of Vocational and Technical Education, U. S. Office of Education, has stated that business and office workers met 44.5 per cent of the labor demands of the states in 1971 and will meet only 30.1 per cent of labor demands projected by the states in 1975.

The need for secretaries in the future is further emphasized by Mr. Harold Goldstein of the U. S. Department of Labor:

> Whether in mini-skirts, midi-skirts, pantsuits, or--you name it for 1980--Stella the stenographer and her fellow clerical workers will be very much with us in the next ten years. Employment in clerical jobs is expected to grow considerably faster than total employment, rising to 17.3 million in 1980, from 12.8 million in 1968.
>
> Jobs for this largest single white-collar group will be affected by the rapid technological developments in the field of computers, office equipment, and communication devices in the 1970s.[1]

---

1. Harold Goldstein, "America's Manpower Needs for the Seventies," American Vocational Journal, April, 1971, 23.

2197

The next question considered was what impact, if any, have research and development and the computer had on the secretarial curriculum. Cecile M. Mosier and Lloyd L. Garrison, Oklahoma State University, have written:

> No doubt the human secretary will still be needed with plenty of work to keep her busy. She will need a thorough knowledge of data processing because her chief task will be to act as an intermediary for reports going or coming from the computer, condensing and summarizing the information along the way.[4]

Joseph F. Klein, Herkimer County Community College, Ilion, New York, reported a follow-up study he conducted at a junior college in New York. Some of the findings were:

> Stenographic Activities. Taking routine dictation and transcribing is still the major activity performed by the secretary in an office. The technical nature of the dictation is on the increase.
>
> Composing letters at the typewriter was performed by over three-fourths of the respondents and over one-half recommended greater emphasis.
>
> ....more training needs to be done with the telephone when the Teletrainer is used for instruction.
>
> Typewriting Activities. Typewriting continues to be a major activity performed by secretaries. Typing tabulations and statistical work was the typing activity recommended most for greater emphasis.
>
> General Office Activities. ....Thirty percent of the respondents recommended greater emphasis to be put on receiving callers. Many of the respondents added comments to the questionnaire emphasizing the need for some course or activity to better adapt them to dealing with people.[5]

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4. Cecile M. Mosier and Lloyd L. Garrison, "The Crystal Ball and Business Education," The Balance Sheet, Volume LII, No. 4, December, 1970--January, 1971, 166.

5. Joseph F. Klein, "Adequately Trained Secretaries--A Follow-up Study," The Balance Sheet, Volume L No. 7, March, 1969, 292-293.

Bruce I. Blackstone, U. S. Office of Education, has stated:

> In addition to these traditional areas of instruction, vocational office education has shown a growth in new emerging education areas, such as supervisory and administration management; miscellaneous office; personnel, training, and related; information communications, and material support.[2]

An article in Business Week, June 20, 1970, has this to say about the "Girl Friday".

> Before interviewing potential Girl Fridays, keep these points in mind:
>
> Bright girls in their 20s and early 30s with two or more years of college--plus average secretarial skills--may be willing to start as private secretaries to top brass. But many will move out fast if the job lacks potential. Usually, this means some visible chance for advancement, or much broader job duties. To avoid this, you might limit the purely mechanical work (assign typing to a pool, for example) and increase the real responsibilities, giving the girl a chance to contact customers, sales people, management staff, and maybe even travel.[3]

From the survey of literature, the secretary will be in increasing demand for the next two decades. For the college trained woman or man in the secretarial profession, an increasing demand will be made by business for technical knowledge--both in the area of the computer and office equipment. It was the concensus of opinion of the authors that the computer has evolved a new profession of specialists; but, nevertheless, the secretary must have some knowledge of computer software and hardware as well as some expertise in interpreting computer produced data.

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2. Bruce I. Blackstone, "Office Occupations and the Junior/Community College," Business Education World, May-June, 1971, 26.

3. "Girl Friday: What They're Looking For," Business Week, June 20, 1970, 107.

CHAPTER IV

INTERPRETATION OF DATA

Evaluation of New Mexico State University Secretarial Curriculum.

Each graduate of the two-year secretarial program was asked to rate the required courses and suggested electives in the curriculum he or she followed. The results of this evaluation clearly indicated that the graduates were more interested in their vocational work than in their general education requirements (forty per cent of the two-year secretarial curriculum was in general education).

Advanced vocational courses were rated higher than the elementary vocational work. However, this may be explained by the fact that many of the secretarial students have had both elementary shorthand and typing in high school, and these requirements were waived and electives substituted.

Computer science was rated below 2.0, but this might be explained by the fact that introduction to computers was not a requirement in the curriculum until 1970, though it was a suggested elective; and a number of graduates were not exposed to the course.

2200

TABLE 1

Course No.		Course Description	No.	Mean
B.A.	104	Introduction to Business	75	2.03
S.A.	101	Elementary Typing	109	2.95
S.A.	102	Intermediate Typing	127	3.43
S.A.	103a	Beginning Shorthand	110	2.97
S.A.	103b	Intermediate Shorthand	120	3.24
S.A.	200	Advanced Shorthand & Transcription	129	3.49
S.A.	201	Advanced Shorthand & Sec. Practice	132	3.57
S.A.	203	Office Practice & Machines I	128	3.46
S.A.	204	Office Practice & Machines II	127	3.43
S.A.	207	Business Machines	118	3.19
S.A.	209	Business Letter Techniques	114	3.08
C.S.	100	Introduction to Computers	67	1.81
Art	101	Orientation in Art	65	1.76
Drama	101	Introduction to Theatre	57	1.54
Music	101	Introduction to Music	59	1.59
Eng.	111	Freshman Composition	105	2.84
Acctg.	201	Principles of Accounting I	111	3.00
Acctg.	202	Principles of Accounting II	90	2.43
Anth.	201	Introduction to Anthropology	50	1.35
Eng.	261	Introduction to Literature I	75	2.03
Hist.	101	Western Civilization I	65	1.76
Phil.	201	Introduction to Philosophy	53	1.43
Soc.	201	General Sociology	76	2.05
Econ.	201	Introduction to Economics I	97	2.62
Psy.	201	Introduction to Psychology	80	2.16
Sp.	253	Public Speaking	111	3.00
Eng.	204	Business Correspondence	107	2.89
B.A.	317	Business Law	80	2.16
C.S.	165	Computer Programming	59	1.59

Evaluation of Suggested Curriculum Additions.

A list of fifteen suggested course offerings were listed for evaluation. Based on the survey of literature, this list was placed in the questionnaire as a guide for respondents to possible weaknesses in the curriculum. The results of this portion of the questionnaire were as follows:

TABLE 2

Suggested Course Offerings	No.	Mean
Key Punch	88	2.38
Computer Programming	87	2.35
Intrepretation of Computer Data	86	2.32
Secretarial Supervision	117	3.16
Office Management	121	3.27
Interpretation of Financial Statements	108	2.92
Interpretation of Economic Data	89	2.41
Insurance	99	2.68
Business Law	90	2.43
Real Estate	87	2.35
Oral and written communications	125	3.38
Business Arithmetic	111	3.00
Office Simulation	104	2.81
Records Management	130	3.51
Human Relations	127	3.43

Six areas of suggested curricular enrichment were:

Records Management	3.51
Human Relations	3.43
Oral and written communications	3.38
Office Management	3.27
Secretarial Supervision	3.16
Business Arithmetic	3.00

2202

Filing and human relations were taught as units of instruction in secretarial procedures classes; business letter techniques and public speaking were required courses in the curriculum; and, office management was a suggested elective in the curriculum.

The fact that three management areas (records management, office management, and secretarial supervision) were considered desirable additions to the curriculum appeared to verify forecasts of a broadening spectrum of secretarial duties. When secretarial graduates that have been employed a maximum of only five years feel the need for managerial knowledge and the concomitants of human relations and communications, the assumption could have been made that the college trained secretary had served a very short apprenticeship before being moved into the lower levels of management.

Weaknesses and Suggested Improvements in the Secretarial Curriculum.

Two open-end questions were asked on the questionnaire. Graduates were asked to list what they considered to be their secretarial weaknesses and to suggest courses or units of study that they felt would strengthen the curriculum. Answers were classified, totaled, and mean values determined. Weaknesses reported were tabulated in Table 3.

TABLE 3

Courses	Number	Percent of 31
Shorthand	1	3.23
Records Management	7	22.58
Telephone	4	12.90
Office Practice	1	3.23
Business English	4	12.90
Human Relations	1	3.23
Grammar	1	3.23
Business Arithmetic	1	3.23
Technical Typing	1	3.23
Data Processing	1	3.23

Seven respondents stated that they needed training in filing beyond alphabetic, chronological, and geographic systems. Those graduates working for the government particularly emphasized a need for training in numerical systems.

Business English, particularly grammar, was a second area of weakness. The weakness in English may be a result of the many graduates who are bilingual and have difficulty translating from Spanish into English.

A third area of weakness mentioned was the telephone, making proper use of the telephone, proper use of telephone systems, and "telephone human relations".

Suggestions offered by respondents for possible units of work or course offerings which would enrich the curriculum were as shown in Table 4.

TABLE 4

Courses	Number	Percent of 31
Records Management	7	22.58
Office Simulation	5	16.13
Human Relations	8	25.81
Computers	4	12.90

Table 4 continued

Real Estate & Business Law	3	9.67
Mathematics	1	3.23
Small Office Bookkeeping	1	3.23
English Grammar	4	12.90
Business Office Procedures	2	6.45
Technical and Legal Terms	5	16.13
Long Typing Jobs Practice	1	3.23
Office Machines (MT/ST, Stenotype)	7	22.58
Technical Typing and Equations	1	3.23
Telephone	1	3.23
Business Letters	1	3.23

CHAPTER V

CONCLUSIONS

As a result of this study, the business administration faculty should give cognizance to the changing profile of the secretary of today and tomorrow. Curricular implications drawn from this study are:

1. Broadening the secretarial curriculum by adding office management, records management, and secretarial supervision as either required courses or suggested electives;

2. Utilizing the existing course in human relations as a suggested elective;

3. Increasing the credit hours from two to three for business letter techniques to include more grammar study;

4. Increasing classroom applications of statistical and tabulation typing;

5. Increasing the use of technical vocabularies in existing skill courses;

6. Expanding office machines equipment, by lease or purchase, to include an MT/ST and electronic calculators.

The present degree plans for secretarial majors include a two-year secretarial Associate of Arts Degree and a four-year baccalaureate degree in Business Administration. For the past five years, the attrition rates in the secretarial programs have been more than fifty per cent. Young women enter the secretarial program, study typewriting and shorthand

2206

until they have obtained a job (one or two semesters of school), and then the students go to work full-time.

R. F. Schuck, writing in the Clearing House, suggests for high schools three-track curricula which may have merit for university curricula as well. He says:

> The three instructional programs include: (1) A one-year general education program which is designed for students who wish to receive an introduction to American business, competency in typewriting or shorthand, and knowledge of data processing. (2) A three-year preprofessional program which is designed for students who wish to prepare themselves for advanced study in business. (3) A three- or four-year vocational program which is designed for students who wish to enter the field of business following graduation.[1]

A one-year intensive secretarial program for students needing skills for clerical and stenographic positions would fulfill a need for those students leaving school before finishing their degrees. In other words, a three-track program of secretarial training should be given consideration--1) one-year intensive stenographic program; 2) two-year secretarial Associate of Arts Degree program; 3) four-year bacculaureate Business Administration Degree program.

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1. R. F. Schuck, "Revitalized Curriculum for Business Education," Clearing House, Volume 45, No. 1, September, 1970, 32-36.

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EXHIBIT A

NEW MEXICO STATE UNIVERSITY

BOX 3AD, LAS CRUCES, NEW MEXICO 88001
COLLEGE OF BUSINESS ADMINISTRATION AND ECONOMICS, AREA 505 646-1201

Department of Business Administration

April 13, 1971

Dear Graduate:

Will you help the Secretarial Administration Faculty at N.M.S.U. evaluate our secretarial curriculum? Please complete the attached questionnaire and return it to us in the enclosed stamped, self-addressed envelope by April 19.

Some time has elapsed since your graduation from the two-year secretarial program at N.M.S.U., and you have had an opportunity to apply your skills and to use your knowledge in the business office. How well did N.M.S.U. prepare you to fulfill the requirements of your employment?

The goal of the secretarial curriculum is to prepare future secretaries as well as possible. Therefore, the questionnaire is an effort to discover whether the secretarial curriculum needs changes to keep pace with the changing business office. Please let us benefit from your practical experience. Thanks.

Sincerely,

(Miss) Eleanor Ann Heins
Assistant Professor

ah

Enclosures (2)

2210

EXHIBIT B

NEW MEXICO STATE UNIVERSITY
COLLEGE OF BUSINESS ADMINISTRATION AND ECONOMICS

QUESTIONNAIRE

I. Since graduating from the two-year secretarial program at N.M.S.U., I have been gainfully employed as a full-time secretary for: (check the most appropriate time period.)

_____ 6 months to 1 year

_____ 1 year to 2 years

_____ 2 years to 3 years

_____ 3 years to 4 years

_____ 4 years to 5 years

II. Based on your office experience, please evaluate each course offering in the secretarial curriculum completed by you at N.M.S.U.

		Small Importance	Average Importance	Vital Importance	No Opinion
B.A. 104	Introduction to Business	_____	_____	_____	_____
S.A. 101	Elementary Typing	_____	_____	_____	_____
S.A. 102	Intermediate Typing	_____	_____	_____	_____
S.A. 103a	Beginning Shorthand	_____	_____	_____	_____
S.A. 103b	Intermediate Shorthand	_____	_____	_____	_____
S.A. 200	Advanced Shorthand and Transcription	_____	_____	_____	_____
S.A. 201	Advanced Shorthand and Secretarial Practice	_____	_____	_____	_____
S.A. 203	Office Practice and Machines I	_____	_____	_____	_____
S.A. 204	Office Practice and Machines II	_____	_____	_____	_____
S.A. 207	Business Machines	_____	_____	_____	_____
S.A. 209	Business Letter Techniques	_____	_____	_____	_____
C.S. 100	Introduction to Computers	_____	_____	_____	_____

		Small Importance	Average Importance	Vital Importance	No Opinion
Art 101	Orientation in Art	_____	_____	_____	_____
Drama 101	Introduction to Theatre	_____	_____	_____	_____
Music 101	Introduction to Music	_____	_____	_____	_____
Eng. 111	Freshman Composition	_____	_____	_____	_____
Acctg. 201	Prin. of Accounting I	_____	_____	_____	_____
Acctg. 202	Prin. of Accounting II	_____	_____	_____	_____
Anthr. 201	Intro. to Anthropology	_____	_____	_____	_____
Eng. 261	Intro. to Literature I	_____	_____	_____	_____
Hist. 101	Western Civilization I	_____	_____	_____	_____
Phil. 201	Intro. to Philosophy	_____	_____	_____	_____
Soc. 201	General Sociology	_____	_____	_____	_____
Econ. 201	Intro. to Economics I	_____	_____	_____	_____
Psy. 201	Intro. to Psychology	_____	_____	_____	_____
Speech 253	Public Speaking	_____	_____	_____	_____
Eng. 204	Business Correspondence	_____	_____	_____	_____
B.A. 317	Business Law	_____	_____	_____	_____
C.S. 165	Computer Programming	_____	_____	_____	_____

III. Based on your office experience, please evaluate the usefulness to the secretary of the following suggested courses:

	Small Importance	Average Importance	Vital Importance	No Opinion
Key Punch	_____	_____	_____	_____
Computer Programming	_____	_____	_____	_____
Interpretation of Computer Data	_____	_____	_____	_____
Secretarial Supervision	_____	_____	_____	_____
Office Management	_____	_____	_____	_____

	Small Importance	Average Importance	Vital Importance	No Opinion
Interpretation of Financial Statements	_____	_____	_____	_____
Interpretation of Economic Data	_____	_____	_____	_____
Insurance	_____	_____	_____	_____
Business Law	_____	_____	_____	_____
Real Estate	_____	_____	_____	_____
Oral and Written Communications	_____	_____	_____	_____
Business Arithmetic	_____	_____	_____	_____
Office Simulation (Model Office)	_____	_____	_____	_____
Records Management (Filing)	_____	_____	_____	_____
Human Relations	_____	_____	_____	_____

IV. Based on your office experiences, please state what you feel to be the weaknesses of the two-year secretarial curriculum at N.M.S.U. Namely, what have been your secretarial weaknesses on the job?

V. Based on your office experiences, please suggest courses and/or units of study that would strengthen the secretarial curriculum and bring the curriculum more in line with the work actually performed in the office today.

2213

VT 013 919
WOODIN, RALPH J., AND OTHERS
AGRICULTURAL EDUCATION IN "LIFE 2000." A REPORT OF A TASK FORCE ON LONG RANGE PLANNING FOR THE COLLEGE OF AGRICULTURE AND HOME ECONOMICS FOR THE YEARS 1985 AND 2000.

OHIO STATE UNIV., COLUMBUS. DEPT. OF AGRICULTURAL EDUCATION.
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DESCRIPTORS - *AGRICULTURAL EDUCATION; *AGRICULTURAL TRENDS; AGRICULTURAL TECHNICIANS; *VOCATIONAL AGRICULTURE; *TEACHER EDUCATION; INSERVICE EDUCATION; *PROGRAM DEVELOPMENT; PROGRAM EVALUATION; EDUCATIONAL NEEDS; MANPOWER NEEDS; RESEARCH NEEDS; CURRICULUM DEVELOPMENT; EDUCATIONAL PLANNING
IDENTIFIERS - OHIO

ABSTRACT - INCLUDED IN THIS SPECIAL TASK FORCE REPORT ARE PROJECTIONS CONCERNING AGRICULTURE EDUCATION IN OHIO FOR THE YEARS 1985-2000 AS WELL AS AN ASSESSMENT OF THE AGRICULTURAL ENVIRONMENT FOR THE YEAR 1970. DEVELOPED FROM 17 TASK FORCES CONSISTING OF OVER 350 FACULTY MEMBERS FROM THE COLLEGE OF AGRICULTURE AND HOME ECONOMICS, THE RESEARCH AND DEVELOPMENT CENTER, AND THE COOPERATIVE EXTENSION SERVICE THESE PROJECTIONS RELATE TO SUCH TOPICS AS: (1) UNDERGRADUATE PREPARATION OF TEACHERS, (2) GRADUATE EDUCATION, (3) PREPARATION OF TEACHERS FROM THE AGRICULTURAL INDUSTRY, (4) IN-SERVICE EDUCATION FOR BEGINNING TEACHERS AND EXTENSION PERSONNEL, (5) INTERNATIONAL AGRICULTURAL EDUCATION, (6) PREPARATION OF TEACHERS OF TECHNICIANS, (7) RESEARCH AND DEVELOPMENT, (8) CURRICULUM MATERIALS, AND (9) STAFF SELF-RENEWAL. TOPICS INCLUDED IN THE ASSESSMENT OF THE 1970 POSITION OF AGRICULTURE EDUCATION ARE: (1) GOALS OF VOCATIONAL EDUCATION IN OHIO, (2) GOALS FOR OHIO COOPERATIVE EXTENSION SERVICE, (3) PLACEMENT OF GRADUATES, AND (4) UNDERGRADUATE PROGRAMS. IT WAS NOTED THAT THE IMPORTANCE OF AGRICULTURE AS A MEANS OF AUGMENTING DIMINISHING WORLD FOOD SUPPLY WILL RECEIVE RECOGNITION BY THE GENERAL PUBLIC. (JS)

VT 013 919

AGRICULTURAL EDUCATION IN "LIFE 2000"

A REPORT OF A TASK FORCE ON LONG RANGE PLANNING FOR THE COLLEGE OF AGRICULTURE AND HOME ECONOMICS FOR THE YEARS 1985 AND 2000

Issued by
The Department of Agricultural Education
The College of Agriculture and Home Economics
The Ohio State University
April 1, 1971

2215

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AGRICULTURAL EDUCATION IN "LIFE 2000"

A Report of a Task Force
on
Long Range Planning
for the
College of Agriculture and Home Economics
for the Years 1985 and 2000

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Issued by
The Department of Agricultural Education
The College of Agriculture and Home Economics
The Ohio State University

April 1, 1971

2216

TABLE OF CONTENTS

	Page
LIST OF TABLES	ii
AGRICULTURAL EDUCATION IN "LIFE 2000"	1
Plan for the Departmental Study	2
SECTION I - The Environment for Agricultural Education in Ohio in 1970	4
Goals for Vocational Education in Ohio	4
Goals for Ohio Cooperative Extension Service	6
Vocational Education in Agriculture	8
Cooperative Extension in Ohio	9
Placement of Graduates	10
Graduate Work	10
Undergraduate Programs	11
Research Activities	13
In-Service Education for New Teachers	13
Non-Credit In-Service Education for Teachers	14
International Education	14
Curriculum Materials Service	15
SECTION II - The Future Educational Environment for Agricultural Education	16
Competency Required of Agricultural Education Personnel Working in the Environment of 1985-2000	17
SECTION III - Future Programs in Agricultural Education	19
Undergraduate Preparation of Teachers	19
Graduate Education	20
Preparation of Teachers From the Agricultural Industry	21
In-Service Education for Beginning Teachers and Extension Personnel	22
In-Service Education	23
International Agricultural Education	23
Learning Resource Center	24
Preparation of Teachers of Technicians	24
Research and Development	25
Curriculum Materials	26
Development and Demonstration of Differentiated Staffing	27
Staff Self-Renewal	27
APPENDIX	29

2217

LIST OF TABLES

PROJECTED NEEDS FOR FULL-TIME FACULTY IN AGRICULTURAL EDUCATION 1985 . . . . . Page 28

Table No.		Appendix
1	NUMBER OF OHIO DEPARTMENTS AND TEACHERS 1965-1971	1
2	NUMBER OF PERSONS QUALIFIED TO TEACH VOCATIONAL AGRICULTURE IN OHIO	1
3	NUMBER OF OHIO AGRICULTURAL EDUCATION GRADUATES TRAINED AND PLACED IN VARIOUS OCCUPATIONS 1965-1970	1
4	ENROLLMENT OF OHIO TEACHERS OF VOCATIONAL AGRICULTURE AND OTHERS MAJORING IN AGRICULTURAL EDUCATION IN PROGRAMS BEYOND THE B. Sc. DEGREE	2
5	NUMBER OF DECLARED UNDERGRADUATE MAJORS IN AGRICULTURAL EDUCATION, OHIO STATE UNIVERSITY	2
6	NUMBER OF MASTERS AND Ph. D. DEGREES GRANTED IN AGRICULTURAL EDUCATION 1965-70	2
7	OHIO COOPERATIVE EXTENSION PERSONNEL FUTURE NEEDS	3
	PROJECTED NUMBERS OF TEACHING PERSONNEL NEEDED FOR VOCATIONAL AGRICULTURE IN OHIO	4
8	PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL IN NON-METROPOLITAN OHIO SCHOOLS INCLUDING GENERAL AND COMPREHENSIVE HIGH SCHOOLS	4
9	PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL IN AREA VOCATIONAL CENTERS	5
10	PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL IN METROPOLITAN SCHOOLS IN TEN MAJOR CITIES	5
11	PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL IN TECHNICAL EDUCATION IN AGRICULTURE	6
12	SUMMARY OF PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL IN ALL PROGRAMS AND ALL INSTITUTIONS	6
13	OHIO AGRICULTURAL EDUCATION ENROLLMENT PROJECTIONS	6
14	AGRICULTURAL EDUCATION ENROLLMENT IN OHIO HIGH SCHOOLS, STATE DEPARTMENT OF EDUCATION	7

2218

AGRICULTURAL EDUCATION IN "LIFE 2000"

A Final Report of the Task Force in Agricultural Education
of the
College of Agriculture and Home Economics
The Ohio State University
April 1, 1971

Project "Life 2000" represented a major effort on the part of the College, the Research and Development Center, and the Cooperative Extension Service toward developing a comprehensive long range plan which would give direction to these institutions for the next thirty years. Seventeen task forces consisting of over 350 faculty members from the three institutions participated in developing the plan. These task forces utilized the services of resource persons from related agricultural industries in making their projections, thus involving the agricultural leadership of the state. The Department of Agricultural Education was represented on several of the task forces and was also responsible for developing it's own report for this particular department.

Each departmental task force was asked to develop a preliminary long range plan, to have faculty members of the department review the plan and submit it for review to college committees working on the long range plan. All departments were asked to include in their departmental plans the following:

1. The future environment of the department.
2. The future role and mission of the department.
3. The future programs of the department in broad outline.

There was considerable interaction between the college task forces and the department committees as they prepared their long range reports. An exchange of preliminary reports took place through the year so that there could be a sharing of ideas. The preliminary report of the Department of Agricultural Education

was provided the steering committee on April 1, 1970 and the balance of the report was submitted July 1, 1970. Further refinements were made, and an amended final report was published May 1, 1971. The department expects, however, to revise this plan periodically in order that it may be of maximum value in providing future leadership.

Plan for the Departmental Study

The task force for the Department of Agricultural Education, appointed by Chairman Ralph E. Bender, initially included Leon W. Boucher, Clarence J. Cunningham, Darrell L. Parks, J. Robert Warmbrod, Richard H. Wilson, and Ralph J. Woodin who served as chairman and editor of the report. Other persons who served as consultants from time to time included Richard Geyer, James E. Dougan, Orlo Musgrave, and Ralph E. Bender.

The committee held a series of meetings from October, 1969 through May of 1970 which provided the basis for the plan.

The committee believed that selected projections could be made in terms of clientele, their needs, and curriculum for preparation of teaching personnel which would be a useful guide to the work of the department. The following represent the type of projections which the committee set out to make:

1. A statement of the philosophy, aims and objectives of agricultural education appropriate for the years 1985 and 2000.

2. The major clientele groups which are to be served in the future and some projections as to their needs and problems.

3. The numbers of persons to be served in each of these clientele groups.

4. A listing of the agencies and institutions which will be concerned with, and which will be offering, agricultural education in 1985 and in the year 2000.

5. A projection as to the breadth of vocational education in agriculture in regard to such matters as community development, public affairs, and similar activities which are becoming a part of continuing education.

6. The numbers of professional personnel required for the program envisioned in 1985 and in 2000.

7. The required competencies for various levels of professional personnel to staff the agricultural education program in the years ahead.

8. The types of curriculum needed for pre-service education in order to produce competent teachers.

9. The kinds of in-service education required for agricultural educators in 1985, including graduate and non-credit programs.

10. The research activities necessary to support and move forward the program of agricultural education.

Section I

The Environment for Agricultural Education in Ohio in 1970

Agricultural Education in Ohio has grown and prospered and has achieved national recognition. This growth was due in a large measure to strong leadership in the program, to dedicated workers throughout the state, and because these programs have met the needs of Ohio's people. A friendly cooperative working relationship between the college, the OARDC, the Extension Service and vocational education has also been an important factor. A more detailed view of this environment may be obtained from the following statements of goals of the programs in which teachers of vocational agriculture and extension agents work.

Goals for Vocational Education in Ohio

The Division of Vocational Education of The Ohio Department of Education is charged with the responsibility of maintaining, extending, and improving existing programs and for developing new programs of vocational-technical education for persons of all ages in all communities of the state. In accordance with federal and state legislation, programs are to be provided for (1) high school students; (2) persons who have completed or left high school who are available for study in preparation for entering the labor market; (3) persons who have already entered the labor market who need training or retraining; (4) persons who have academic, socioeconomic, or other handicaps that prevent them from succeeding in regular vocational education programs; and (5) handicapped persons who cannot succeed in the regular vocational education program without special assistance or who require a modified vocational education program.

The total program of vocational education also includes provision for guidance and counseling, teacher education, supervision, administration and leadership, research and development, the development of instructional materials, and program evaluation.

From these goals, the following specific objectives were developed by the staff of the Division of Vocational Education, Department of Education, State of Ohio:

1. To provide by 1977 an occupational orientation program for all youth in the elementary schools.

2. To provide by 1977 a career orientation program for all 12- and 13-year old youth designed to aid them in making realistic decisions about job training.

3. To provide by 1977 a career exploration program for all youth 14 and 15 years of age.

4. To provide by 1974 an occupation work adjustment program for all dropout-prone youth below 16 years of age.

5. To serve by 1974, 40% of all high school students 15 years of age and above with job preparatory vocational education programs, including 75 percent of the disadvantaged youth who have academic, socioeconomic, or other handicaps and 50 percent of the handicapped high school youth.

6. To serve by 1980, 26% of all persons 18 to 22 years of age through post-high school technical education programs.

7. To serve by 1974, 10% of all adult workers through retraining and upgrading vocational education programs.

These statements of goals and objectives of vocational education in Ohio

suggest important responsibilities for pre-service and in-service teacher education programs. They also describe the nature of future vocational education programs in the public schools.

Goals for Ohio Cooperative Extension Service

The Ohio Cooperative Extension Service provides educational programs in agriculture, home economics, and related subjects for the citizens of Ohio. Major emphasis is given to economic development and related social and cultural needs.

The basic objective of the Cooperative Extension Service is to assist people in making use of information relating to agriculture and home economics so that they may be better able to solve problems. Such information may pertain to the agricultural industry, family living, youth, and community needs of Ohio. The aim of the program is an improved level of living for all citizens through increased understanding and use of up-to-date, scientific information.

Research-derived information is used in the development of the extension educational program. This is furnished by the College of Agriculture and Home Economics of The Ohio State University, the Ohio Agricultural Research and Development Center, the United States Department of Agriculture, and other land-grant colleges and universities.

Educational assistance based on information from these sources is made available to the people through a professional extension staff of county and area extension agents and state extension specialists. All are members of the faculty of the College of Agriculture and Home Economics of The Ohio State University. These staff members work closely with citizens who are members of the county, area, and state extension advisory committees. They also work with

local, state, and federal organizations, agencies, and groups in identifying major problems and determining objectives.

The general framework for extension educational programs is established by state and federal laws. It is spelled out in the Memorandum of Understanding between the United States Department of Agriculture and The Ohio State University as well as in approved project agreements covered by the Memorandum of Understanding. Program emphasis is determined within the framework of policies of The Ohio State University, the College of Agriculture and Home Economics, and the Ohio Cooperative Extension Service. Available financial and professional resources and priorities established in terms of major needs of the people are key factors in determining program direction.

Major areas of program emphasis for the Ohio Cooperative Extension Service have been defined in project agreements with the Federal Extension Service. They are:

1. Agricultural Production, Management, and Natural Resource Development;
2. Marketing and Utilization of Agricultural Products;
3. Home Economics;
4. 4-H and Other Youth Work;
5. Community and Public Affairs.

Within these five general categories, the Ohio Cooperative Extension Service brings its resources to bear on the educational needs of Ohio's citizens. The Cooperative Extension Service is directed by both state and federal laws to work with both adults and youth regardless of whether they live in rural or urban areas.

Vocational Education in Agriculture

The general purpose of vocational agriculture is to prepare high school students for careers in most phases of agriculture including farming. Vocational agriculture provides high school preparation for agricultural careers not requiring a bachelors degree. Continuing education is also provided for those engaged in agriculture who wish to update their skills and abilities in this field. This program is supervised by Assistant Director James E. Dougan of the Agricultural Education Service, of the State Department of Education, and his staff of ten who serve as consultants and supervisors.

The extent of the vocational agriculture program is indicated by the fact that in 1970 Ohio had 310 departments of vocational agriculture, employing 467 high school instructors as well as 7 full-time adult instructors. Further details are presented in Appendix Table 1.

The annual enrollment of high school students in vocational agriculture in 1970 was approximately 17,000. There had been an increase of nearly 4,000 high school students in agriculture since 1965. There was an enrollment of 3,600 young farmers and 6,165 adult farmers in organized classes conducted by teachers of vocational agriculture. While many vocational agriculture programs were offered in comprehensive high schools, a network of 15 area vocational centers in the state offered 51 vocational agriculture programs. Additional area vocational centers are to offer agricultural programs in the future as vocational education programs are developed in 100 planning districts in the state.

The high school enrollment of approximately 17,000 in vocational agriculture in 1970 was divided among 12,574 in production agriculture, 1,188 in

agricultural business and services, 1,367 in vocational horticulture, 561 in agricultural-industrial equipment, and 325 in agricultural resources. The agricultural work experience program for the disadvantaged had an enrollment of 685. The remaining students were enrolled in some of the newer specialized programs such as environmental protection, agricultural processing, and small animal care.

Post-secondary two-year programs in agricultural education were being offered by an increasing number of technical institutes. During the 1970-71 academic year a total of some 245 students received instruction in one or more of twelve different agricultural technologies offered by eight technical institutes in Ohio. Projections indicate that by the year 1975 a total of 14 institutions will be offering instruction in approximately 20 agricultural technologies to a total enrollment of some 1,500 students.

Cooperative Extension in Ohio

Ohio's Cooperative Extension Service conducts an extensive program in Ohio. Offices are maintained in each of the 88 counties in the state, employing 250 agents in agriculture, 4-H and Home Economics. Ten area offices provide extension programs of a more specialized nature for all areas of the state.

Among the unique features of the Ohio program in extension are the pre-service program of Professional Preparation, the Research and Development Program, the Area Center Program, and the emphasis upon educational programs in agricultural production, marketing, home economics, community development and youth development. Selected extension agents also assist in the development of teachers in county extension offices.

Placement of Graduates

Fifty-eight students completed the Agricultural Education curriculum in 1970 and were certified to teach vocational agriculture as shown in Appendix Table 2. An additional 14 majored in other areas and enrolled in sufficient course work in the department to be certified. Of the 72 certified, 39 were placed as teachers of vocational agriculture, 3 in extension, 4 continued in graduate work and 26 were in other related fields in education and agriculture or in the armed services. Further details for the period from 1965 to 1970 are shown in Appendix Table 3. A similar pattern of placement has obtained for the past five years, with about 60 percent of the graduates entering vocational agriculture teaching.

Graduates of the department may enter the Extension Service upon graduating with a bachelor's degree or after some years of teaching experience. In 1970 about 60% of the men in field work for the Cooperative Extension Service had received their bachelor's degrees in the Department of Agricultural Education.

Graduate Work

The department offers academic programs leading to the Master of Arts, Master of Science and Doctor of Philosophy degrees. The primary objective of these programs is to prepare effective teachers and personnel for leadership positions in supervision and teacher education.

In the doctoral program two or three minor areas in addition to agricultural education are ordinarily selected. These areas are often in other departments in either the College of Agriculture or the College of Education. The graduate curriculum includes a total of twenty-four graduate offerings, sixteen organized courses as well as seminars, workshops, and individual study programs.

The graduate program in extension education is designed primarily for county, area, and state extension staff members interested in agriculture, 4-H and community development activity. Students follow similar planning and procedures in carrying out their graduate studies.

A five year average of degrees awarded shows 9.6 Ph.D. degrees earned per year and 18 Masters degrees. The graduate students in the department last year represented 21 states and 3 foreign countries.

In 1970, 104 teachers of vocational agriculture, 24 extension agents and 55 others majoring in agricultural education were enrolled in programs beyond the bachelors degree. This represented a total of 183 persons. Further details are shown in Appendix Table 4.

A major thrust of the graduate program is a series of 3-week workshops developed cooperatively with the supervisors and the Departments of Agricultural Engineering and Agricultural Economics which are conducted each year. One hundred and fifty-five teachers were enrolled in this in-service education program in 1970.

Another important feature of the graduate program are the off-campus offerings. Ordinarily two courses are offered each quarter in locations in the state convenient to extension and vo-ag personnel. In 1970, four of these courses enrolled a total of 52 persons.

Undergraduate Programs

An average of about 190 students have majored in the department's undergraduate programs over the past three years. Further details of enrollment are shown in Appendix Table 5. A vigorous program of recruitment has been carried on because of the persistent shortage of teachers. Evidence of the success of

recruitment is indicated by the total number qualified for teaching vocational agriculture which has risen from 40 who were prepared in 1965 to 72 who were prepared in 1970.

The curriculum in agricultural education allows for considerable flexibility and opportunity for specialization in any one of six specialty areas. Sixty-one of the 196 hours required for a degree are in technical agriculture and 33 hours of professional education are required for certification.

The professional courses in agricultural education include a three-hour introductory course, a five-hour course on methods and programs in agricultural education, both of which are taken prior to student teaching. Last year, 64 students were enrolled in student teaching. They received field experience in 29 vocational agriculture training centers and 21 extension centers. Most students enrolled for 14 weeks of field experience.

The field experience program involves placement with selected vocational agriculture teachers during the month of September followed by student teaching in the same school. During the student teaching quarter trainees spend approximately three weeks under the direction of selected Cooperative Extension Agents. Other additional supervised field experience in related fields, under the supervision of the department, is provided, and last year 23 students were enrolled.

Another aspect of the curriculum is participation in the Agricultural Education Society which provides students experience in presiding at meetings, conducting committee meetings, participating in forums and symposiums, planning social and educational meetings and participating in parliamentary procedure.

Research Activities

The research efforts of the department are directed toward the preparation of students capable of conducting independent research as well as the development of research which contributes to more effective agricultural education in the state. A new course in research design and a research seminar were added to the offerings of the department completing a sequence of three courses in research methodology which were first offered in 1969.

All graduate students in the department take at least one course in research and Ph. D. candidates take a series of at least four courses including the above course plus a course in statistics. A major research effort of the department at this time is a project designed to estimate current and projected manpower needs in Ohio for persons requiring knowledge and skill in agriculture. This inventory will provide a valuable basis for planning and projecting future agricultural education programs.

A valuable resource for the research aspects of the department is provided through The Center for Vocational and Technical Education. Four students pursuing Ph. D. degrees served last year as research assistants at The Center and one was the recipient of the John Deere Fellowship Award.

Other important resources for research in the department, including the funding of research assistantships, have been provided by: The Center for Vocational and Technical Education; the Division of Vocational Education; the Cooperative Extension Service and The Ohio Agricultural Research and Development Center.

In-Service Education for New Teachers

A comprehensive in-service education program for new teachers of vocational agriculture is conducted by the department. This program which involves a series

of seminars, meetings and visits to schools, is designed to assist teachers to plan, organize, conduct and evaluate programs of vocational agriculture in their own communities. A three-day seminar is held in August to assist the new teachers in their initial planning followed by small group seminars held throughout the state during September, November, February and April. A midyear two-day seminar is conducted in December at The Ohio State University. At this seminar attention is given to evaluating progress, completing curriculum plans, and discussing current problems.

Non-Credit In-Service Education for Teachers

The department also assists supervisors in agricultural education in developing an in-service education program in technical agriculture for all teachers in the state. In 1970, 123 teachers were enrolled in 12 workshops conducted through the summer months. These workshops included such topics as "Farm Credit," "Weed Control," "Legal Aspects of Agriculture," "Farm Income Tax," "Animal Nutrition," "Teaching Electricity," and "Spray Painting."

International Education

The department has given continued support to university programs of international education. Among persons who have participated in this program in the past five years are Dr. Ralph E. Bender who has made a survey of the need for agricultural education in Brazil, Dr. Wayne Schroeder who has served as Chief of Party for the College of Education project in India, Dr. Leon Boucher who served as a consultant for the College of Education India Project, and Dr. Lowell Hedges and Mr. Daryl Sharp who served as consultants in vocational agriculture in India.

An average of three foreign nationals per year have received their Ph. D. degrees in agricultural education for the past several years. Many of these men

occupy strategic positions of leadership in agricultural extension and agricultural education in their own countries. While most of these men have come from India, other countries represented include Pakistan, Syria, Nigeria, Nepal, Korea and Afganistan.

Curriculum Materials Service

The department plays an important role in developing and providing curriculum materials for vocational agriculture teachers. The Ohio Agricultural Education Curriculum Materials Service is a cooperative activity sponsored by the Department of Agricultural Education and the State Department of Education. It's purpose is to assist teachers in the improvement of instruction through providing curriculum materials.

An important activity is to search out and make available existing materials suitable for use by teachers and students. A catalog of listings last year included 696 printed and audio visual items which were ordered by Ohio vocational agriculture teachers. Each year the Curriculum Materials Service prepares new materials for teachers which are not available from other sources. Over one hundred such items are available in the current catalog.

Section II

The Future Educational Environment for Agricultural Education

As the task force considered the work of the Department of Agricultural Education fifteen and thirty years hence, it was believed desirable to consider the educational environment in which the department would likely be operating in the future.

Generally this forecast is based upon a belief that both agriculture and education will become increasingly important in the lives of all persons and that both will be accorded greater public support. It is also believed that agricultural education will become an increasingly important aspect of a comprehensive program of occupational education which is offered at all levels to all persons. In such a context it appears that agricultural education may be more diffused as a part of several program areas.

The following represent the forecast of the task force regarding the future educational environment for agricultural education.

1. The importance of agricultural research and education as a means of augmenting diminishing world food supplies will receive recognition by the general public.

2. The percentage of Ohio's work force engaged in agricultural production will have decreased slowly and continuously as improvements in technology occur. By 1985 Ohio should have about 30,000 commercial farms and about 25,000 by the year 2000.*

3. The percentage of Ohio's work force engaged in off-farm agricultural occupations will have increased continuously to about 15% of the total as more farming operations are shifted to the factory and as consumers demand higher quality and more convenient food products.

*This figure includes only farms with gross income of $20,000 or more.

4. As more agricultural instruction is offered in the elementary and junior high schools, and as prevocational courses are organized, vocational agriculture teachers and extension agents will be called upon to a greater extent to assist other teachers in securing information and providing student experiences.

5. Vocational agriculture courses will be offered in each of the four years of high school with an increasing degree of specialization in the eleventh and twelfth grades.

6. Continuing education programs in agriculture will be greatly expanded, will be offered on a year-round basis and will involve more coordination of all agricultural agencies.

7. Post-high school, thirteenth- and fourteenth-year technical education in agriculture, will be available to most high school graduates and will provide for entering specialized agricultural occupations.

8. Continuing education programs for adults will expand most in the area of organized formal instructional programs, which will be available to both farmers and those engaged in related agricultural occupations.

9. The clientele of continuing education will include the commercial farmer but in addition the lot of the disadvantaged in agriculture will receive more attention.

10. Entrance into the world of work will come later as the number of positions requiring the unskilled grows more scarce.

11. Future preparation of personnel in agricultural education will continue to be centered at The Ohio State University rather than diffused among several educational institutions.

12. Agricultural Education Programs will continue to face the task of assigning priorities because of limited financial support for all educational endeavors and more competition for the available tax dollar.

Competency Required of Agricultural Education Personnel Working in the Environment of 1985-2000

A changing social, educational and agricultural environment will impose a need for new, varied, and specific competencies on the part of those engaged in agricultural education in 1985 whether as teachers of vocational agriculture or as extension workers. The development of persons possessing combinations of these unique competencies becomes a major objective of the Department of Agricultural Education.

The task force believes that the agricultural educator of the future should be competent in each of the following aspects of his work.

He should be able to:

1. Participate intelligently and cooperatively in helping to plan and promote the educational efforts of the institution in which he works, to the end that it may make its maximum contribution to a constantly developing and improving society.

2. Plan a viable and effective program, with the aid of community representatives, through which his efforts may provide realistic, high quality preparation for agricultural occupations. Such a program should be based upon careful appraisal of agricultural and educational needs of the community, the state, and the nation, and suited to the needs, interests, and abilities of those who can profit from such education.

3. Teach classes and groups effectively on the basis of their individual needs, utilizing group planning, thinking and evaluation processes, appropriate technical materials, community resources, and purposeful experiences associated with appropriate classroom methods.

4. Guide students in securing realistic, useful, occupational experiences which will provide useful and meaningful preparation for agricultural occupations.

5. Advise organized youth groups, to the end that students may participate in a broad program of activities which will provide meaningful supplementary social experience.

6. Offer continuing education programs for out-of-school youth and adults in order that they may upgrade their agricultural proficiency, using the same educational principles as in teaching high school classes.

7. Participate intelligently in the affairs of the community and develop desirable attitudes on the part of the community toward educational institutions and the program of agricultural education.

8. Guide and counsel individuals of all age groups, assisting them in the selection of appropriate vocations in agriculture and in becoming better adjusted to their social and physical environments.

9. Plan and organize the physical facilities required for effective learning, adapting them to the needs of the individual learners.

10. Contribute to the profession through the exemplification of high ethical standards, conscientious professional service and leadership in professional organizations as well as through a program of personal professional improvement.

Section III

Future Programs in Agricultural Education

To accomplish the goals and objectives of The Department of Agricultural Education fifteen and thirty years hence, the following programs are believed necessary. Each of these programs consists of a series of activities and procedures conducted by the staff in order to further certain specific goals of the department.

1. Undergraduate Preparation of Teachers

A major program of the department will be the undergraduate preparation of teachers of agricultural education for general and specialized technical agriculture programs, for extension education and related careers, including the teaching of disadvantaged. Faculty of the department will be responsible for developing appropriate curricula in agriculture, environmental improvement and education, with the cooperation of other departments of the university. Opportunity should be provided for all who desire to teach in this field and sufficient numbers should be prepared to meet the demand.

Student personnel development will be considered a part of the undergraduate preparation of teachers and will include recruitment, guidance, counselling, and placement.

Current projections of the State Department of Education forecast 976 units of agricultural education or teaching positions in Ohio high schools by 1975. Assuming that the current 12% turnover rate of teachers would continue this would mean that by 1975 one hundred and seventeen teachers per year would be needed for replacement. An additional 50 persons would be required annually to meet growth requirements making a total of 167 persons needed each year to enter teaching.

Since about 60% of those qualified enter teaching, in order to provide 167 teachers it would be necessary that about 280 persons be qualified each year. This would require an enrollment of approximately 1100 students in the undergraduate program of The Department of Agricultural Education.

Projections for 1985 shown in Appendix Table 12 calls for a total of 1,174 persons employed in vocational agriculture in Ohio. Since this represents an increase of about 20% over 1975 numbers, plans should be made for an undergraduate enrollment, at that time, of about 1250 and about 330 graduates per year. The equivalent of six full-time faculty will be needed in 1985 to carry out this program.

2. Graduate Education

Many favorable factors point to The Ohio State University as the major center in the nation for graduate study and research in occupational education. These favorable factors include the location of The National Center for Vocational and Technical Education on the campus, the strong leadership in each vocational teacher preparation program, and the many exemplary programs of vocational and technical education in the public schools of Ohio. Similar factors are also appropriate to Cooperative Extension Education.

Agricultural education can make an especially important contribution to the development of graduate education in vocational-technical and extension education for within this department are more resources than any other single segment of the university. These resources include faculty who are nationally recognized, as well as a wide variety of course offerings applicable to all areas of occupational and extension education. Another important factor is the

productive relationships which have been established with departments in the College of Agriculture and Education and with the public schools of Ohio.

An important program of the department will continue to be that of offering graduate work at the Masters and doctoral levels for teachers and others who are employed in vocational-technical education and extension education positions at state, national and international levels. Courses taught by faculty in agricultural education will provide graduate students with an understanding of principles and procedures involved in the development and refinement of agricultural education programs. Increasing emphasis will be given to opportunities for practice and application of principles under realistic situations. Course offerings will be sufficiently broad to meet the needs of those persons engaged in various programs of agricultural education.

Projections to the year 1985 call for doubling the number of those qualified with Master's degrees, and increasing the number receiving Ph. D. degrees by 50% annually. It would seem realistic that by 1985 the department should be qualifying annually 85 persons with Master's degrees and 30 per year with doctoral degrees. By 1985 three full-time staff members would be needed for the program as planned.

3. Preparation of Teachers From the Agricultural Industry

More teachers in the future will likely be recruited from the agricultural industry. Professional understandings must be developed in these persons if they are to become successful teachers.

To meet the needs of these potential teachers specially designed professional courses in agricultural education will be provided. A curriculum will be designed to certify those individuals having satisfactory experience in the agricultural industry.

Such a program will provide for organized instruction, field experiences, individual observation and consultation leading to a recommendation for certification by The Department of Agricultural Education.

In addition to serving as professional persons, some of these teachers from the agricultural industry may also serve as teaching technicians and teacher aides.

Projections to the year 1985 show a need for a total of 140 teaching aides and 140 teaching technicians who would presumably come from the agricultural industry. It might be assumed that an additional 100 teachers each year would be required for teaching specialized agricultural courses in high school. One full-time faculty equivalent would be required for this program.

4. In-Service Education for Beginning Teachers and Extension Personnel

An in-service education program will be conducted for new and returning teachers in agricultural education. The program should serve those persons entering the profession and those returning to it after an absence of several years. The program should be conducted by the department through individual visits, group sessions, and seminars during a period of internship. Attention should be directed to the problems and policies of programs conducted by the participants and should extend through at least a two-year period.

The size of this program will depend upon two factors. One being the number of teachers enrolled, and the second being the number of years that they are enrolled in the program. Assuming an increase of 100% in teachers, and providing a two-year program for them would require at least 3.5 full-time staff persons devoting their time to in-service education for beginning teachers and extension personnel.

5. In-Service Education

An in-service education program consisting of both credit and non-credit courses, seminars, internships, workshops, and individual study will be offered by the department. This program will be designed to update the professional and technical competence of workers in the field. It will provide sufficient variety and flexibility so that each person will be involved in some phase of the program at least every three years. Off campus offerings will be made at convenient locations over the state, as well as at The Ohio State University.

In view of the number of workers in agricultural education requiring in-service education by 1985, a plan should be made for the equivalent of two full-time persons who would be engaged in credit and non-credit programs of in-service education.

An important contribution of the department, to the College, will be that of in-service education in teaching methods, techniques, materials and evaluation as applied to the teaching of agriculture. All beginning instructors should be enrolled in an orientation seminar to be offered each year. In addition, all faculty members should be enrolled periodically in seminars on specific teaching problems designed to update and renew their teaching proficiency.

6. International Agricultural Education

An expanded program of International Agricultural Education will be developed. This program will seek to export appropriate competencies to nations desiring to further develop their agricultural resources through education.

The program will include faculty visitation and service with other nations, exchange professorships, the exchange of students, and joint efforts in research in the field.

The addition of one half-time staff member would be required by 1985 to provide for additional instruction required as well as the coordination of international efforts in agricultural education.

7. Learning Resource Center

The Department of Agricultural Education will give leadership to the development of a learning resource center which will provide the faculty of the College of Agriculture with professional and technical assistance in improving instruction, including curriculum development, teaching procedures and instructional media, such as super 8 picture projection, computer assisted instruction, and video tapes. In addition, the center will provide technical assistance in developing and implementing individualized instruction as well as maintaining an efficient library of resource materials relevant to course offerings in the college. This service will provide professional and technical assistance to all departments in the college.

The academic plan of the department calls for leadership in designing and developing a learning resource center which would be supported and used by the college. The department proposes to provide an additional staff member, one research associate and a secretary. As the learning resource center develops it is assumed that the college as well as other departments would help to support the total effort.

8. Preparation of Teachers of Technicians

A program specifically designed for the preparation of teachers in agricultural technician programs in technical institutes, junior colleges, and community colleges will be developed in the department. The department will advise these students and consult with appropriate subject matter departments

regarding appropriate curricular offerings. This program will ordinarily involve five years of course work which will enable students to receive a Master's degree. Internship and experience in appropriate schools, businesses, and agencies will be a part of this program.

In view of the expected growth in technical education by 1985, plans should be made for the allocation to this program of a full-time staff member plus an additional secretary and two graduate assistants.

9. Research and Development

The department's research and development activities will be expanded to emphasize the development and appraisal of new programs and practices in vocational-technical and extension education. Much of the research in vocational and technical education in agriculture will be conducted within the broader context of occupational, vocational, and technical education. The expanded program of research and development will necessitate cooperative arrangements between the Department of Agricultural Education and other departments in the College and University, the Ohio Agricultural Research and Development Center, and The Center for Vocational and Technical Education. It is anticipated that an expanded research and development program in the department will result in increased financial support from appropriate governmental and private agencies outside the University.

The proposed major areas of emphasis for the department's research and development program include: the establishment, conduct, and appraisal of pilot and demonstration programs; evaluation of educational programs using cost-effectiveness and performance capability models; development and appraisal of techniques for estimating employment demand in the agri-business industry; and

the development and appraisal of new instructional media such as computer assisted instruction, audio-tutorial systems, and videotape.

If the research function of the department is to be improved substantially, it is necessary that additional staff be appointed to (1) plan and conduct research, (2) prepare proposals for research to be funded from sources outside the University, (3) teach graduate courses in research methods and design, and (4) direct research conducted by Master's and Ph. D. candidates. It is proposed that two additional faculty members, one secretary, and three graduate research associates will be required by 1985. It is anticipated that additional graduate research associates will be supported from project funds acquired from outside sources. Also it is proposed that a Department of Agricultural Education be established in the Ohio Agricultural Research and Development Center, including the appointment of an associate chairman of the department who will be responsible for coordinating and administering the department's research and development program.

10. Curriculum Materials

The Curriculum Materials Service will be further developed and expanded to better serve vocational agriculture in Ohio. This service will provide needed teaching materials such as course outlines, resource units, study guides, slides, transparencies, films, video tapes, audio tapes, and other appropriate teaching resources. Emphasis will be placed upon development of those teaching resources needed in establishing new and improved areas of the curriculum.

In view of the program expansion planned by 1985, four full-time faculty members should be employed by that time, one technician, and an additional secretary.

11. Development and Demonstration of Differentiated Staffing

A new program will be developed in order to assist in incorporating differentiated staffing procedures in agricultural education in Ohio. The development phase will consist of exploring with selected schools appropriate means of preparing teacher aides and teacher technicians, of holding conferences and workshops designed to provide understanding of the use of differentiated staffing patterns in agricultural education, and in demonstrations of differentiated staffing in various kinds of institutions such as comprehensive high schools, area vocational programs, and in technical institutes.

The addition of one-half FTE of faculty would provide for this program.

12. Staff Self-Renewal

A program of self-renewal for all members of the faculty of the department will be developed. This program should help each faculty member to keep abreast of changes in agriculture and in education, and to grow in competency and leadership. Each member will plan and carry out an individualized program which may involve post-doctoral study, membership and participation in professional and learned societies, teaching and consulting. Self-renewal will also be promoted by staff policies regarding more use of graduate students as teaching assistants and more rotation of staff responsibilities. With a staff of twenty-six persons, one-half of a full-time staff member would be required to carry out this staff self-renewal program.

PROJECTED NEEDS FOR

FULL-TIME FACULTY IN AGRICULTURAL EDUCATION

1985

Program	Present Faculty	Projected Faculty 1985
1. Preparation of undergraduates for teaching and extension	3.5	6
2. Graduate Education	2	3
3. Preparation of teachers from the agricultural industry	--	1
4. In-Service Education - Beginning Teachers	1.5	3.5
5. In-Service Education - Experienced Teachers	1	2
6. International Education	--	.5
7. Learning Resource Center	--	1
8. Preparation of teachers of technicians	--	1
9. Research and Development	1	3
10. Curriculum Materials	1	4
11. Differentiated Staffing	--	.5
12. Staff Self-Renewal	--	.5
TOTAL FACULTY	10	26

Supporting staff--the following personnel would be required:

Secretaries	14
Teaching and Research Assistants	30

Facilities -

Based upon 3,518 sq. ft. of office space and 6,050 ft. of laboratory, classroom and other for the 1970 program, or a total of 9,568 sq. ft., it is projected that the 1985 program would require a total of 25,000 sq. ft. Of this total 15,000 sq. ft. would be required for classrooms and laboratories, 3,500 for Curriculum Materials and 6,500 for office space.

A P P E N D I X

Table 1
Number of Ohio Departments and Teachers 1965-1971

Item	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
Number of Teachers	372	378	385	407	459	472
Number of Departments	304	300	305	312	312	310

Table 2
Number of Persons Qualified
To Teach Vocational Agriculture in Ohio

Item	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Regular Graduates	35	48	54	51	62	58
Others	5	8	4	5	9	14
TOTAL	40	56	58	56	71	72

Table 3
Number of Ohio Agricultural Education Graduates
Trained and Placed in Various Occupations 1965-1970

Year	Number of Men Trained	Number Placed		Graduate School	Other, Inc. Armed Services
		Vocational Agriculture	Extension		
1969-70	72	39	3	4	26
1968-69	71	45	2	4	20
1967-68	56	37	0	4	15
1966-67	58	35	5	4	14
1965-66	56	36	1	3	16
1964-65	40	33	1	2	5

Table 4
Enrollment of Ohio Teachers of Vocational Agriculture
and Others Majoring in Agricultural Education
in Programs Beyond the B. Sc. Degree

Year	Enrollment		Others	Total
	Ohio Teachers	Extension Personnel		
1969-70	104	24	55	183
1968-69	89	18	63	170
1967-68	78	28	53	159
1966-67	92	14	49	155
1965-66	99	29	38	166
1964-65	101	28	36	165

Table 5
Number of Declared Undergraduate Majors in
Agricultural Education, Ohio State University

Quarter	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70*
Autumn	141	165	159	166	191	166
Winter	152	167	183	171	199	177
Spring	168	162	183	190	207	181

*Freshmen and Sophomores enrolled in University College

Table 6
Number of Masters and Ph. D. Degrees Granted In
Agricultural Education 1965-70

Degrees	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Masters	22	22	24	21	18	7
Ph. D.	5	7	10	8	11	12

Table 7

Ohio Cooperative Extension Personnel

Future Needs

	1970	1985	2000
Number of Counties	88	88	88
Number of Area Centers	10	10	10
Professional Faculty (FTE)			
State Specialists			
Agricultural Industry	80	80	78
Community Resource Development	12	20	30
Home Economics	13	24	36
4-H and Youth	7	10	12
Program Support	15	18	21
Administration	18	18	18
Area Agents			
Agricultural Industry	30	50	60
Community Resource Development	5	20	24
Home Economics	10	20	30
4-H and Youth	10	20	20
County Agents			
Agricultural Industry	88	88	88
Community Resource Development	1	50	76
Home Economics	88	178	203
4-H and Youth	78	178	178
Sub-Professional-County (FTE)			
Agricultural Industry	--	--	20
Community Resource Development	--	--	10
Home Economics	200	560	910
4-H and Youth	15	520	978
Sub-Professional-Area and State (FTE)			
Technical Assistants	--	90	100

PROJECTED NUMBERS OF TEACHING PERSONNEL NEEDED FOR VOCATIONAL AGRICULTURE IN OHIO

The following tables are based upon expected development in agriculture and in education in the state projected to the years 1985 and 2000.

Each of these tables contains a section containing information on expected changes in various types of education installations offering agricultural education. The second section of these tables gives expected numbers of teaching personnel based on the changes listed.

Table 8
PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL
In
Non-Metropolitan Ohio Schools
Including General and Comprehensive High Schools

	1970	1985	2000
Number of school districts	471	235	200
High schools offering vo-ag programs	312	150	200
Average enrolled per school (9-12)	50	65	90
Total enrollment high school	15,912	9,750	18,000
Total enrollment continuing education	11,775	10,000	18,000
Teacher aides	0	20	200
Teaching technicians	0	20	200
Professional teachers*	393	300	600
Local supervisors	0	0	50
State supervisors	7	6	10
TOTAL	400	346	1,060

*Does not include O.W.E.
but does include D.A.Y.

Table 9

PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL
In
Area Vocational Centers

	1970	1985	2000
Number of Area Centers	18	50	50
Number of Area Centers offering Agriculture	16	50	50
Total enrollment - high school	970	6,250	10,000
Total enrollment continuing education	240	2,000	5,000
Enrollment per center -	81	125	200
Positions:			
Teacher aides	0	50	100
Teacher technicians	0	50	100
*Professional teachers	42	250	340
Local supervisors	8	50	60
State supervisors	1	2	3
Other - curriculum specialists		1	2
Total	51	403	605

*It is assumed that within a 30-year period that some of the area vocational centers will have become the nucleus for comprehensive secondary school institutions and that they will generally offer 13th and 14th year programs of vocational education.

Table 10

PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL
In
Metropolitan Schools in Ten Major Cities

	1970	1985	2000
Number of metropolitan districts	10	12	15
Number of metropolitan districts offering agriculture	5	10	15
Enrollment per district (9-12)	133	300	300
Total enrollment - high school	644	3,500	4,500
Total enrollment - continuing education	150	2,000	4,000
Positions:			
Teacher aides	0	20	15
Teaching technicians	0	20	30
Professional teachers	22	100	150
Local supervisors	4	10	15
State supervisors	.5	1	2
Other (Adult Ed. teachers - full time			
Total	26.5	151	232

Table 11

PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL
In
Technical Education in Agriculture

Positions	1970	1985	2000
Institutions offering training for agricultural technicians	8	16	20
Total enrollment	425	3,200	4,000
Enrollment per institution	53	200	200
Total Units - 11			
Agricultural Education Personnel			
Teacher aides	-	50	55
Teacher technicians	3	50	55
Professional teachers	16	160	200
Local supervisors	1	6	8
Total	20	266	318

Table 12
SUMMARY OF PROJECTED NEEDS FOR VOCATIONAL AGRICULTURE PERSONNEL
In
All Programs and All Institutions

Positions	1970	1985	2000
Teacher aides	0	140	380
Teaching technicians	3	140	385
Professional teachers	473	810	1,290
Local supervisors	16	66	133
State supervisors	9	15	20
Other (Curriculum Materials Specialists)	1	3	6
Total	502	1,174	2,214

Table 13
OHIO AGRICULTURAL EDUCATION ENROLLMENT PROJECTIONS

Type of Institution	1970	1985	2000
Area Vocational Centers			
high school -	970	6,250	10,000
adult -	240	2,000	5,000
Metropolitan Schools			
high school -	644	3,500	4,500
adult -	150	2,000	4,000
Non-Metropolitan Schools			
high school -	15,912	9,750	18,000
adult -	11,775	10,000	18,000
Total High School	17,526	19,500	32,500
Total Continuing Education	12,165	14,000	27,000
Total Continuing Education plus High School	29,691	33,500	59,500

Table 14

AGRICULTURAL EDUCATION
ENROLLMENT IN OHIO HIGH SCHOOLS
State Department of Education

	Total Enrollment	
	1969-70	1968-69
Number of teachers	457	402
Basic Principles of the Agricultural Industry	8,159	13,065
Production Agriculture 0100	4,394	
Agricultural Supplies 0200	816	501
Agricultural Mechanics 0300	368	205
Agricultural Processing 0400		3
Vocational Horticulture 0500	1,448	911
Agricultural Resource Conservation 0600	290	194
Forestry 0700	19	18
Students with Special Needs	683	378
Other 9900		169
Total number of high school students enrolled	16,177	15,066

VT 013 946
REPORT OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM, (WECEP). ADVISORY COMMITTEE REACTIONS, EVALUATION, AND RECOMMENDATIONS.

DEPARTMENT OF LABOR, WASHINGTON, D.C. DIV. OF CHILD SAFETY.
MINNESOTA STATE DEPT. OF EDUCATION, ST. PAUL. DIV. OF VOCATIONAL AND TECHNICAL EDUCATION.
MINNEAPOLIS PUBLIC SCHOOLS, MINN.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - OCT70 23P.

DESCRIPTORS - *PROGRAM EVALUATION; PROGRAM IMPROVEMENT; *VOCATIONAL EDUCATION; *EMPLOYMENT PROGRAMS; *WORK EXPERIENCE PROGRAMS; ADVISORY COMMITTEES; CAREER EDUCATION; SCHOOL COMMUNITY RELATIONSHIP; *INTERAGENCY COOPERATION; TABLES (DATA)
IDENTIFIERS - WORK EXPERIENCE CAREER-EXPLORATION PROGRAM; WECEP

ABSTRACT - INCLUDED IN THIS DOCUMENT IS THE ADVISORY COMMITTEE'S EVALUATION OF THE WORK EXPERIENCE CAREER EXPLORATION PROGRAM (WECEP). WECEP IS A COOPERATIVE VENTURE OF LOCAL AND STATE EDUCATIONAL AGENCIES AND COMMUNITY GROUPS AIMED AT REDUCING THE FLOW OF YOUNG PEOPLE INTO THE HARD-CORE UNEMPLOYED. AN OPINION SURVEY CONDUCTED WITH THE USE OF AN OPEN-ENDED QUESTIONNAIRE SENT TO EMPLOYMENT SUPERVISORS, PROVIDED DATA, WHICH ALONG WITH THE EXPERIENCE OF COMMITTEE MEMBERS, SUGGESTED THAT MORE ATTENTION SHOULD BE GIVEN TO PRE-JOB ORIENTATION OF STUDENTS AND ON-THE-JOB SUPERVISORS. OTHER SUGGESTIONS REGARDING PROGRAM IMPROVEMENT ARE INCLUDED ALONG WITH TABLES ON ABSENTEEISM, TARDINESS, EARNINGS, AND JOB TENURE DATA. (JS)

VT 013 946

REPORT OF THE

WORK EXPERIENCE CAREER EXPLORATION PROGRAM

(WECEP)

ADVISORY COMMITTEE

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
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WECEP
Advisory Committee
1970

Al Weyrauch, NSP, Chairman

Gen Bolger, Bolger Publications

Bruce Bausman, Red Owl Inc.

Bobbin Fuller, Daytons

Cliff Jurgensen, Minneapolis Gas Co.

Carole Kerl, Pillsbury Co.

Emmett Mulcare, Amalgamated Meat Cutters

Jack Mull, NSP Co.

Dean Velander, Headliners, Inc.

Raymond Nord, Minneapolis Public Schools

Larry Harris, Minneapolis Public Schools

WECEP Sponsors - 1969-70 School Year

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Pillsbury Company
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Red Owl Stores
Russ Realty
Schochet Press
Teamsters Local 1145
Tom Thumb Nursery
Tension Envelope

WHAT IS WECEP?

WECEP IS:

1. based on the assumption that experiences of a positive, concrete and relevant nature can arouse aspirations and alter young lives constructively;

2. a cooperative venture, utilizing community resources from local and state educational agencies, business, industry, labor, civic organizations, etc.;

3. geared to increase the chances for students to succeed in vocational, civic, social and academic pursuits;

4. intended to reduce the constant flow of young people into the vast hard-core unemployed pool.

The Work Experience Career Exploration Program (WECEP) is operated jointly by the U. S. Department of Labor - Child Safety Division, the Minnesota Department of Vocational Education, the Minneapolis Public Schools and participating employers.

The Department of Labor, seeking data for revision of the Child Labor Laws of 1938, has temporarily suspended some of the provisions of this law for 14 and 15 year old students enrolled in this program through the Minneapolis Public Schools and nine other participating school districts across the nation.

The Minnesota Department of Vocational Education has funded the project as a prevocational exploratory program for educationally disadvantaged ninth grade students.

Many firms have entered into an active partnership with the Minneapolis schools. The provide students with employment and invaluable experiences which demonstrate the relationship between education, marketable skills and personality on the one hand, and the employment or career one can aspire to on the other.

The Minneapolis Public Schools are operating the program as dropout preventative, focusing on ninth grade students not responding to the regular school program. Pupil personnel teams (counselors, administrators, social workers and coordinators,) at each of the participating schools identify the highest risk potential dropouts, who qualify as educationally disadvantaged. (This is based on failure in school, poor achievement on tests, unstable home situations, behavior problems in home, school and community, and poor or erratic attendance patterns.)

In addition to the regular academic program of English, mathematics and social studies, students participate in an employability skills seminar and work 3-4 hours daily, 15-28 hours weekly. Saturday work is at the option of student and employer.

The entire program is keyed to success and positive reinforcement, with concentrated supportive services and constant communication between academic teachers, job supervisors and parents. This function is carried out by the teacher-coordinators.

Students in the program have shown great strides in maturity, social adjustment and performance in their schools and homes during the first semester of operation. Thorough evaluation and follow-up of both program and individual students is now underway and must continue over the next four years.

Introduction

On April 8, 1970 the WECEP Advisory Committee held its initial meeting. Appointed by Nathaniel Ober, Associate Superintendent for Secondary Education, the committee was asked to perform four tasks· evaluate the project; make recommendations for the future of the project; propose inputs to program and curriculum; and, recommend format for future advisory committees.

After reviewing the charge to the committee several actions were initiated. Recommendations were made for the immediate future (see Appendix C). The recognition luncheon was discussed. Work was started on an opinionaire to WECEP on-the-job supervisors.

Recognition Luncheon

The Advisory Committee decided to sponsor annual, circulating trophies to the four school WECEP units showing the greatest achievement in a) reduction in absenteeism; b) reduction in tardiness; c) thrift, based on percent of gross earnings placed in savings; and d) lowest job turn-over rate or least job-hopping. These awards were made to the Jordan, Folwell, Phillips and Franklin WECEP units respectively. The data upon which the awards were based are contained in Appendix A. To summarize for the WECEP participants overall:

absenteeism was reduced:	66.3%
tardiness was reduced:	75.0%
portion saved of gross earnings	19.9%
job turnovers:	10.4%

Project Evaluation

An opinionaire was sent to WECEP supervisors consisting of six open-ended questions, plus space for additional comments (see Appendix B). This procedure invited a wide variety of responses in the following areas:

1. observable student change
2. student job adjustment
3. co-worker & supervisor acceptance of students
4. coordinator effectiveness
5. program design & effectiveness
6. suggested program inputs

The following is a cataloging of the responses and comments contained in the opinionaire:

Question #1: Thinking back to the first few days on the job, what changes, if any, do you see in your WECEP trainee?

Of the 33 responses received on this item, 28 were of a positive nature. The dimensions cited provide a picture of the kinds of changes in students which were observed by supervisors. The dimensions in which gains were observed, and the frequency of appearance, were: social adjustment (12), responsibility (7), confidence (6), maturity (6), initiative (3), job skills (3). Improvement in reliability and grooming were also cited.

Typical of these responses were:

> "He's accepted more responsibility. He knows the meaning of working for a living." (Excel Carpet Service)

> "My trainee is now able to see ahead and do jobs without direction or supervision. His outlook is friendly, and his eagerness to do a good job is a good example for others." (Red Owl)

"The trainee has matured, and accepts responsibility."
(Publications Office)

The five negative responses provide some valuable inputs for future practice:

1. "Needed better pre-job orientation."
2. "Students couldn't handle the independence -- couldn't work alone."
3. "Saw little change, but student was o.k. to start with."
4. "Little gain in terms of skill."
5. "The student lost interest in the job, but not the pay."

Question #2: How well has the student adjusted to the company; his job; his fellow employees, his supervisor?

There were thirty-one positive responses on this item. The dimensions cited, and their frequency of appearance were as follows: very well/very good (20), well/good (3), made many friendships (3), well, considering age (3), excellent (2), fair (2) and great! (1).

Typical of the positive responses were:

"There doesn't seem to be any problem. The student has won the friendship of all her fellow workers and supervisor, as well as her manager." (Blue Shield)

"He has adjusted well in every respect."
(International Multifoods)

"Very well. Possibly we have had the ideal--or unique--situation in that the young lady (WECEP) has had to work with both younger girls, 18-20, and with women of her mother's age. They have counseled with her in a motherly way." (Benson Optical)

The three negative responses were:

1. "Outside activities came before her job."
2. "Hasn't been on the job long enough to adjust."
3. "Very well, except she neglects to inform us when ill."

QUESTION #3: How was the student received by other employees at the outset; currently?

In response to this question all responses were favorable, ranging from excellent to o.k., as follows:

excellent	(3)
complete acceptance	(5)
very good/very well	(10)
good/well	(10)
o.k.	(2)

Typical comments on this item were:

"Well received...actually the same as any other new employee new on the job." (NW Bank)

"The other employees were looking at them to see how they would do. 'They look awfully young', etc. were typical comments. We are not hearing these comments now - due I believe to their performance." (N. Mem. Hosp.)

"Received with reservation...gets along very well with other employees now." (Industrial Arts Supply Co.)

"Very well, and with understanding." (NSP)

"Very well, he fit right in." (Clark Oil)

"With some degree of apprehension. Because he has proven he can perform the tasks they have come to rely on him, and consequently accept him." (Tally Ho Cafe)

Question #4: How effective has the coordinator been in working with the student; the supervisor? In what ways might coordinators be more effective?

Responses on this item were all quite positive. Typical of the comments made, are:

"Regular follow-up and tie-in with the academic program seems to be a big reason for these youth succeeding." (NWNL)

"Mr. K--- makes regular visits, and problems are corrected immediately." (Publications Dept.)

"In the opinion of myself and other employees, Mr. G--- has done an excellent job. He has made great efforts to assure the success of (WECEP trainee) the program. (Bermal-Smaby)

Some inputs for coordinators were contained in the following excerpts:

1. ".....not enough coordinator contact with other employees."
2. "..... need to see the coordinator more, need an easier way to contact him, and need more background information on the student."

Question #5: Have you participated in other school work programs in the past; currently? If yes, how does WECEP compare in terms of students; work; school support?

Of the thirty-one respondents, eight indicated no prior contact with school programs. Of the remaining twenty-five responses, all but five were positive. Adjectives and frequency of response were as follows:

See more of the coordinator	(4)
Better supportive services	(7)
Comparable to other programs	(5)
Too young	(3)
Students more willing	(4)
Better program	(1)

Comments on this item were essentially student and coordinator centered, as follows:

"9th grade seems to be a more opportune time to get students thinking in these terms than when they are seniors. Also, the coordinator contact with students is far better in the WECEP project, and this has been very helpful." (North Memorial Hospital)

"Better coordinator follow through has been very beneficial." (Bryn Mawr Home)

"I feel this program has helped this student a lot. I know it was very educational for me.....In my opinion it was the greatest thing for this student." (Bermal-Smaby)

Question #6: If you were to develop a work program such as WECEP, for next year, what should the employers do differently? What should the schools do differently?

Responses fell in four general categories, as follows:

No comment	(3)
Keep program the same	(16)
Suggestions for schools	(8)
Suggestions for employers	(5)

The suggestions in reference to the school component of the program were as follows:

1. "Schools should contact us early in the fall."
2. "A portion of each pay check must be saved. Also, definite plans for summer work."
3. "School should develop a job description questionnaire to save time for both coordinator and employer."
4. "Also, students should be carefully screened to be sure they are adaptable to the business climate."
5. "Brief the supervisors on personal problems of the individual, to better understand their sensitive areas."
6. "Provide more background on the student."
7. "Students should be given a test on their job."

In terms of suggestions for future practice of employers, the following suggestions were offered:

1. "Employers should have a firm plan as to how students should be used, to be sure they can be kept busy."
2. "Spend more time with the trainee."
3. "As an employer, I would like to establish a short training program prior to the actual work situation."
4. Two respondents felt the jobs given their trainees offered too much training, not enough low-level work.

Responses contained in the section headed Additional Comments ranged from expressions of gratitude for having been afforded an opportunity to help a youngster, pledges to participate next year, and encouragement in expansion of the program, to such strong statements as the following:

> "We have been involved in the program for a very short time, but are very impressed with both how and why the program was organized. As employers, we must begin accepting more of the responsibility for our youth by providing opportunities for them to taste success. The public schools have borne the brunt of criticism all alone for too long."
>
> Paul D. Sletten, Dir. of Training

Summary and Conclusions

On the basis of our own experience and opinionaire feedback, we would make the following suggestions:

1. More attention be paid to pre-job orientation of students and on-the-job supervisors.
2. Students must not be placed on:
   a. jobs where they are isolated
   b. jobs either too easy or too hard
   c. jobs lacking promotability
3. Coordinator's be more readily accessible when needed.
4. Make more complete background information available on student when appropriate.
5. Job descriptions should be specific, consisting of meaningful work.

The WECEP Advisory Committee concludes, on the basis of both the opinionaire responses and our own observations, that the project must be continued and expanded.

The young people demonstrated substantial gains in both on-the-job and school performance. Students accepted responsibility and grew in maturity, poise and their understanding of the adult world.

Employees accepted the challenge which these young people represented. The liaison between home, school and job provided by the WECEP teacher-coordinators was invaluable and unique. These supportive services, and the constant communication, provided and insured a team approach, and the participating firms became full partners in this educational endeavor.

Hopefully, WECEP has opened up a different approach to education for a group of young people with a different learning style, and demonstrated to these youths the need for education and marketable skills prior to terminating their formal schooling.

The WECEP project has caused many of us to view our firms as potential educational resources of the community, and all of us as partners in the business of educating our young people.

APPENDIX A

ABSENTEEISM DATA

WECEP Unit & Coordinator	S's	Student Days on Project	Absences on Project	Absent Rate on Project	Absent Prior Like Period*	Absent Rate Prior Period	% Change in Absence Rate
BRYANT D. Gomez	11	732	67	9%	195	26%	down 66%
FOLWELL C. Knutson	10	434	20	4.5%	51	12%	down 61%
FRANKLIN E. Koester	15	961	35	3.6%	143	15%	down 76%
JEFFERSON B. Golob	7	190	12	6%	19	10%	down 37%
JORDAN R. Alm	10	328	3	1%	43	13%	down 93%
LINCOLN W. Kane	15	720	50	9%	96	13%	down 48%
PHILLIPS E. Lue	16	1102	45	4%	140	13%	down 68%
RAMSEY T. Griffiths	10	373	9	2.5%	28	7.5%	down 67%
SHERIDAN D. Kurimay	1	12	1	8%	2	16%	down 50%
TOTALS	95	4552	242	5.3%	717	15.7%	down 66.3%

NOTE: All data was gathered for each student separately, then totalled by school unit. Only students inducted into program prior to April 30, 1970 were included in the population (S's).

* Prior Like Period represents performance of students for a number of schools days equal to the number spent in the program by each student. The specific period for each student directly preceded the date of induction into the program.

TARDINESS DATA

WECEP Unit & Coordinator	S's	Student Days on Project	Tardies on Project	Tardy Rate on Project	Tardies Prior Like Period*	Prior Tardy Rate	Change in Tardy Rate
BRYANT D. Gomez	11	732	52	7%	217	29%	down 76%
FOLWELL C. Knutson	10	434	3	.6%	34	8%	down 91%
FRANKLIN E. Koester	15	961	28	3%	220	23%	down 87%
JEFFERSON B. Golob	7	190	6	3%	39	20%	down 85%
JORDAN R. Alm	10	328	19	6%	42	13%	down 55%
LINCOLN W. Kane	15	720	34	4.7%	73	10%	down 54%
PHILLIPS E. Lue	16	1102	47	4%	146	13%	down 68%
RAMSEY T. Griffiths	10	373	11	3%	27	7%	down 59%
SHERIDAN D. Kurimay	1	12	0	0%	5	41%	down 100%
TOTALS	95	4552	200	4.4%	803	17.6%	down 75%

NOTE: All data was gathered for each student separately, then totaled by school unit. Only students inducted into program prior to April 30, 1970 were included in population (S's).

* Prior Like Period represents performance of students for a number of school days equal to the number spent in the program by each student. The specific period for each student directly preceded the date of induction into the program.

THRIFT DATA
(Earnings & Savings)

WECEP Unit & Coordinator	S's	Earnings (est. gross)	Amount in Savings	% Saved (of gross)	Average Saved
BRYANT D. Gomez	11	$3738.00	$ 275.00	7%	$ 25.00
FOLWELL C. Knutson	10	2232.00	615.00	27%	61.50
FRANKLIN E. Koester	15	4244.00	758.00	18%	50.00
JEFFERSON B. Golob	7	597.00	157.00	26%	22.50
JORDAN R. Alm	10	1760.00	337.00	19%	33.70
LINCOLN W. Kane	15	2968.00	539.00	18%	36.00
PHILLIPS E. Lue	16	4005.00	1,261.00	31%	78.80
RAMSEY T. Griffiths	10	1610.00	270.00	17%	27.00
SHERIDAN D. Kurimay	1	25.00	2.50	10%	2.50
TOTALS	95	21,179.00	4,214.50	19.9%	44.36

NOTE: All data was gathered for each student separately; then totaled by school unit. Only those students inducted into the program prior to April 30, 1970 were included in the population (S's).

JOB TENURE DATA
(Job Holding)

WECEP Unit & Coordinator	S's	Jobs Held	Holding Power	Total Days Employed	Weighted * Holding Power
BRYANT D. Gomez	11	11	100%	732	732
FOLWELL C. Knutson	10	12	83%	434	360
FRANKLIN E. Koester	15	18	83%	961	798
JEFFERSON B. Golob	7	7	100%	190	190
JORDAN R. Alm	10	10	100%	328	328
LINCOLN W. Kane	15	17	88%	720	634
PHILLIPS E. Lue	16	18	88%	1102	970
RAMSEY T. Griffiths	10	12	83%	373	328
SHERIDAN D. Kurimay	1	1	100%	10	10
TOTALS	95	106	89.6%	4,552	453 (av.)

NOTE: All data was gathered for each student separately, then totaled by school unit. Only students inducted into the program prior to April 30, 1970 were included in the population (S's).

* Holding power is weighted in an attempt to equalize effect of size of group and total time on jobs and in program, by multiplying percentage by total days worked.

2270

wecep

ADVISORY COMMITTEE

The WECEP Advisory Committee has been formed for the purpose of (a) evaluation of the project and (b) formulation of recommendations for future practice.

We solicit your frank response to the attached questionaire in order that our evaluation and recommendations might be more meaningful.

In addition to the six items covering specific areas of concern, space has been provided for your additional comments, which we heartily solicit.

Thank you very much.

WECEP Advisory Committee

Al Weyrauch

Al Weyrauch, Chairman, NSP
Carole Anderson, Daytons
Gen Bolger, Bolger Publications
Bruce Bausman, Red Owl Inc.
Cliff Jurgensen, Minneapolis Gas Co.
Carol Kerle, Pillsbury Co.
Emmett Mulcare, Amalgamated Meat Cutters
Jack Mull, NSP
Dean Velander, Headliners Inc.

2271

Company Name Northern States Power Company

Respondent _____

1. Thinking back to the first few days on the job, what changes, if any, do you see in your WECEP trainee:

   Although ——— showed enthusiasm for her job she was at first, timid, self-conscious, unsure of herself and found it difficult to respond to many in the department, especially the men. At this time she seems to take pride in her assigned duties, works well on her own and has on occasion offered constructive suggestions regarding her little part of our operation.

2. How well has the student adjusted to the company; his job; his fellow employees; his supervisor?

   ——— appears to have overcome many of the personal problems that were so apparent when she joined our group. She has adjusted exceptionally well to her job, fellow employees and supervisor. I believe she associates all mentioned above with "the company".

3. How was the student received by other employees at the outset; currently?

   Everyone made an effort to make her feel welcome at the outset and many have made special efforts to offer her personal attention and interest.

4. How effective has the coordinator been in working with the student; the supervisor? In what ways might coordinators be more effective?

   ——— expresses respect for ——— and mentions him often. He has kept us informed of ——— progress and activities whether good or bad.

2272

5. Have you participated in other school work programs in the past; currently? If yes, how does WECEP compare in terms of students; work; school support?

No

6. If you were to develop a work program such as WECEP, for next year, what should the employers do differently: What should the schools do differently:

7. Additional Comments:

Although ———seemed to be very immature in personality, she has shown a great deal of maturity in her work habits and attitude. She should be given a great deal of credit for her punctual attendance, lack of procrastination and general attitude toward her work.

We feel grateful for the opportunity to work with ——— and hope the summer months will result in even more progress on her part.

2273

RECEIVED
APR 13 1970
VOCATIONAL DEPARTMENT

April 10, 1970

Raymond V. Nord, Director
Vocational, Technical, &
Occupational Education
Minneapolis Public Schools
807 Northeast Broadway
Minneapolis, Minnesota 55413

Dear Mr. Nord:

I am writing you at the request of the Work Experience Career Exploration Program (WECEP) Advisory Committee to advise you of the three-part recommendation reached at our meeting, April 8.

It was the feeling of the committee that it is difficult, at best, to evaluate accurately a program of this sort after such a short time. However, early indications are so promising that we cannot afford to retreat at this point.

I am attaching early attendance data on three of the WECEP units. You will note that after entering the program,these students reduced absence to roughly 30%, tardiness to 25%, of the level prior to entry into the program.

We see in the program a relevant, viable effort to reduce the flow of persons into the vast pool of hard-core unemployed. We do not want to retreat from this goal at this crucial moment.

The recommendation of the Advisory Committee is as follows:

a) The WECEP project be continued a second year.

b) The teacher-coordinators be retained over the summer, to continue their supportive services to students, supervisors and parents of students.

c) The WECEP project be expanded in September to provide this opportunity to more educationally disadvantaged students throughout the city.

We feel the needs are urgent, the project is working and must be continued.

Sincerely,

A. P. Weyrauch

A. P. Weyrauch
Chairman
WECEP Advisory Committee

c: All committe members

attachment

2274
c-1

WECEP Attendance Summary, Bryant, Franklin and Phillips Junior High Schools

		2nd Quarter (Nov. 7 - Jan. 23)	3rd Quarter (Jan. 26 - Apr. 3)
Bryant	abs.	88	30
	tard.	134	34
Franklin	abs.	87	40
	tard.	152	64
Phillips	abs.	153	49
	tard.	176	44
TOTAL	abs.	328	119
	tard.	462	142

Carole Anderson	Daytons 700 Nicollet Mall 332-6123
Gen Bolger	Bolger Publications 428 Washington Ave., N. 339-8921
Bruce Bausman	Red Owl Inc. P.O. Box 329 Minneapolis, Minn. 55440 935-5110
Cliff Jurgensen	Minneapolis Gas Co. 739 Marquette Ave. 372-4701
Carole Kerl	Pillsbury Co. 608 2nd Ave., S. 330-4312
Emmet Mulcare	Amalgamated Meat Cutters 5001 W. 78 St. 925-2252 (res. 781-1380)
Jack Mull	NSP Co. 414 Nicollet Mall 330-5843
Dean Velander	Headliners, Inc. 506 5th Ave., S. 339-0615
Al Weyrauch	NSP Co. 414 Nicollet Mall 330-5575

2276

RED OWL
P.O. BOX 329 / MINNEAPOLIS, MINNESOTA 55440 / 612 • 935 • 5110

April 6, 1970

Paul Muller, Project Administrator
WECEP
Minneapolis Public Schools
107 S.E. 4th Street
Minneapolis, Minnesota 55414

Dear Paul:

I wanted to reiterate, in writing, some of the things we discussed the other day concerning the WECEP program during the summer months.

If it appears at all possible that the supportive services such as counseling, etc. could be continued during the summer months I feel it well worth our while to push for them. With the program starting to pick up momentum now it would seem a shame to allow failure to slip in the back door simply because of a lack guidance or counseling.

The summer months are especially taxing in our business with vacations, etc. I'm sure this will have some effect on the amount of time that our store managers will be able to spend with each trainee, thus even more emphasizing the need for supportive services.

If there is any further way that I can help by making my opinion known please let me know.

Sincerely,

Bruce Bausman
Training Supervisor

BB:df

2277

RED OWL STORES INC./ SUBSIDIARY OF GAMBLES
OFFICES: 215 EAST EXCELSIOR AVENUE/HOPKINS, MINNESOTA 55343

VT 013 948
A STUDY OF LAW ENFORCEMENT TRAINING PROGRAMS.

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DESCRIPTORS - *LAW ENFORCEMENT; JOB TRAINING; *PROGRAM EVALUATION; QUESTIONNAIRES; *STATE SURVEYS; POLICE SEMINARS; *PROGRAM IMPROVEMENT; COMMUNITY COLLEGES; FINANCIAL SUPPORT; *STATE PROGRAMS
IDENTIFIERS - *WASHINGTON LAW ENFORCEMENT TRAINING COMMISSION; WASHINGTON

ABSTRACT - THE NEED FOR AN EVALUATION OF LAW ENFORCEMENT PROGRAMS IN THE STATE OF WASHINGTON PROMPTED THE HOUSE TO PASS A RESOLUTION CALLING FOR THE JOINT COMMITTEE ON HIGHER EDUCATION TO CONDUCT SUCH A STUDY AND TO MAKE RECOMMENDATIONS FOR IMPROVEMENT. THIS STUDY IS CONCERNED WITH BASIC TRAINING CLASSES CONDUCTED BY THE WASHINGTON LAW ENFORCEMENT TRAINING COMMISSION AS WELL AS WITH PRESERVICE, INSERVICE AND SUPPLEMENTARY PROGRAMS IN COMMUNITY COLLEGES. RESULTS OF THE STUDY INDICATE A NEED FOR MORE TRAINING, FOR IMPROVEMENT OF THE QUALITY OF PRESENT TRAINING, AND FOR ADEQUATE FUNDING TO ALLOW ALL DEPARTMENTS, REGARDLESS OF SIZE, TO PARTICIPATE IN THE TRAINING BEING PROVIDED. THE COMMITTEE MADE THE FOLLOWING SPECIFIC RECOMMENDATIONS: (1) THE PRESENT PROGRAMS AT THE FIVE COMMUNITY COLLEGE LOCATIONS SHOULD BE EXPANDED, (2) THE PRESERVICE, INSERVICE, AND SUPPLEMENTARY PROGRAMS SHOULD BE STRENGTHENED, (3) ADEQUATE FUNDING SHOULD BE PROVIDED FOR ALL DEPARTMENTS, AND (4) SHORT-TERM COURSES AND SEMINARS SHOULD BE INCREASED. INFORMATION REGARDING THE PROGRAMS, THE RESULTS OF QUESTIONNAIRES, AND THE COSTS FOR A SPECIFIC PROGRAM IS APPENDED. (AUTHOR/GEB)

VT 013 948

A

STUDY OF

LAW ENFORCEMENT TRAINING PROGRAMS

By
Joint Committee on Higher Education
of the
Washington State Legislature

VT013948

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
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January, 1971

2279

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IN THE LEGISLATURE
of the
STATE OF WASHINGTON

HOUSE OF REPRESENTATIVES

Resolution No. 69-113 by Representatives Mentor, Kopet, Ceccarelli, Pardini, Leland, Chapin, Shera, Cunningham, Grant, Bottiger, Evans, Smythe, Marsh, DeJarnatt, King, Kalich, O'Dell, Wanamaker, Lynch, Brouillet, Randall and Sprague

WHEREAS, Law enforcement across the nation has been under severe criticism for its action in recent social crises; and

WHEREAS, Law enforcement is one of the most critical services of state and local government, and there is a need to improve the quality of law enforcement service; and

WHEREAS, The State of Washington has many agencies seeking to improve the quality of law enforcement service, and the State of Washington should be concerned with raising the career of law enforcement to professional stature; and

WHEREAS, Professional programs exist or are planned in the Universities and Colleges of the State. The first program in law enforcement was offered at Clark Community College for those employed officers at Vancouver. This was followed by a preparatory and an in-service program at Highline College in 1964. Law enforcement programs are now enrolling seven hundred students in the following of the twenty-two community college campuses in the state:

Clark Community College	Vancouver
Highline Community College	Midway
Bellevue Community College	Bellevue
Green River Community College	Auburn
Shoreline Community College	Seattle
Seattle Community College	Seattle
Olympic Community College	Bremerton
Everett Community College	Everett
Yakima Community College	Yakima
Spokane Community College	Spokane
Columbia Basin Community College	Pasco
Centralia College	Centralia
Lower Columbia Community College	Longview
Ft. Steilacoom Community College	Lakewood

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Furthermore, Skagit Valley Community College (Mount Vernon, Washington) and Tacoma Community College both offer certain specialized courses for local law enforcement agencies.

This number of programs would rank the State of Washington second among the fifty states and four territories; and

WHEREAS, If a career as a law enforcement officer is to be elevated to professional status, it must maintain a liaison and identity with higher education; and

WHEREAS, Legislation now before the Legislature will create a coordinating council for higher education;

NOW, THEREFORE, BE IT RESOLVED, By the House of Representatives, That the Joint Committee on Higher Education, if such committee be established by this legislative session, or the Legislative Council if such Joint Committee on Higher Education not be established by this legislative session, be authorized and directed to conduct a study of current law enforcement programs and to make recommendations as to improving such existing programs and for the establishment of new related law enforcement programs.

BE IT FURTHER RESOLVED, That the results of this study and proposed recommendations, if any, be presented to the next Session of the Legislature.

ADOPTED May 2, 1969.

I hereby certify this to be a true and correct copy of Resolution adopted by the House of Representatives May 2, 1969.

Malcolm McBeath

Malcolm McBeath, Chief Clerk
House of Representatives

TABLE OF CONTENTS

	Page
Purpose	4
Recommendations	4
Background	6
Current Studies	9
Law Enforcement Training Programs in the State	12
Conclusion	20
Appendix I	22
Appendix II	24
Appendix III	25
Appendix IV	28
Appendix V	31
Appendix VI	34
Appendix VII	35

PURPOSE

The purpose of this chapter is to fulfill the requirements of House Resolution No. 69-113, calling upon the Joint Committee On Higher Education "to conduct a study of current law enforcement programs and make recommendations for improving existing programs and for establishing new related programs." This study is concerned with basic training classes conducted by the Washington Law Enforcement Officers Training Commission as well as with preservice, inservice and supplementary programs in community colleges.

RECOMMENDATIONS

Results of the study indicate a need for more training, for improvement of the quality of present training, and for adequate funding to allow all departments regardless of size to participate in the training being provided. In order to meet the needs of departments in small communities as well as those in large urban areas, the Joint Committee On Higher Education makes the following recommendations:

1. Present law enforcement basic training programs at the five community college locations should be expanded as follows:

    a) Additional basic training classes be scheduled during spring and summer quarters so that present facilities need not be expanded.

    b) A law enforcement training supervisor be appointed by the Law Enforcement Officers Training Commission to

supervise the program at each of the community colleges.

c) Criteria be established jointly by the Law Enforcement Officers Training Commission and the State Board for Community College Education for selection of instructors in the basic training program.

d) Cost analysis of present basic training programs be conducted by the State Board for Community College Education and a determination be made of cost of the programs in order that funding be more commensurate with actual cost.

2. Preservice, inservice and supplementary programs at community colleges should be expanded as follows:

a) A Coordinator of Law Enforcement programs be appointed by the State Board for Community College Education in order to assist community colleges in strengthening these programs.

b) A greater degree of articulation between law enforcement programs in the community colleges and those in private and public four-year colleges and universities be maintained.

3. Adequate funding should be provided to make training available to all departments regardless of size.

4. Short-term courses and seminars sponsored jointly by the State Board for Community College Education and the Washington Law Enforcement Officers Training Commission should be increased.

BACKGROUND

The need for a comprehensive evaluation of law enforcement programs for the purpose of establishing truly professional law enforcement agencies in the State of Washington cannot be overemphasized. In no area is public opinion at the present time more divided than in the area of law enforcement.

On the one hand, there is a hue and cry for police action. Crime is on an increase in many areas and citizens are demanding more protection. At the same time, police are denigrated; they are asked to enforce laws that are unenforceable; they are asked to do a job but society has made restraining rules that prohibit law enforcement. Occasionally there is tension between the police and the prosecutor. Recurring shakeups in police departments because of political domination are a problem. In addition, the changes in our society require more varied and sophisticated responses for which frequently no training is provided.

A major part of the problem is lack of funding to provide training, but here again we are faced with bifurcated public opinion. To provide adequate training for all law enforcement officers in our state would be a considerable expense. There are more than 500 law enforcement personnel in the State of Washington who have received no basic training whatsoever. They are simply given a badge and a gun.

In order to see that they are trained requires more than the establishment of a program; it requires not only that programs be established, but that it be made economically feasible for men from small communities, from Colfax and Grand Coulee, from Ilwaco and Kettle Falls, to take the training.

There have been efforts made in the State of Washington to provide law enforcement training. The Seattle Police Department established its training school in 1937. Not until 1948 however, was training made available to the policemen outside the city of Seattle. Then through the cooperation of the Federal Bureau of Investigation, the Washington Association of Chiefs of Police and the Washington Sheriff's Association, a program was instituted at Fort Lewis. The program was limited in outreach, however. In the early 60's law enforcement programs were established at Clark and Highline community colleges. In 1965 the Legislature established the Law Enforcement Officers Training Commission. It was empowered to provide training and set standards for all cities and counties in the state with the exception of first class cities and class AA and A counties. The last class graduated from the training school at Ft. Lewis in May of 1966, and a basic training program was instituted at Olympic College in Bremerton.

Subsequently, the basic training programs have been extended to Everett Community College, to Columbia Basin Community College in Pasco, to Green River Community College in Auburn, and to Lower Columbia College in Longview. A number of other community

colleges have developed preservice and supplementary law enforcement programs that are designed to supplement the basic training programs.

The basic training program consists of 400 hours of instruction. During the past year, from July of 1969 to June of 1970, eleven basic schools were conducted at the five community college locations. The schools graduated 233 m3n from 174 agencies during this period. In addition, the Washington Law Enforcement Officers Training Commission sponsored a number of short term courses and seminars. (For a complete list and the number of personnel trained, see

In spite of this program, the need for more training is evident from the results of a questionnaire which the Joint Committee On Higher Education sent to chiefs of all law enforcement departments in Washington. Comments of the questionnaire almost unanimously expressed a desire for more training and higher standards.

The State of California has taken a step toward upgrading police departments by instituting statewide certification of police officers. The program is financed through the Police Officers Training Fund. Certified basic training, management and technical courses are offered at a number of different locations. Of the 225 certified courses, 190 are coordinated or presented by community colleges. Fifteen courses are taught at four-year colleges and universities and 20 are presented by non-college affiliated academies.

CURRENT STUDIES

The Washington Law Enforcement Officers Training Commission authorized Battelle Northwest to conduct a study as a "basis for their decision as to size, location and capabilities of state-wide training facilities for law enforcement officers in Washington." It is based on the assumption that there is a need for a central law enforcement academy and it evaluates fourteen (14) sites as to cost and utility. The report states, "There were diverse views expressed by almost all personnel interviewed, on whether a law enforcement training system should be centralized, or dispersed at a number of locations throughout the state. There are valid points to be made on both sides of that issue. However, it may be concluded that in the case of a centralized facility, it should be ideally located so that travel distance for all students using it will be minimized."

The study, however, did not explore the regional concept; it is exclusively a single site selection study. It included consideration of a new facility at specific sites in Cedar Hills, and in Preston and Echo Glen in King County, and also at a site near Purdy. Unspecified sites were considered at Ellensburg, Wenatchee, Spokane, Walla Walla, Vancouver, and Bellingham. Expansion of the Washington State Patrol Academy in Shelton was considered, as well as acquisition of Providence Heights College in Issaquah, and facilities at Paine Field in Everett, and at Larson Air Force Base in Moses Lake. Estimates were made of the cost of the facility

and this was a prime factor in the final evaluation of each site.

Each site was rated on a six point scale in the following areas; classrooms, administrative areas, gymnasium, training tank, pistol range, rifle range, skid pan, pursuit driving, living quarters, food service, accessability for students, instructor availability, non-interference factors, expansion capabilities, utilizing for inservice training, future availability of land and buildings, and image. In the final determination, Cedar Hills with a total utility score of 314 compared to a high of 336, considered ideal, and a low of 161 for the status quo (present training programs in community colleges) was the site which received the highest score.

Another problem not considered by the Battelle study is the type of training to be given. The President's Commission on Law Enforcement and the Administration of Justice in their report in 1967 states as follows:

> *It is nonsense to state or assume that the enforcement of the law is so simple that it can be done best by those unencumbered by a study of the liberal arts. The man who goes into our streets in hopes of regulating, directing, or controlling human behavior must be armed with more than a gun and the ability to perform mechanical movements in response to a situation. Such men as these engage in the difficult, complex, and important business of human behavior. Their intellectual armament -- so long restricted to the minimum-- must be no less than their physical prowess and protection.*

The study conducted by Battelle Northwest does not explore the relevance of police academy training to the needs of our society nor does it explore the establishment of a multi-discipline training center which, in fact, many law enforcement officers prefer. The Office of the Attorney General conducted a comprehensive law enforcement survey, the results of which were made available on August 1st, 1970. The question was asked, "In conjunction with a police academy, do you favor establishment of a broadly-based, multi-discipline training center which could offer training for probation officers and other related professionals in addition to law enforcement officers?" Of the departments answering, 168 answered "Yes" and 56 "No."

The Joint Committee On Higher Education sent questionnaires to all law enforcement agencies in the State of Washington. Those to 2nd, 3rd, and 4th class cities and counties were identical, and the objective was to determine the adequacy of present training areas in which additional training is needed and preferred type of institution for this training (whether community college or law enforcement academy.) The questionnaire to first class cities was a different one and the intent was to determine the adequacy of present programs, what changes are needed and whether training with smaller departments would be acceptable if a state law enforcement academy were established.

Of the 304 questionnaires sent to second, third, and fourth class cities and counties, 108 were returned. Nine of the ten questionnaires sent to first class cities were returned. Results of the questionnaires have been compiled and are listed as Appendix V.

All departments indicated a need for additional training in one or more areas; forty-six of the departments indicated the preference for taining location to be a law enforcement academy. Forty-five of the departments indicated the preference for training location to be a combination of law enforcement academy and a community college. Four departments preferred the training to be only at a community college.

All chiefs expressed a need for additional training in one or more areas. Of the 105 answers from second, third and fourth class districts, 89 wanted more training in narcotics and drugs; 85 in criminal investigation; 63 in criminal law; 58 in crowd control. Appendix V gives the totals for the 12 areas which were listed on the questionnaire. The Washington State Law Enforcement Officers Training Commission offers seminars or short courses in the four areas in which the need appears to be the greatest. The questionnaire allowed space for comments and 18 of the chiefs indicated they were unable to utilize abailable training because of the cost involved in releasing a man and sending him away for training.

In the questionnaire sent to first class cities, all departments answering indicated they encouraged members to continue their training at a community college. To the question "Would you recommend

that your department become a part of the Washington Law Enforcement Officers Training Commission?" there were five "Yes" answers, three "No" answers. Four departments would be willing to have personnel trained at a central academy, three would not.

Evidence from the Joint Committee On Higher Education questionnaire, as well as from the report of the Office of the Attorney General indicates there is a great need for more training, but no single solution to the problem of law enforcement training in the State of Washington. The Washington State Law Enforcement Officers Training Commission is providing training in those specific fields where there is a need but the training cannot be utilized by small departments with funding difficulties.

LAW ENFORCEMENT TRAINING PROGRAMS IN THE STATE OF WASHINGTON

The University of Puget Sound has developed a law enforcement program which encompasses the law and justice approach. Its purpose is to provide strong academic experience in the liberal arts and professional development which will be related to improvement in the entire criminal justice system. In order to provide the opportunity for students to complete the four-year baccalaureate degree, the University attempts to cooperate fully with community colleges offering the basic police science and liberal arts courses. During the Fall semester, students supported by Law Enforcement Education Program funds provided under the Omnibus Crime Control and Safe Street Act of 1968, number approximately 35 of whom over

20 are in the "in-service" category. Although there is no separate major for police science, it is possible to have a criminal justice emphasis within the sociology major.

Although the University of Washington, Central Washington, Western Washington and Eastern Washington, offer courses in criminology in their respective Departments of Sociology, only Washington State University has a Department of Police Science and Administration leading to degrees of Bachelor of Science in Police Science and Administration and Master of Arts in Police Science and Administration. The objectives of the program as stated in the bulletin, are "to give students a broad liberal education in conjunction with the intensive professional training for the police and other investigative services; to prepare them for a career in this professional field; to develop the qualities of leadership; to foster ideals of professional achievement in public service." Although preservice programs at community colleges do include liberal arts classes such as psychology, sociology, English, report writing and others, the law enforcement training programs at community colleges are primarily career training programs. Law enforcement programs at four year colleges offer liberal arts training at the lower division and career training at the upper division so that a student in a law enforcement training program at a community college wishing to transfer is not given credit for the career training courses he has already taken.

Law Enforcement courses at community colleges fall into the following categories:

1. Preservice - full time students preparing to enter the field and working toward an AA degree.

2. Inservice - employed police officers working toward an AA degree.
3. Supplementary - upgrading courses (may be evening classes.)
4. Basic - standard course prescribed the Law Enforcement Officers Training Commission.
5. Seminars - a short course, usually outlined by the Training Commission.
6. Corrections - both prepatory and supplementary.

The State Board for Community College Education has estimated that 2,500 to 3,000 people have been trained during the past year.

Appendix II shows enrollment figures by college and type of training.

A degree of dissatisfaction with present basic training programs is indicated by the fact that seventeen of the chiefs utilized space for comments provided on the Joint Committee questionnaire with an indication of need for more advanced programs and upgrading of curriculum, while six stated that there is a lack of professionalism and discipline in present programs. The criticism needs to be met.

Although the type of facility in which instruction takes place is a rather important factor in determining the quality of education which occurs there, it is not of prime importance. A core group of highly qualified instructors is probably the most important element.

The 1967 Report of the President's Commission on Law Enforcement and Administration of Justice, The Challenge of Crime in a Free Society makes the following recommendations for the improvement of education and training:

1) *State Police standards commission programs to establish minimum recruitment and training standards, and to provide training, particularly through the establishment of regional academies or programs for medium and small size communities.*
2) *Graduate training in law and business administration for police executives through degree courses or special institutes.*
3) *Curriculum development and training for instructors in police academies and police training programs.*
4) *Special training programs in such critical problems as organized crime, riot control, police community relations, correctional supervision of offenders being treated in the community, the use by police and juvenile court intake personnel of social agencies in the community.*
5) *Programs to encourage college education for police in liberal arts and sciences, including scholarship and loan support, and curriculum development to guide college police-science programs away from narrow vocational concentration.*

The State of Washington has made a beginning with the establishment of the Washington Law Enforcement Officers Training Commission. This step was given the first priority by the President's Commission, but it is only the first step. In the meantime, crime does not wait to be committed. Our need increases daily with the increase in criminal activity.

To meet the immediate problem requires that training be provided for aqproximately 240 men. In addition, according to the study conducted by the office of the Attorney General, there are approximately 500 officers who have had no training and who are unable to have training because the small departments for which they work cannot afford to release them. An attempt was made by the 1965 Legislature to alleviate this problem. Chapter 43.100.170 RCW states as follows:

> *The commission shall annually allocate and the state treasurer shall pay from the law enforcement officers' training fund to each municipality which has applied and qualified for aid a sum which will reimburse the municipality in an amount not to exceed one-half of the salary paid to each law enforcement officer meeting the recruitment standards and who participates in training. (Appendix VII, page 33)*

Funds to implement this section were not allocated and the problem still exists. Additional funding for this purpose to the Washington Law Enforcement Officers Training Commission would provide a considerable student increase in the basic training program.

A look at enrollment figures at community colleges shows a pattern of decreased enrollment for Spring quarter. Enrollment at Everett Community College dropped more than 400 students from Fall of 1969 to Spring of 1970. At Columbia Basin College the drop for the same period was more than 600 students, at Green River the drop was approximately 470 students and at Lower Columbia College the drop was more than 200 students. This means a total drop in enrollment of 1670 students from the Fall to Spring quarters at four of the five schools where basic training is presently being conducted. If the facilities at these colleges

were to be used to capacity by a deliberate scheduling of basic training classes during the spring quarter low-enrollment period, all necessary training could be provided without additional capital construction.

The study by Battelle Northwest includes operating cost of the "Present Situation," training at the five community college locations, and lists this as $53,500. This figure does not include permanent staff, utilities and maintenance; it is the cost of visiting staff and travel only. The Washington Law Enforcement Officers Training Commission has conducted a basic training course on an experimental basis at Providence Heights. This is an academy situation under the supervision of the Washington State Law and Justice Planning Office . The training provided was the same type and followed the same basic training curriculum as that being conducted at the five community college locations. In addition, a number of short courses and seminars were conducted. Total cost of operating the school has been broken down to cost per student hour and varies from $4.20 per student hour for the month of April to $6.03 for the month of August, which includes room and board. Costs for months of April through August are given under Appendix VI.

Comparative costs at community colleges are difficult to secure. In a sample selection from 8 of the 14 community colleges offering Law Enforcement degree programs, the cost of instruction was $10.70 per student credit hour for Fall Quarter of 1969. Comparisons to the basic training course are difficult to make and

not valid since community college costs are computed by full-time equivalent, one FTE being fifteen student hours per quarter. The basic training course offered at the five community colleges is equal to one FTE since it is given fifteen quarter hours of credit. However, a student in a regular program, taking fifteen quarter hours, will have spent approximately 150 to 200 hours in class compared to 320 to 400 hours in the basic training course.

Although operating cost comparisons cannot be made with data presently available, there are cost factors which favor continuation of law enforcement training at present community college locations. The major one is the fact that no capital construction funds will be needed since training can be provided by utilization of existing community college facilities. Another factor to be considered is the cost of travel and time lost in travel. The community colleges which now provide basic training are located in Bremerton, Auburn, Longview, Everett, and Pasco. By sending men to the school nearest their department location, travel time and cost can be minimized. In view of the increased costs which would be involved in providing a new location, the Joint Committee recommends the continuation of basic law enforcement training at the five community college locations listed above

CONCLUSION

Adequate training of law enforcement officers in the State of Washington cannot be accomplished by a simple solution nor, by a single agency. It will require the cooperative efforts of those involved in law enforcement training, specifically the Washington Law Enforcement Officers Training Commission and the State Board for Community College Education. The necessity for immediate action cannot be over-emphasized. In a study conducted by Charles B. Saunders, Jr., for the Brookings Governmental Studies Program, he discusses this need.

> *It is ironic that law and order should become the primary domestic issue at a time of growing affluence, unprecedented national efforts to alleviate poverty and other social ills, and increasing professionalization of the police. Just as law enforcement is beginning to make real progress toward higher standards, the public is coming to expect even better law enforcement....In a more important sense, the national concern is an expression of the compelling need to heal the deep divisions threatening American society. Social unrest makes civil order not only vital but unachievable without the rule of law. More and more, social conditions are placing a premium on the competent performance of the law enforcement task....The police, moreover, will not be able to perform effectively if a substantial segment of the population feels contemptuous of or threatened by them. If order and the rule of law are to prevail, society must assure that the authority and competence of the police both deserve and receive respect....The current national concern for law and order, and the growing need for fairer and more effective law enforcement, could generate a comprehensive effort to upgrade police manpower....Knowledgeable observers have insisted for half a century that any such effort must be based on higher standards of police education and training.*

Our study provides evidence of an increasing need in the State of Washington for more and better law enforcement training. Nationally law and order has become the primary domestic issue and Charles Saunders indicates that the effort to upgrade police education and training. In view of these considerations the Joint Committee urges that the recommendations contained in this report be implemented.

Appendix I

Schools coordinated by the Washington State Law Enforcement Officers Training Commission, July 1969 - June 1970.

1) 3 Advanced investigative schools

   40 hours of instruction
   88 persons trained
   71 departments represented

2) 2 Fingerprint Identification Schools
   80 hours of instruction
   29 persons trained
   14 departments

3) 2 Juvenile control schools
   40 hours of instruction
   65 persons
   30 departments

4) 2 Traffic supervision schools
   Contracted with Traffic Institute of Northwestern University
   88 persons
   120 hours
   65 departments

5) Sheriffs' civil functions school

   25 hours
   58 persons
   25 departments

6) Immediate care of the sick and injured (course at the University of Washington in cooperation with the School of Medicine.)

   2 days
   163 persons
   56 departments

7) 2 Crowd control schools

   2 days
   129 persons
   55 departments

8) 3 Defensive tactics and firearms
   2 days
   114 persons
   16 departments

9) 3 Narcotic and Dangerous Drug Seminars

2 days
218 persons
57 departments

10) 10 Seminars on Extremist Groups and Violence

7 hours
746 persons
136 departments

11) 3 Basic Zone Inservice Schools
1 week
102 persons
11 departments

12) 35 Legal Seminars

4 hours
2266 persons
339 departments

APPENDIX II
COMMUNITY COLLEGE LAW ENFORCEMENT ENROLLMENTS--FALL 1969

COLLEGE	1 PRESERVICE	2 * INSERVICE	3 * SUPPLEMENTARY	4 BASIC	5 SEMINARS	6 CORRECTIONS
Peninsula	-0-	-0-	-0-	-0-	-0-	-0-
Grays Harbor	-0-	-0-	12	-0-	-0-	-0-
Olympic	164	165	52	92	-0-	45
Skagit Valley	-0-	-0-	-0-	-0-	-0-	-0-
Edmonds	-0-	-0-	-0-	-0-	-0-	-0-
Everett	114	-0-	-0-	14	45	49
Seattle	-0-	82	-0-	-0-	-0-	-0-
Shoreline	124	-0-	35	-0-	-0-	-0-
Bellevue	135	-0-	77	-0-	-0-	-0-
Highline	100	-0-	30	-0-	-0-	-0-
Green River	118	16	17	30	60	-0-
Ft. Steilacoom	60	-0-	-0-	-0-	-0-	-0-
Centralia	13	22	38	-0-	-0-	16
Lower Columbia	58	-0-	40	10	-0-	12
Clark	88	48	-0-	-0-	20	-0-
Wenatchee Valley	-0-	-0-	-0-	-0-	-0-	-0-
Yakima Valley	102	-0-	-0-	-0-	-0-	-0-
Spokane	57	100	-0-	-0-	-0-	3
Big Bend	-0-	-0-	-0-	-0-	-0-	-0-
Columbia Basin	57	-0-	-0-	20	-0-	-0-
Walla Walla	-0-	-0-	15	-0-	-0-	14
Tacoma	-0-	75	-0-	-0-	-0-	-0-

Total Preservice (Column 1) = 1,190
* Total Inservice and Supplementary (Columns 2,3, & 5) = 949 Fall quarter only.
Total Corrections (Column 6) = 139
Total Basic Law Enforcement (Column 4) = 166

For one quarter only
(Estimate for year 2,500 - 3,000 people)

Appendix III

TRAINING REQUIREMENTS AND LEVELS - CITIES, TOWNS, AND COUNTIES

First Class Cities

Depts. having minimum educational requirements	10
Depts. having no minimum educational requirements	0
Depts. offering basic training	9
Depts. offering no basic training	1
Personnel who have completed basic training	2056
Personnel who have not completed basic training	85

Second Class Cities

Depts. having minimum educational requirements	4
Depts. having no minimum educational requirements	0
Depts. offering basic training	2
Depts. offering no basic training	2
Personnel who have completed basic training	99
Personnel who have not completed basic training	24

Third Class Cities

Depts. having minimum educational requirements	76
Depts. having no minimum educational requirements	4
Depts. offering basic training	45
Depts. offering no basic training	33
Personnel who have completed basic training	688
Personnel who have not completed basic training	183

Fourth Class Cities

Depts. having minimum educational requirements	75
Depts. having no minimum educational requirement	48
Depts. offering basic training	32
Depts. offering no basic training	84
Personnel who have completed basic training	131
Personnel who have not completed basic training	136

Unincorporated and Unclassified

Depts. having minimum educational requirements	2
Depts. having no minimum educational requirements	1
Depts. offering basic training	1
Depts. offering no basic training	2
Personnel who have completed basic training	10
Personnel who have not completed basic training	6

Counties

Depts. having minimum educational requirements	34
Depts. having no minimum educational requirements	5
Depts. offering basic training	20
Depts. offering no basic training	20
Personnel who have completed basic training	766
Personnel who have not completed basic training	133

TOTALS

Depts. having minimum educational requirements	201
Depts. having no minimum educational requirements	58
Depts. offering basic training	109
Depts. offering no basic training	142
Personnel who have completed basic training	3750
Personnel who have not completed basic training	567

Appendix IV

RESULTS OF QUESTIONNAIRE TO FIRST CLASS CITIES

1.	Total number of law enforcement personnel	2478
	a. Number with arrest authority	2094
	b. Additional personnel (Secretarial, clerical, etc.)	438
2.	Length of basic training period for personnel with arrest authority	varies from 30 days to 19 weel
3.	What specialized law enforcement training is provided for personnel who do not have arrest authority	None - 5 In service - 4
4.	Is present training adequate?	Adequate - 3 For new officers - 2 Inadequate - 4
5.	What changes would you recommend?	More training See below
6.	Would you recommend that your department become a part of the Washington Law Enforcement Officers Training Commission.	Yes - 5 No - 3 N/A - 1
7.	Would you consider training your personnel at a Washington State Law Enforcement Academy if standards of training were equivalent to those presently provided by your department?	Yes - 4 No - 3 N/A - 2
8.	Do you encourage members of your department to take classes in law enforcement at the Community College in your area?	Yes - 9
9.	What changes do you recommend in the Community College programs?	None - 1 N/A - 1 See below for specific recommendations

Specific answers to question 5

a. Added training in non-criminal matters, i.e. human relations, P. R., community relations.

b. In-service training and basic training need more emphasis in the areas of law, community relations, technical pro-

cedures and reports.

c. The present Academy is adequate on the basic introduction into the Police profession; however, it could be greatly improved with the acquisition of a separate facility for training, improved training devices, improved range facilities, and retaining more highly skilled professional people for instructors. Additional instruction (In-Service Training) after the Academy suffers because of the overload placed on the training staff.

d. Increase basic to 10 weeks.

e. We have no formal basic training, academy or indoctrination programs. New officers are trained by Sergeants and senior officers.

f More stress on accuracy of report writing.

g. A police science degree program at Columbia Basin College.

Specific comments to question 9

a. They currently program for the needs of the police and sheriffs departments with advisors from both departments.

b. Standardization of course content -- AA degree offered at selected community colleges throughout the state. Applicants screened before enrollment, work toward establishing a state-wide pool of pretrained applicants and an AA degree requirement for all recruits. The ultimate goal being a four year degree in police work and allowing specialization within the field of law enforcement.

c. More emphasis on liberal arts subjects.

d. More emphasis is needed in the recruitment of interest in the Law Enforcement Field. It is felt that more instructors in the Police Science Courses should be in or have experience in law enforcement and a wider variety of courses should be offered in Police Science.

e. Use of more bona-fide law enforcement officers as instructors.

f. Set up correspondence courses.

g. Less emphasis on technical police subjects and more Liberal Arts subjects. Also must be coordinated more with our department.

The survey which was sent to 2nd, 3rd, and 4th class cities and counties allowed space for comments as to effectiveness of present law enforcement programs. Not all departments utilized the opportunity to make comments, but of those who did, the comments fell broadly into the areas listed below:

Good to excellent	5
Adequate	11
Inadequate	7
Geared to large departments	4
Small departments unable to utilize training because of lack of funds	18
Lack of professionalism and discipline	6
More advanced programs needed and curriculum should be upgraded	17

APPENDIX V

RESULTS OF QUESTIONNAIRE IN SECOND, THIRD AND FOURTH CLASS CITIES

A. Second and Third Class Cities

Number of Departments answering 63

	Totals	Percentage
Number of officers with less than six weeks of formal law enforcement training	208	20.1%
Number of officers with from six to ten weeks of law enforcement training	376	36.3
Number of officers with ten weeks to a year training	332	32.1
Number of officers who have completed two years in law enforcement or related field at a community college	98	9.5
Number of officers with a degree in police science or related fields from a 4 year college	22	2.1
Total number of officers involved in questionnaire	1036	
Number of officers who are continuing their training at a community college or a four-year college	291	28.1
Number of officers who are continuing training by attending workshops	314	30.3
Number of departments where officers pay the total cost of continuing training	3	5.1
Number of departments which pay the total cost of continuing training	47	79.7
Number of departments where cost is paid jointly by the officer and the department	9	15.3

Second and Third Class Cities

Number of department chiefs answering 63

Numbers who listed the need for additional training in the listed areas:

	Totals	Percentage
Narcotics and drugs	56	88.9%
Criminal investigation	50	79.4
Crowd control	40	63.5
Criminal law	35	55.6
Human relations	34	4.0
Juvenile enforcement	30	47.6
Court procedures	30	47.6
Community police relations	29	46.0
Patrol procedures	24	38.1
Family crisis	22	34.9
Traffic control	21	33.3
Firearms	17	27.0

Where training was preferred was ranked as follows:

Law enforcement academy only	31	49.2
Combination of law enforcement academy and community college	24	38.1
Combination of law enforcement academy and four - year college	5	7.9
Community college only	2	3.2
Four year college only	1	1.6

B. Fourth Class Cities

Number of department chiefs answering 42

Chiefs ranked the need for additional training in the listed are as follows:

	Totals	Percentag
Criminal investigation	35	83.3%
Narcotics and drugs	33	78.6
Criminal law	28	66.7
Court procedures	20	47.6
Crowd control	18	42.9
Community-police relations	17	40.5
Juvenile enforcement	17	40.5
Family crisis	15	35.7
Patrol procedures	15	35.7
Traffic control	15	35.7
Human relations	15	35.7
Firearms	11	26.2

Chiefs ranked the location preferred for this training as follows

Combination of law enforcement academy and community college	21	50.0
Law enforcement academy only	15	35.7
Combination of law enforcement academy and four year follege	4	9.5
Community college only	2	4.3
Four year college only	0	0

APPENDIX VI

Cost of Basic Training - Providence Heights

Month	Total Cost	Total Student Hours	Cost per student hr.
April	$63,446.00	14,600	$4.20
May	54,800.00	12,300	4.45
June	37,460.00	7,600	4.87
July	56,800.00	13,100	4.25
August	81,050.00	13,400	6.03

These costs are for training approximately 760 people.

Classes taught were:

6 Basic police training
1 Community in conflict
1 Directed field experience
1 Auto theft
1 Bomb and arson seminar
1 Mid-management
1 Community based corrections workshop
1 State narcotics agents school
1 Organized crime workshop

Receiving training were:

Police and sheriffs
Prosecutors
Judges
Parole people
Corrections people
Institutions people

from an interview with Gene Lieberg, Providence Heights.

APPENDIX VII

Law Enf. Officers' Training Comm'n.

43.100.910

43.100.170 Reimbursement of municipalities--Amounts--Reduction in allocations. The commission shall annually allocate and the state treasurer shall pay from the law enforcement officers' training fund to each municipality which has applied and qualified for aid pursuant to RCW 43.100.150 through 43.100.170, 43.100.900 and 10-.82.070 a sum which will reimburse the municipality in an amount not to exceed one-half of the salary paid to each law enforcement officer meeting the recruitment standards and who participates in training, meeting the standards prescribed pursuant to this chapter, during the period when such officer is physically engaged in such training during the period covered by the allocation, plus one-half of necessary living expenses incurred by such officer which are necessitated by training required that he be away from his residence overnight, but not to exceed a maximum sum established by the commission. If the moneys in the law enforcement officers' training fund budgeted by the commission for such salary and living expenses reimbursement are insufficient to allocate such amount to each participating municipality, the amount so allocated shall be reduced proportionately. In no event shall any allocation be made to any municipality which has not, throughout the period covered by the allocation, adhered to the recruitment and training standards established by the commission as applicable to personnel recruited or trained by such municipality during such period. [1965 c 158 § 18.]

VT 013 957
GUIDELINES FOR UTILIZING NEW HEALTH CAREER WORKERS.

INSTITUTE FOR HEALTH RESEARCH, BERKELEY, CALIF.
CALIFORNIA STATE DEPT. OF PUBLIC HEALTH, BERKELEY.
PUBLIC HEALTH SERVICE, ROCKVILLE, MD.
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INSTITUTE FOR HEALTH RESEARCH, 2055 CENTER STREET, BERKELEY, CALIFORNIA 94704 ($1.00)
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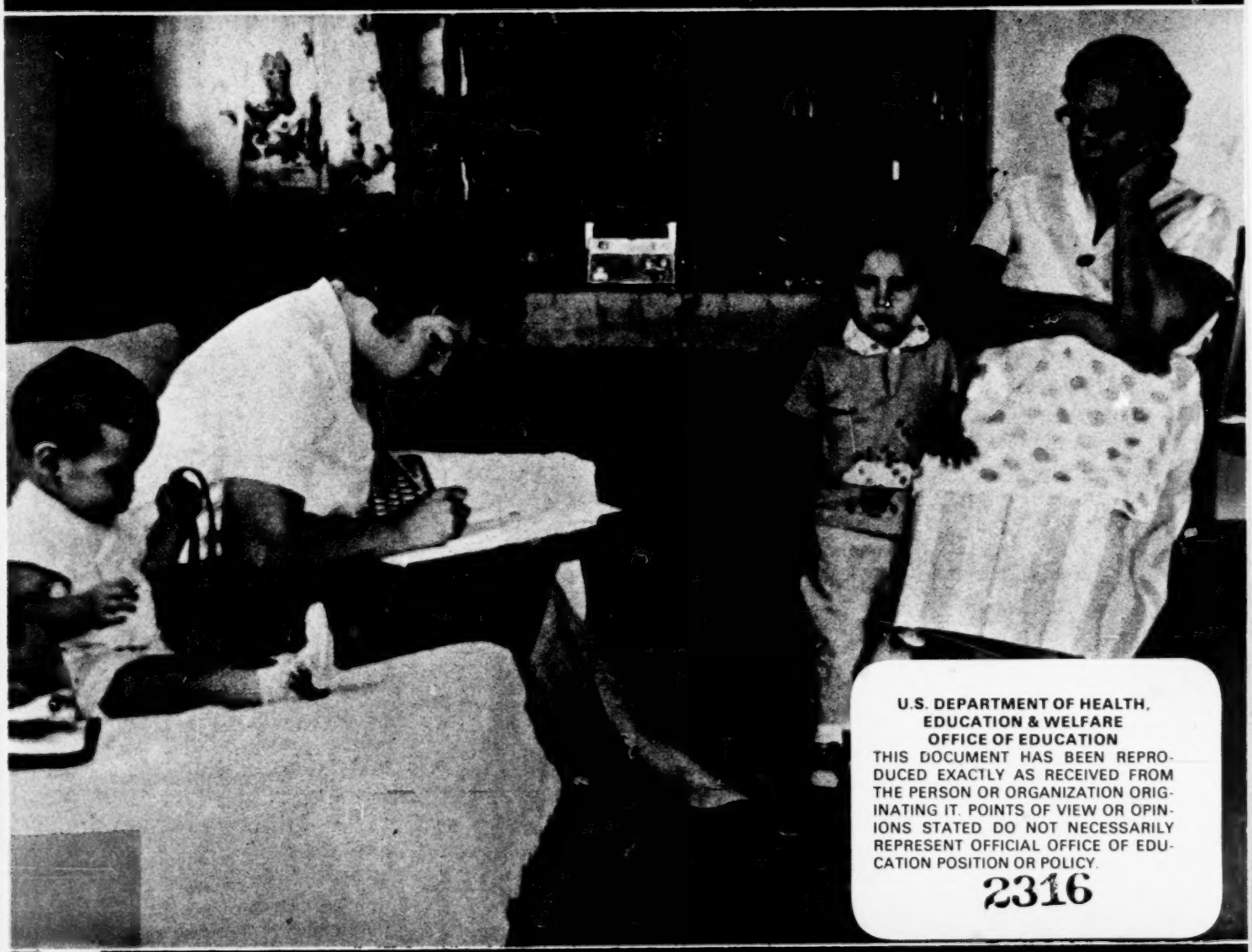
DESCRIPTORS - *GUIDELINES; *HEALTH OCCUPATIONS EDUCATION; *SUBPROFESSIONALS; *PROGRAM DEVELOPMENT; PROGRAM DESCRIPTIONS; HEALTH PERSONNEL; *CAREER OPPORTUNITIES; HEALTH PROGRAMS; HOME HEALTH AIDES; COMMUNITY HEALTH SERVICES
IDENTIFIERS - *NEW HEALTH CAREER WORKERS

ABSTRACT - DEVELOPED IN CONJUNCTION WITH THE NEW HEALTH CAREERS DEMONSTRATION PROJECT, AND BASED LARGELY ON DATA DRAWN FROM THE EXPERIENCE OF USING HEALTH AIDES IN MIGRANT HEALTH PROJECTS, NEIGHBORHOOD HEALTH CENTERS AND LOCAL HEALTH DEPARTMENTS IN CALIFORNIA, THESE GUIDELINES ARE DESIGNED TO AID PROFESSIONAL HEALTH STAFF IN SOLVING THE PROBLEMS OF HOW TO SELECT, EMPLOY, TRAIN, AND SUPERVISE HEALTH AIDES. MAJOR AREAS COVERED INCLUDE: (1) JUSTIFICATION FOR EMPLOYMENT OF NEW HEALTH CAREER WORKERS, (2) DEVELOPMENT OF EMPLOYMENT STANDARDS, (3) ESTABLISHMENT OF TASKS TO BE PERFORMED BY NEW HEALTH CAREER WORKERS, INCLUDING JOB DESCRIPTIONS, (4) MINIMUM QUALIFICATIONS, (5) TRAINING REQUIREMENTS, (6) CERTIFICATION AND ACCREDITATION, (7) WORKER SUPERVISION, AND (8) SUPERVISOR TRAINING. A CHECKLIST FOR UTILIZING AUXILIARY HEALTH PERSONNEL AND A SELECTED ANNOTATED BIBLIOGRAPHY ARE INCLUDED. APPENDIXES PROVIDE A SAMPLE JOB DESCRIPTION AND CERTIFICATE OF COMPLETION OF BASIC TRAINING. (AW)

VT 013 957

GUIDELINES



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2316

VT013957

utilizing NEW HEALTH CAREER WORKERS

INSTITUTE FOR HEALTH RESEARCH

JANUARY 1971

GUIDELINES

FOR

UTILIZING NEW HEALTH CAREER WORKERS

INSTITUTE FOR HEALTH RESEARCH
2728 Durant Avenue
Berkeley, California 94704

January 1971 $1.00

2317

FOREWORD

The Institute for Health Research is conducting a New Health Careers Demonstration Project which will develop practical models for the employment and training of new kinds of health workers to deliver improved health services to communities. Through a $650,000 three year research grant from the National Center for Health Services Research and Development, U.S. Public Health Service, the project will perform a functional analysis of program objectives and existing jobs in various health programs, restructure tasks into more efficient utilization patterns, employ poor people in new job classes with career ladders, and create appropriate basic education, on the job training, and continuing education programs which are relevant to each job and are accredited by educational institutions. The effects of this project on the organizational structure of the health agencies, the workers in the agencies, and the delivery of health services to the community will then be evaluated.

Many health workers are requesting this kind of information now, to help them use new kinds of personnel in their programs. They recognize the need to employ workers in non-traditional jobs, and urgently require specific information on how to recruit, select, train, employ, and supervise auxiliary personnel. These guidelines are designed to meet that need; to provide interim assistance to staff presently utilizing auxiliary workers in health programs. Improvements and refinements will come out of manpower demonstration projects, such as the one described above.

The guidelines are based upon data which comes largely from the experience of using health aides in migrant health projects, neighborhood health centers, and local health departments in California. However, they are written to be applied to the widest range of situations. The ideas and methods described can be adapted to utilizing health aides and auxiliary workers in many different kinds of health programs.

These guidelines focus on the development of entry level personnel such as health aides and community workers. But this is only a step towards developing career opportunities with positions at all levels. The term "new health career workers" means persons who are employed in beginning level positions where there is potential for advancement. Dead end jobs can be eliminated and career ladders created which make it possible for all individuals to grow in meaningful and worthwhile careers in health agencies. The long range goal is not to create jobs for jobs' sake, but to provide better health care to consumers by utilizing manpower in more effective and efficient ways.

Many people contributed to the development of these guidelines. They are the result of a joint effort of the staff members of the California State Health Department's Farm Workers Health Service and the Institute for Health Research's New Health Careers Demonstration Project.

I wish to thank Faustina Solis, Sarah Erlach, Dolores Garza Pena, Frances McPheeley, Warren Holm, and Douglas Taylor who contributed to and reviewed these guidelines. My gratitude goes to the health aides and other staff of the California migrant health projects who gave their time for interviews and to review sections of the guidelines. Their names are too many to mention. I also wish to give special recognition to Jane Thornton and Brenda Miller who typed the many drafts and to Laurie Snyder who typed the final copy, to Rita Jaxyson who wrote the clinic task section, and to Harleen Lyons who wrote the major portion of the plans for training and certifications and who edited and corrected the draft. The cover photograph was furnished by the Farm Workers Health Service, CSDPH.

Wilbur Hoff

Wilbur Hoff, DrPH

TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
II.	JUSTIFICATION FOR EMPLOYING NEW HEALTH CAREER WORKERS	3
III.	EMPLOYMENT STANDARDS	5
IV.	TASKS THAT CAN BE PERFORMED BY NEW CAREER WORKERS	7
	Guidelines for Job Descriptions	7
	Worker tasks	8
	Outreach tasks	9
	Clinic tasks	11
	Health education tasks	13
	Environmental health tasks	15
V.	MINIMUM QUALIFICATIONS	18
VI.	TRAINING REQUIRED TO PERFORM VARIOUS TASKS	19
	Outreach tasks	19
	Clinic tasks	27
	Health education tasks	31
VII.	CERTIFICATION AND ACCREDITATION OF NEW HEALTH CAREERISTS	38

TABLE OF CONTENTS (CONTINUED)

		Page
VIII.	SUPERVISION OF WORKERS	39
IX.	TRAINING FOR SUPERVISORS	42
X.	CHECKLIST FOR UTILIZING AUXILIARY HEALTH PERSONNEL	44
	SELECTED ANNOTATED BIBLIOGRAPHY ON NEW HEALTH CAREERISTS	45
	APPENDIX I: SAMPLE JOB DESCRIPTION FOR OUTREACH WORKER	49
	APPENDIX II: CERTIFICATE OF COMPLETION OF BASIC TRAINING	51

I. INTRODUCTION

The delivery of comprehensive health services to our urban and rural communities is a challenge, particularly to health professionals who work with the poor and disadvantaged and with rural and migrant groups. Since the largest component of our health delivery system is manpower, new ways must be found to utilize personnel more effectively and efficiently.

During the coming years the health services industry will require vast increases in health manpower. One way to meet the critical manpower shortage is to use new types of workers on the health team. During the past few years, for example, there has been a great impetus to employ indigenous workers to extend and improve health services to special population groups. Health departments, neighborhood health centers and other health agencies have employed a variety of health aides in personal and environmental health programs.

Since 1961, the Farm Workers Health Program in the California State Department of Public Health has employed health aides to enhance the health services provided to migratory laborers and their families. They have been employed as nurse, clinic, sanitation, or nutrition aides, as community health or health education aides, and as interpreters. They have performed a wide variety of activities and have assisted the physicians, nurses, health educators, sanitarians, and social workers with their functions. Since then there has been a large increase in the numbers and types of auxiliary workers that have been employed in public health and medical care programs.

Auxiliary health personnel (health aides) are defined as persons employed to perform a health job at a level below that of the traditional professional. These persons have usually been recruited with little or no previous experience or training; they may have been given some health orientation and remedial education, but primarily they have been trained on the job and given close supervision in the performance of specific health tasks. They have been functioning under titles such as community health aides, family health workers, and nurses' aides.

However, the introduction of this new type of worker into our health delivery system has created difficulties. Health professionals have been largely inexperienced and inadequately prepared to utilize such workers, and many professionals have raised questions about the specific problems of how to select, employ, train, and supervise health aides.

These guidelines can be used in the following specific ways:

1. To select tasks that can be performed by aides to implement a variety of health program objectives.

2. To justify the creation of entry level jobs in a health program.

3. To write job descriptions for these positions.

4. To establish minimum qualifications for recruiting and selecting job applicants.

5. To provide orientation, on the job training, and other training that is relevant for health aides.

6. To create continuing and accredited education programs to enable entry level persons to advance in a health career.

7. To set up effective patterns of supervision for health aides.

8. To establish criteria for evaluating work performance.

9. To plan for the creation of new career opportunities for health workers.

These guidelines are also intended as a draft which may serve as a basis for discussion and experimentation among health aides and professionals. From research, demonstration studies and experience of ongoing programs, more specific and relevant guidelines can eventually be adopted for use by many health agencies, education and training institutions, and professional associations.

The long range national goal is comprehensive health care to all citizens. More effective use of health manpower will help accomplish this goal. Professionals who are prepared to train and utilize manpower effectively, training programs that are certified and accredited for health aides and the development of new health careers are steps toward this goal.

II. JUSTIFICATION FOR EMPLOYING NEW HEALTH CAREER WORKERS

Numerous demonstration projects supported by funds from the United States Public Health Service, the Office of Economic Opportunity, and the Department of Labor have shown how auxiliary personnel can enhance the delivery of health care to various community groups. A number of studies and projects referred to in Section XI, the selected annotated bibliography at the end of these guidelines, have documented positive effects of utilizing such personnel.

The following is a summary of significant reasons for justifying the creation of new career positions in a health program:

1. Extends and improves the quality of health services delivered to people. Auxiliary health workers who receive training in how to relate to and communicate with clients and how to carry out various kinds of health care tasks can be an important addition to the health team. The employment of outreach and other kinds of auxiliary personnel can extend more comprehensive health services to the poor, the high risk, and other groups not now being covered. This can reduce the fragmentation of services and provide to clients a more personal and a greater variety of community health services.

2. Improves the efficiency of the health delivery system. By matching the levels of tasks performed to the levels of training and experience required, more efficient staffing patterns can be obtained. The employment of auxiliary personnel can reduce the cost and/or improve the quality of health programs by freeing the professionals to use their skills in planning, implementing, and evaluating both the traditional and innovative health programs for consumers. The professional's expertise and time can thus be extended to meet the health problems and needs of more people. In many instances this can change the professional's role from that of direct provider of services to that of supervisor, trainer, planner, etc.

3. Provides a large resource of health manpower to meet the health system's needs. There are critical needs for more and additional trained personnel at the local, state, and national levels. Large numbers of poor and disadvantaged persons who live in urban and rural communities are available and willing to work. They can be trained and employed to alleviate the shortages of our health delivery system. The creation of entry level positions for aides will also provide a good resource for recruiting future professional staff. If opportunities are created for job advancement, the experience and training that health aides receive in entry level jobs will result in dedicated and

experienced persons who want to continue their education and work in a professional health career.

4. Overcomes many traditional barriers in getting health services to clients. The inherent qualities indigenous personnel possess, combined with specific skills, can largely overcome barriers of language, race, culture, and ethnic differences that often interfere or prevent clients from obtaining or receiving services. Indigenous health aides can help to reduce the social distance and professional status that stands between the deliverers and the receivers of a health service. They can also improve communication and understanding and help with other problems that have interfered with the provision of health services to disadvantaged groups.

5. Helps the health agency become more responsive and accountable to the community it serves. If new career personnel are recruited from the consumer groups, they can act as a bridge between the agency and the community by improving the flow of communication between the two. If aides are allowed to function as full fledged members of the health team and are encouraged to participate in the planning and decision making processes of the agency, they can be an invaluable resource or channel for feeding in information about consumer needs and problems. The health services can thus be designed and carried out more in tune with the needs of its consumer-client constituents.

6. Demonstrates new ways to improve the delivery of health services. The definition of new jobs and the recruitment, selection, and training of new categories of persons could serve to demonstrate innovative and imaginative ways to carry out more comprehensive health services. This process could serve as a catalyst to update, reorganize, and streamline some of the traditional organizational processes of hiring, training, and utilizing health personnel. Also, the challenge of enthusiastic new careerists often opens the eyes of the professionals, allowing them to see the inadequacies of existing services and forcing them to redefine the role of the agency.

7. Attaches a dignity to work for the persons who are employed. Jobs for new career health workers are important, needed, provide meaningful careers and produce significant economic and social benefits, including employment opportunities for many persons who now require maintenance under public assistance programs.

III. EMPLOYMENT STANDARDS

A survey was conducted by the Farm Workers Health Services, CSDPH, in 1968 to determine the employment conditions of health aides working in California Migrant Health Projects. The results of this study indicated that substandard working conditions were prevalent. The findings revealed that most aides were employed in seasonal or temporary jobs, received low pay, and obtained few, if any, regular benefits such as social security, vacation and sick leave.

After considering the results of the study, the Seasonal Agricultural Workers' Advisory Committee of the California State Department of Public Health proposed nine recommendations to remedy these unjust conditions. These were then approved by the California State Department of Public Health, and the nine point standard was designated to apply to any state health program or project which employed auxiliary health personnel. These standards can be used in conjunction with the checklist in Section X to measure the adequacy of proposed or ongoing career development programs.

1. The decision for using auxiliary personnel shall be based upon the needs and conditions of the population groups to be served and the minimum requirements for staff which are required to carry out the health service activities.

2. A job description shall be developed for each position. It shall include the specific duties to be performed and the minimum qualifications for the position.

3. It is desirable that full time positions be established. When this is not possible, half time positions may be opened. Positions should be created through the agencies' established civil service, merit, or other personnel system.

4. Persons shall receive the same employment benefits that other staff receive in the agency, such as social security, vacation, sick leave, compensation insurance, and health plan.

5. Persons shall receive a salary equivalent to and competitive with other comparable positions in the area.

6. Personnel policies should include opportunities for advancement in salary and career position in the project or the agency.

7. Temporary aide positions should be converted into permanent positions within two years if the need continues to exist.

8. An organized training program for the aides must be provided at the beginning of the job. This must include training in both the technical and interpersonal skills that are required for the job.

9. Every auxiliary person shall be supervised by a trained person who understands the job to be done. Supervision should include periodic conferences with the aide and an evaluation of his/her work at least once a year.

IV. TASKS THAT CAN BE PERFORMED BY NEW HEALTH CAREER WORKERS

A. Guidelines for job descriptions

A job description should be written for each worker. Job descriptions should be based upon the work that must get done to achieve the objectives of the health program. Careful thought must first be given to what work needs to get done, and second, how this work can be divided upon among workers to get it done. Job descriptions must therefore relate to specific areas of worker functions and describe the nature and level of tasks to be performed.

Many situations exist where the activity of auxiliary workers is vague, general, and poorly defined. This usually indicates that the professional staff has not given enough thought and planning to exactly how the workers will be used, what they will do, and how their duties relate to other health workers and the objectives of the program.

A carefully written job description will help to remedy these difficulties. A job description generally includes the following parts:

1. Title of worker:
   Examples: Family Health Worker, Community Health Aide, Environmental Technician.

2. Salary range:
   Example: $481 to $584 per month, paid twice a month.

3. Minimum Qualifications:
   Information should be stated as to the minimum requirements for education, experience, special knowledge, skills, or attitudes, and licensing, if required. See Section V for details.

4. General description:
   This summarizes the job tasks. The important or general duties and tasks of the position should be described in not more than one paragraph. See Appendix I, sample Job Description.

5. Typical tasks:
   Specific tasks of the position should be listed. Tasks should describe each significant activity and should indicate the nature of the work and general level of responsibility required for the job. For examples, see the following section on Worker Tasks and Appendix I.

6. Advancement opportunities:
   Information should describe what opportunities exist for the worker to advance in a career, such as eligibility for certification, for further training, for higher levels or positions within the same or other job classes in the agency. See examples in Sample Job Description, Appendix I.

B. Worker tasks

The most important part of determining what kinds of workers are needed is to identify the tasks that are required for carrying out the various operations and services in the health program. Once the specific tasks have been identified, they can be combined and structured into job descriptions.

The following lists contain tasks that are actually being performed by various health aides or entry level workers. They are classified according to the major health program functions of outreach, clinic, health education, and environmental health. These task lists were compiled by analyzing a wide variety of job descriptions for health aides, by interviewing selected health aides in these program areas and then by reviewing the lists with the aides' supervisors.

These task lists are meant to be illustrative only, not a rigid description of what any one job should be. These lists should be used as a guide to select those tasks which are required in a particular program or health service, and then to combine them into a job description which meets the needs of the program, the worker, and the agency. A particular job description might include some, all, or more than the tasks listed in one or more of the following categories. Specific tasks should be combined into jobs in the most appropriate way to perform required health services, and according to the structure and resources of the agency.

1. Outreach Tasks

a. Identify individuals and/or families in a neighborhood who have specific health problems/conditions in order that a contact can be made and appropriate services provided.

b. Locate target individuals/families from a list, map, or other data in order to prepare for a personal contact or for other activity.

c. Contact/greet/introduce self and state purpose of contact in order to gain entry or set stage for further discussion.

d. Describe prescribed information about a health problem/program/services in order that a client can determine its relevance to him/her/family, using visit form or brochure of agency services.

e. Explain to client what rights and benefits are available (i.e. health, welfare, employment, legal, etc.) and how these services can be used in order to enable him/her to utilize the system of resources, in the community, using directory of community resources.

f. Listen to/acknowledge and paraphrase responses of client to determine acceptance and understanding of message, following principles of basic communication.

g. Ask prescribed questions of client to identify or obtain specific health information about problems/concerns/conditions of client or family members in order to complete record/determine eligibility/make a referral, using record or interview form or other guidelines.

h. Observe prescribed behavior of client (i.e. specific signs and symptoms)/ environmental conditions in order to obtain information required of visit/ interview, following guidelines of how to observe.

i. Using information collected in tasks f,g,h, engage client in discussion of a specific problem or condition of relevance to him/her in order to coach and encourage client to use an appropriate health or health related service or to take other preventive or remedial action related to the problem.

j. Answer questions/clarify/discuss with client any complaints, objections, misunderstandings, difficulties, or lack of information in order to resolve negative attitudes, values, or cultural differences which may prevent client from using service or taking appropriate action.

k. Make referral to appropriate agency/service to enable client to obtain personal health care, environmental health or other service (i.e. employment, welfare, legal, etc.).

l. Make an appointment for client to obtain an interview/examination/other service to enable patient to obtain desired service, using prescribed appointment form and procedure.

m. Identify need and arrange supportive services (i.e. transportation, child care, etc.) for patient in order for patient to obtain service.

n. Note on record/form prescribed information obtain from interview/visit in order to provide basis for further action by self, supervisor, or other worker.

o. File or route record/visit/interview form to appropriate person for further decisions and action, following agency procedure.

p. Interpret/translate in language understandable to the patient an instruction, message, or other health information given by a professional or other worker.

q. Interpret/translate to the professional/health worker specific information/questions/answers/problems which the patient desires to communicate.

r. Revisit individual/family to perform follow-up action, (i.e. confirm an appointment, convey instructions by doctor/nurse, etc.) and note results of activity on record, according to agency policy or instructions from supervisor.

2. Clinic Tasks

a. Set up examining room using needed supplies and equipment required for patient examination.

b. Summon and interview patient to determine reason for visit.

c. Register patient as a means of recording for future reference and identification.

d. Ask prescribed questions of patient to identify or obtain specific health information.

e. Locate patient's medical record for proper identification and review.

f. Review medical record to familiarize self with case history.

g. Prepare patient for examination, using sheets, drapes, pads, etc.

h. Weigh, measure, take vital signs (TPR-BP) as a guide in checking health symptoms using appropriate instruments and equipment.

i. Collect specifmens, such as urine, stool, sputum, for lab analysis and diagnosis according to prescribed procedure.

j. Transport specimens to lab for immediate diagnosis and analysis.

k. Return lab reports to clinic for review by professional workers and to inform patient of results.

l. Read and record results of tests for future reference.

m. Take temperature (oral,rectal, axillary) to establish a guideline for future reference or to determine change in patient's health condition.

n. Give urine test to determine amount of sugar and acetone present, using Clinitest or other prescribed methods.

o. Administer first aid to provide emergency medical care, using officially recognized first aid procedures.

p. Change simple dressings as a means of cleanliness and to check for possible infection or proper healing.

q. Observe prescribed behavior of patient (i.e. specific signs and symptoms) to obtain pertinent medical information.

r. Interpret/translate in language understandable to patient, instructions, messages, or other information given by physician or other professional.

s. Interpret/translate to physician or other professional health worker, specific information, questions, answers, problems, which patient desires to communicate.

t. Refer patient to appropriate agency to obtain other than clinic services.

u. Make return appointment as a means of follow-up medical care.

v. Record, file, route to appropriate person for further decisions and action.

w. Check working conditions of small equipment such as speculums, scissors, etc., to be sure they are in good working order.

x. Check and stock examining room supplies such as: swabs, tongue depressors, speculums, cotton balls, etc.

y. File closed records.

3. Health Education Tasks

a. Watch for health education materials that might be appropriate for specific ethnic or language groups and suggest to supervisor that they be obtained for review/purchase in order to establish an adequate resource library.

b. Review (look at or read) a pamphlet, film, or other health education material to suggest whether it is suitable for use with a specific language or ethnic group.

c. Obtain health education or audio visual items for a home visit, group meeting, clinic, or other prescribed health education purpose using appropriate files, forms, AV catalogues and a library of resource materials.

d. Deliver/post health education notices/posters at labor camps, housing units, community centers and other appropriate places to announce a health program or service, following procedures learned in training.

e. Hand out and explain to a consumer/client the nature of a pamphlet or brochure to demonstrate how they can use the information in it.

f. Use a visual aid, (i.e. chart, model) in order to communicate to one or a few persons specific information about the prevention, treatment or cure of a health problem or condition.

g. Demonstrate, (set up and handle) with several objects or materials to a group of consumers/clients, how to carry out a prescribed health behavior (i.e., how to use or cook a food, brush teeth, bathe a baby) according to guidelines on how to conduct a demonstration.

h. Set up and operate one or more pieces of the following audio visual equipment, in order to present health information to a group of persons, following the manuals of operation: 16mm film projector; tape recorder; 35 mm slide projector.

i. Set up and operate a tape recorder to record messages and spot announcements for broadcast over radio/TV in order to inform people of health services that are available or other related activities, following manual of instruction and directions of studio staff.

j. Pretest a draft of a pamphlet, poster, or similar health education material by reading, showing, and reviewing it with selected consumers and recording their responses regarding its understandability, following directions of supervisor and procedures on pretesting.

k. Review results of pretest and note suggested revisions in order that the educational material will be more understandable to the target group.

l. Translate from English to another language health information which can be used for a pamphlet, flyer, poster, questionnaire, or radio announcement and in a form which can be understood by a specific language or ethnic group using glossary/dictionary and following rules of simple writing.

m. Write information about a specific health service/program/condition in an announcement form for broadcast over radio/TV to a particular ethnic or language group, following directions of supervisor and guidelines for writing an announcement.

n. Attend a community meeting and give prescribed information about a health problem/program/service in order to inform the participants about a preventive or remedial action they can/should take, following principles of public speaking and directions of supervisor.

o. Participate as a member of a community group by listening, asking questions, and giving information in order to stimulate members to become aware of a relevant health problem and to discuss and agree upon action to resolve the problem, following guide on how to participate in a meeting.

p. Outline a plan for a group meeting which includes the objectives for the meeting, methods of presentation, backgroun information, appropriate audio-visual materials and other resources, following guidelines on how to plan a group meeting.

q. Organize a small discussion-action meeting by arranging a convenient time and place to meet and notifying individuals about when where, and why to come, following guidelines on organizing a group meeting.

r. Direct a small community discussion group by identifying a local health problem, by presenting information relevant to the health condition and by discussing alternative solutions in order that the members can agree and act upon a solution, following guidelines on how to lead a small group.

4. Environmental Health Tasks

a. Identify camp/field/establishment on map in order to determine exact location for field visit using records/inspection form and other information from file.

b. Visit and greet owner or manager of dwelling/camp or operator of food establishment or water plant to introduce self and agency, explain purpose of visit and request permission to inspect the premises, following inspection procedures.

c. Check/inspect premise for presence of specific environmental conditions to collect data so that compliance of specific environmental health laws and standards can be determined, prior to issuing permits for operation, following procedures listed in inspection checklist and laws and regulations.

d. Contact individuals regarding complaints about refuse, garbage, rats, mosquitos, flies, or other insects and pests in order to determine presence of disease and nuisance vectors, upon direction of supervisor.

e. Inspect premise/site for presence and production of vectors in order to recommend control or abatement action, following department procedures and using inspection checklist.

f. Survey a prescribed area to collect information in order to determine the quality or status of environmental conditions, using checklist and following directions of supervisor.

g. Record, using standard inspection forms, the conditions found, noting items of compliance and noncompliance (deficiencies) in order to evaluate conditions found and to insure compliance with laws or regulations.

h. Discuss results of inspection with supervisor, noting items of noncompliance to assure that action is taken for compliance with laws or regulations.

i. Contact owner/manager/operator of dwelling/camp/establishment to explain results of the inspection, importance of the problem, and the specific action that is required to comply with laws or regulations, following prescribed procedures and using necessary forms, educational brochures, and other printed material.

j. Complete inspection forms/records and file or route to appropriate person or agency for follow-up action, according to standard office procedure.

k. Contact by phone/letter/visit the owner/manager of an establishment to obtain consent and to arrange to collect a sample or resample of water/food/other item to determine potability or quality of item following department procedure, at the direction of supervisor.

l. Collect sample of water/food/other material from a prescribed location using sample bottle or other container, following prescribed sampling and collecting methods.

m. Perform percolation test on soil to determine if permit can be issued, following prescribed sampling and collecting methods.

n. Record information on sample or test forms and when required take or send sample to laboratory for bacteriological/chemical or other analysis, following standard procedures.

o. Note results of sample test analysis on report/record and give to supervisor for further action.

p. Explain results of test to owner/manager/operator in order that he can take corrective or other necessary action, following department procedures and at the direction of supervisor.

Rabies Control Tasks (when regulated by Health Department)

a. Contact owner of biting animal and inform of potential danger and quarantine procedure in order to keep animal restricted to premises, following procedures specified in the Health and Safety Code, and S.H.D. manual of Communicable Disease Control.

b. Obtain information from owner to determine whether animal has been vaccinated and licensed and notify person bitten to consult his physician regarding treatment as soon as possible.

c. Complete record of complaint and flag for follow-up action during the quarantine period and after expiration of the quarantine.

d. Visit owner during quarantine period and after it has ended to determine if animal is dead or alive. If alive, explain to owner the animal must be controlled, if dead notify supervisor for instructions about transporting animal

or head to laboratory for rabies test, following standard rabies prevention procedures.

e. Complete the state animal bite report form and report to supervisor the results of observations during and after quarantine period.

V. MINIMUM QUALIFICATIONS

Qualifications required of any health worker should be determined by the kinds of qualities and experience it takes to do the job adequately. The minimum qualifications listed below are meant to apply to various health workers at the entry level, but are not meant to be conclusive. Depending upon the specific situation and level of job required, these suggested qualifications may be upgraded, revised, or expanded.

1. Age: Minimum 18, maximum - agency policy.

2. Language: Ability to speak and write the language of the target group.

3. Education: Completion of eighth grade is desirable or the ability to read and write Engligh and perform basic arithmetic operations.

4. Experience: Six months' experience working with or living among people similar to the target community such as in rural or urban poverty areas or other experience that is related to the job.

5. Possess valid California drivers' license, and be eligible for liability insurance, if required.

6. Meet minimum health requirements as determined by agency policy.

7. An expressed commitment to the following conditions:

   a. Willingness to work with and in behalf of people.

   b. Willingness to accept responsibilities of the job.

   c. Willingness to undergo a job training program.

   d. Willingness to maintain confidentiality of clients.

   e. Willingness and ability to work during non-regular hours such as evening or night, if required.

8. Have demonstrated a knowledge and acceptance of the culture of the target group for which employed.

VI. TRAINING REQUIRED TO PERFORM VARIOUS TASKS

If health workers are assigned to tasks specified in Section IV, they must be able to function at an adequate level in the prescribed health areas. In this section, training programs containing specific content and teaching methods are suggested for Outreach Clinic and Health Education Tasks. Because so many training programs are available in nursing manuals and related publications for teaching various clinic skills, only the content is offered here. Because there was not enough time, we did not expand the Environmental Health Tasks into a training program.

A. Training for Outreach Tasks

1. Orientation to Employing Agency

Objective: Worker will observe responsible work habits and follow prescribed policies of the agency.

a. Content:

- Orientation to worker's job and its benefit to the worker, the agency, and the community.
- Agency policies: working conditions - hours, pay, etc.; workers' rights and benefits - vacation, health plan, etc.
- What is expected of trainee: responsibilities and limits of job, confidentiality of information, working with fellow workers.
- Orientation to training program: content and methods.
- How to work with supervisor: expectations of supervisor and supervisee; how personal difficulties can be resolved; how performance is evaluated.
- Supportive counseling services available to the worker: child care, health, legal, social, consumer, housing.
- Plans for opportunities for continued education and future advancement.

b. Methods:

- Explain one section at a time, the job, agency policies, what is expected of trainee, training program, and other information.

- Hand out and go over job description, personnel policies, training program, and other agency brochures.

- Stimulate discussion and answer questions. Allow trainee to express his own concerns and needs.

- Physically orient trainees to agency by walking them through facility to meet people and see various activities.

2. Basic Communication Skills

Objective: Worker must be able to communicate with confidence and effectiveness on an interpersonal basis with his clients/patients, his supervisor, and other workers in the agency.

a. Content:

- Importance of the communication process in helping people attain better health and in building good working relationships.

- Knowledge of the communication cycle and its component parts.

- Application of basic communication skills to the work setting:

  - confront and place attention on another person
  - originate and direct a message to another person
  - acknowledge a communication
  - listen with attention
  - duplicate and paraphrase to confirm understanding of message

b. Methods:

- Present basic principles of communication and knowledge of the basic skills.

- Pair off trainees and have each pair intensively role play each communication skill. With guidance from the trainer, the trainees can coach each other while practicing and developing effective skills to communicate with each other.

- Discuss experiences of trainees after each role play session. Have trainees in small groups role play problem situations they encountered on the job and demonstrate how good communication skills might resolve the problem.

3. Knowledge of Consumer/Client and Environment

Objective: Worker will have prescribed knowledge of the personal and environmental health, social and economic problems characteristic of the consumer/client group.

a. Content:

- Orientation to the individuals and families in the population group to be served, i.e.:

  - who they are: age, sex, education, family status, number, etc.
  - where they live: location, mobility, etc.
  - economic situation: income, employment, etc.
  - environmental conditions: housing, transportation, etc.
  - personal health problems: illnesses, diseases, etc.
  - special problems: language, ethnic, racial, etc.

- Orientation to the community in which the target clientele live, i.e.:

  - physical location and boundaries in relation to other communities and environments.
  - type and location of human resources that are available (i.e. health education, welfare, recreation, social, employment, legal).
  - political organization and conflicts within the community.

b. Methods:

- Present basic information about the community using maps, census data, studies and other graphic material.

- Have individual trainees report on the sections of the community they are familiar with.

- Have representatives from various agencies talk to trainees.

- Take a tour around the community to identify living conditions, resources, etc.

- Have group discussion so trainees might share their own knowledge of the community.

- Have trainees in small groups conduct a simple survey to identify and describe specified conditions in one section of a community.

- Present information on specific diseases; show films; give pamphlets, discuss.

- Discuss results of survey and the possible causes of personal and environmental health problems.

4. Interviewing - Observing - Recording Skills

Objective: Worker must be able to obtain from the client and record prescribed information in a manner acceptable to the client and the agency.

a. Content:

- Importance of keeping information confidential.

- How to interview a client to obtain desired information in an accepting and pleasant manner.

- How to observe for prescribed signs and symptoms.

- How to record information on prescribed forms.

- How to file or route forms/information for further action.

b. Methods:

- Present importance and discuss reasons for confidentiality of patient.

- Discuss importance of and basic principles of collecting and using information, i.e. observing, interviewing, etc.

- Practice techniques of interviewing on each other.

- Observe an actual interview in a home or clinic.

- Simulate interview setting; role play different situations and discuss results.

- Practice interview skills in community survey.

- Trace procedure for routing forms through agency to see how the data is used and how further decisions are made.

- Practice filling out forms or making a report from interview.

5. Translating/Interpreting

Objective: Worker must be able to translate/interpret accurately messages and/or feelings expressed between a client/patient and a health or other professional worker.

a. Content:

- Knowledge of language of client, including local dialects and idioms.

- Knowledge of medical or other technical terminology.

- How to translate ideas and messages in a manner that is understandable to the two parties involved.

b. Methods:

- Use Spanish/English Glossary; collect list of medical/technical terminology from other health and professional workers; present and discuss meaning of words. Have aides translate into English the meaning of Spanish terminology used to explain conditions/directions to Spanish speaking patients.

- Discuss the importance and nature of good translation/interpretation.

- Observe good and poor examples of translation.

- Simulate different job settings and role play interpretations on each other.

- Memorize commonly used words in Spanish-English glossary and use to translate health messages in an understandable manner.

- Paraphrase message to determine degree of accuracy in translation.

6. Educating/Coaching a Client Regarding a Health Problem

Objective: Worker must be able to carry out prescribed action to educate or coach a client for prevention, remedy, or control of a health problem or condition. (The content, methods, and amount of time required for this unit will depend upon the specific nature and complexity of the tasks assigned.)

a. Content:

- How to make a first contact visit and make a person feel at ease.
- How to introduce self, agency, and state purpose of visit.
- How to talk to client giving prescribed information regarding the purpose of the visit.
- Knowledge of other helping agencies available in the community and their services (mental health, unemployment, welfare, etc.)
- How to identify a personal or family health problem and coach patient to follow a prescribed course for preventive or remedial action.
- How to refer a client to a community service which is appropriate to the need.
- How to make an appointment for a specific health service.
- How to provide supportive assistance to enable client to obtain the required service.
- How to follow through with client on agreed upon plan of action.
- How to handle special situations which one might encounter, such as drunkenness, accidents, addiction, emotional outbursts.

b. Methods:

- Present basic information on the nature, prevention, and treatment of the personal and environmental diseases or problems dealt with in the program.

- Discuss the importance of prevention and treatment of various diseases and health problems, what services are available for their control and the important role of the outreach worker to help the client.

- Role play first contact visits to develop confidence, ease, and skill at doing this.

- Simulate discussions with patients and role play how one could identify problems and give assistance in the situation.

- Observe family or patient visits and discuss results.

- Have representative of other agencies explain purpose, services, eligibility requirements, etc. of that agency.

- Visit other agencies in the community and walk through the process of being referred.

- Practice using health education materials while explaining a problem or procedure to a client.

- Role play special problems one might encounter on a visit and discuss and practice how to handle them.

- Discuss importance of follow-up action and what might be done to insure that adequate long range prevention, treatment, or care if followed.

- Discuss importance of accurate records to insure good diagnosis and care and practice filling out such records and routing them to the appropriate place.

- Discuss how to seek out or arrange for supportive services to families such as child day care, transportation, etc. from voluntary groups, churches, and other helping agencies.

7. Administrative Duties

   Objective: Worker should be able to perform routine office activities that are required by his job and the agency.

a. Content:

- How to answer the telephone in a pleasant manner and take an accurate message.
- How to write or answer memo or letter.
- How to file and keep accurate records.
- How to make required reports, i.e. mileage, expense, activities.
- How to contribute to discussions and decisions made in staff meetings.
- How to work effectively with one's supervisor, i.e. obtain guidance, make work plan, resolve difficulties and problems, evaluate performance.

b. Methods:

- Discuss nature and importance of above items.
- Practice each skill in the job setting.
- Have telephone representative discuss proper phone usage.
- Show film and discuss communication breakdown.
- Role play good and poor ways to answer telephone, participate in staff meetings, etc. and discuss effect.
- Hold practice sessions with supervisors to discuss typical problems regarding performance, etc.

8 General Education Development (if required)

Objective: Worker must be able to perform basic education functions at a level adequate to perform the job.

a. Content:

- How to read and comprehend.
- How to spell and write.

- How to use vocabulary in speaking and writing.

- How to make and use simple mathematical computations.

b. Methods:

- Techniques used in adult basic education.

B. <u>Training for Clinic Tasks</u>

1. Orientation to Employing Agency

See A. Training for Outreach Tasks.

2. Interviewing Techniques

Objective: Worker will be able to obtain and record prescribed information from client in a manner acceptable to client and the agency.

a. Content:

- Importance of information collected on forms. How used.

- How to obtain necessary forms.

- Which forms to use for: registering patient, obtaining personal history, obtaining medical history, and any other procedures workers are expected to carry out.

- How to fill out each of the above forms:

  - Form: How many copies, in pen or pencil, etc.
  - Content: How to ask questions.

- How to explain and clarify questions on the forms which patients cannot understand.

- How to encourage patient to be completely honest and open in answering questions by stressing confidentiality of all information.

- How to answer general questions about agency, etc. and encourage patient to reserve medical questions for doctor or nurse.

3. Nursing Skills

Objective: Worker will be able to perform selected nursing tasks according to prescribed procedures.

a. Content:

- The reasons for and importance of the following tasks:

1. Take temperature

2. Take respiration

3. Take blood pressure

4. Take pulse

5. Change simple dressing

6. Perform lavage

7. Collect specimens; urine, blood, feces, sputum

- How to do the preceding tasks according to prescribed procedures.

- How to explain briefly to patient what is being done, and answer patient's questions.

4. Clinic Tests

Objective: Worker will be able to perform selected clinic tests.

a. Content:

- The reasons for importance of the following tests:

1. Tonometer

2. Spirometer

3. Tine/PPD

- How to perform the preceding tests according to prescribed procedures.

- How to explain briefly to the patient what is being done, why, and answer his questions.

5. Give First Aid

Objective: Worker will be able to give first aid according to prescribed procedures.

a. Content:

- How to give first aid for the following:

1. Wounds: abrasions, cuts, lacerations, puncture

2. Bleeding

3. Shock

4. Poison by mouth

5. Burns

6. Injuries: bone, joint,muscle

7. Animal bites and scratches

8. Snake and insect bites

6. Assist with Examinations

Objective: Worker will be able to assist the doctor or nurse with examinations according to prescribed procedures.

a. Content:

- How to prepare patient for the following examinations:

  1. Physical

  2. Vaginal or rectal

- How to prepare examining room for the preceding examinations: what instruments, records, etc. to put out.

- How to hand instruments and supplies to doctor or nurse during examination.

- How to direct patient to pharmacy to fill prescription; how to make return appointment, etc.

- How to straighten room, replace used supplies, etc.

7. Maintain Examing Room

   Objective: Worker will be able to maintain examination room according to prescribed procedures.

a. Content:

- Importance of sterilizing equipment.

- How to clean and sterilize instruments used.

- How to perform routine cleaning and maintenance of equipment such as autoclave.

- Proper storage space, methods for supplies, equipment after use.

- How to make request for needed supplies, when to re-order supplies, etc.

8. Counseling

   Objective: Worker will be able to present information and answer questions from patient about selected health problems.

a. Content:

- How to identify specific problems of patient from medical records, by interview, etc.

- How to explain clearly and simply the prescribed information about health problems such as personal hygiene, family planning, and venereal disease.

- How to answer questions clearly and simply about prescribed health problems such as those mentioned above.

- How to recognize other health-related problems (children's school problems, drugs, etc.) through information obtained during counseling and suggest correct referral.

C. Training for Health Education Tasks

1. How to Use Health Education Materials

Objective I: Worker will be able to review and use health information materials such as pamphlets, flyers, posters, and films for a health education program directed toward a specific target group.

a. Content:

- Knowledge of consumers, such as their education and ethnic background, language and idioms, beliefs and attitudes about culture and health.

- Basic knowledge of the health problems and content of the subject being considered or discussed with the client.

- How to judge appropriateness of AV health education materials for a specific group and purpose.

- Knowledge of what kinds of health information and audio visual materials are available in the library, pamphlet room, and resource files.

- How to find and check out appropriate materials, using audio visual catalogues and resource files.

- How to use a visual aid to teach one or a few people simple information about a specific health problem.

- How to explain in simple, understandable language the content and intent of a pamphlet to a patient or client.

- Knowledge of places where target people live, work, trade, play, congregate, and would most likely see posters or other educational materials.

- How to ask for permission to post posters and other messages in labor camps, local businesses, etc.

- Where to look for new health education materials, such as in conferences, through information services, different agencies, other projects and journals, etc.

b. Methods:

- Discuss target group: background, socio-economic factors, etc. Survey to determine information if necessary.

- Discuss suitability of a particular visual aid for a specific group: considering sex, age, education, ethnic background.

- Present material on specific diseases and health conditions covered by pamphlets and other visual aids.

- Tour and explain how to use library, film, and pamphlet rooms.

- Give out and go over copy of department film and pamphlet catalogues.

- Have aides look up informational materials (pamphlets, films, etc.) available in the library on a particular health problem. Have aides determine which ones are appropriate to use with a specific ethnic or target group.

- Role play the aide explaining the nature of a specific pamphlet: discuss accuracy and understandability of explanation and aide's ability to illicit consumer's general understanding of information.

- Have aides brainstorm and list strategic places to post a poster.

- Have aides ask client's opinion of proper, important places to catch most clients' attention.

- Role play how to ask camp manager, laundry, or store owner, etc. (appropriate persons) permission to display poster.

- Discuss and make a checklist of examples of where to look for new health education materials; conferences, through information services, different agencies, other projects, journals, etc.

Objective II: Worker will be able to demonstrate, set up, and operate various health education aids or audio visual equipment to present health education programs to consumer groups.

a. Content:

- How to set up and operate a 16 mm. film projector, 35 mm. slide projector, and tape recorder.

- How to properly use a tape recorder to record a health message for radio or TV spots.

- How to set up objects or items and conduct a health demonstration for a group of persons.

b. Methods:

- Discuss different visual aids.

- Practice how to use and manipulate different visual aids until comfortable and proficient in handling.

- Demonstrate how to set up and operate (how to run, change tubes, lights, etc.) audio visual equipment.

- Pair off aides having one do actual manual operation of equipment while second acts as coach; then reverse roles of student/coach.

- Set up piece of equipment with faulty set-up; example: film loose on sound drum, bad light, etc. and have student determine and correct situation.

- Pass out list of common errors made in using equipment or problems which can occur when using each piece of equipment and show how to avoid making errors and how to correct particular problems.

Objective III: Worker will be able to pretest, translate, and/or write health education messages in a form to reach specific target groups.

a. Content:

- Basic knowledge and principles of pretesting health education materials, i.e. importance and methods.

- How to pretest a pamphlet, particularly to ask questions of a consumer as to his understanding of the information in the pamphlet.

- Understanding of different colloquial language used in area.

- How to use a glossary and dictionary.

- Knowledge of radio/TV stations and programs which appeal to specific populations, for example, Spanish speaking, country Western, soul stations.

- How to write a health message that is appropriate for radio-TV use directed toward a particular language or ethnic group.

- How to use rules of simple writing to write effective messages for pamphlets, posters, and flyers in own language.

b. Methods:

- Present and discuss principles and philosophy of pretesting.

- List steps of conducting a pretest on blackboard and in a handout and discuss:

  - ask questions exactly as written
  - record answers exactly as given
  - bring in, make corrections and revisions as indicated by the pretest
  - route for processing

- Role play a pretest situation, then discuss.

- Give actual experience/assignment of carrying out pretest.

- Discuss how to and importance of translating a health message in a clear, understandable form.

- Discuss among own indigenous workers the language or words most frequently used among target groups.

- Lecture/discuss medical/technical terminology to be used.

- Discuss and give practice in proper usage of dictionary and glossary.

- Discuss importance of accuracy, simplicity, and appropriateness of wording information for special groups.

- Simulate writing down of specific health information for specific group and delivery of message to proper station/person for example, "talk show," "open line."

- Role play spot announcement or "call in show" giving good/poor translation of information. Discuss.

- Give individual or pairs of students specific materials to translate; pretest work on co-workers for evaluation.

- Make list (handout) of specific radio-TV stations and appropriate person to contact at each to have message broadcast.

2. How to Perform Group Education Tasks

Objective I: Worker will be able to attend and participate in specific group meetings in order give information about a health program/problem/service.

a. Content:

- Adequate knowledge about a specific health problem/program/service in order to inform and explain to groups.

- Knowledge of the basic principles of public speaking.

- Ability to participate as a productive group member.

- Awareness of scheduled community meetings.

b. Methods:

- Presentation and discussion of a specific health problem/program service.

- Lecture on basic principles of public speaking; handout a checklist of important points to remember about public speaking techniques.

- Give each aide assignment to present a brief announcement or health message to training group, utilizing basic principles of public speaking. Discuss constructively.

- Discuss possible sources to learn of scheduled community meetings: radio, T.V., posters, notices in stores, businesses, special community publications, neighborhood workers in other agencies, etc.

- Discuss various qualities of a productive group member, such as to:

  - listen carefully
  - ask relevant questions
  - keep on topic
  - add pertinent information
  - summarize accurately and briefly

Objective II: Worker will be able to plan, organize, and conduct a health education program in a group setting.

a. Content:

- Understand the steps in planning, organizing, and conducting a group meeting.

- Develop skills in planning, organizing, and conducting educational group meetings.

b. Methods:

- Hand out and describe a checklist on how to organize and conduct a health education program in a group setting.

- Assign each aide a topic to present within the group, then give constructive criticism of the presentation, listing "good points" and "room for improvement" on blackboard.

- Have aide share responsibility in a health presentation with other health workers, for example: translate talk, assist in demonstration, give added information, etc.

- Put aide in charge of educational program during a CHC, migrant medical clinic, etc; be there to observe, encourage, support, and discuss constructively with worker the presentation and his feelings about it.

- Role play a group meeting with aides taking the roles of leader, productive, and non-productive member. Discuss dynamics.

- Present and discuss qualities of a good group leader. Use film and role play situations.

VII. CERTIFICATION AND ACCREDITATION OF NEW HEALTH CAREERISTS

A problem which is characteristic of most training given to auxiliary personnel is the lack of accreditation or certification. This restricts the aide's ability to move or to seek other related employment, as he/she has nothing tangible to show for the training received. Consequently, if the employing agency has no system of upgrading entry level staff, the individual finds himself in a dead-end job.

To avoid the continuance of such a confining situation, agencies of personnel responsible for the training of such workers should begin efforts to establish certified and/or accredited training programs. A few places have begun such efforts utilizing several different methods.

One method is to approach neighboring junior (community) colleges and to work with them to establish meaningful curricula for New Careerists. In Bakersfield, California, an Interagency Training and Steering Committee, consisting of representatives from the Health Department, Welfare, Employment, Human Resources Development, O.E.O., Probation, and Bakersfield Junior College officials has been formed and is setting up a Public Service Studies Program for community workers. The program consists of lectures, seminars, and work experience for which the worker/student receives college credit. The courses offered, thus far, have been in community organization and communication, and group dynamic skills; however, an entire continuing curriculum is being planned with room for specific agency content.

Another possibility is to get qualified professionals in the agency credentialed and their proposed training programs recognized and accepted by a local Junior College, so that the training, though conducted in an agency or community setting other than the college campus, would be accredited. This has been done quite successfully for Family Health Workers, Dental Assistants, and Clerical Assistants in Alviso, where West Valley Junior College has agreed to give 6 units of credit in health education for the core curriculum taught in the Alviso CSO Family Health Center.

In this neighborhood health center all trainees completing the core curriculum will receive:

1. Red Cross First Aide Certificate
2. Red Cross Mother and Baby Care Certificate
3. Health Association Certificate in cardiopulmonary resuscitation.

All Family Health Workers can be certified by the Center as Home Health Aides. (This is a State of California certificate.) Also, the Family Health Workers will receive certification in Red Cross Home Nursing and certification to teach the Red Cross Baby Sitting Course.

The Adult Education Department gives credit towards high school graduation for course work done at the Center, and the West Valley Junior College gives credit for the clerical training program conducted in the Health Center.

In addition, release time is given to each trainee to take classes through Adult Education at West Valley Junior College, or some other education institution in which credits and certificates are given.

In King City, California, located in Southern Monterey County, 50 miles from the nearest Junior College, an instructor from Hartnell Junior College in Salinas travels down to give college accredited instruction to the Rural Health Project aides.

A fourth option open to an agency involved in training is to issue a certificate indicating completion of basic training, such as that given by the Kern County Health Department (See Appendix II). If possible the certificate should state the number of hours and/or content of the training to be most meaningful to a new potential employer.

Valid proof and recognition of training is necessary for New Career workers so that they are able to move more freely between agencies and communities. Also, it serves as a tangible form of recognition and personal accomplishment for the individual. Most important, establishment of such accreditation and certification is essential for the building of successful career ladders.

VIII. SUPERVISION OF WORKERS

Good supervision is an important requirement for all workers and especially for new career personnel. It is important not only from the health agencies' point of view to get the desired work accomplished, but also from the workers' viewpoint, in order that the job can become a satisfying and meaningful experience. For suggestions on how to train supervisors see Section IX - Training for Supervisors.

The main responsibility of the supervisor is to provide guidance and support for the worker. This can best be provided and accepted in a climate which is open and free and where the supervisor and worker discuss what needs to be done and any difficulties that might arise. The supervisor can contribute to the growth and development of the aides by being sensitive to their needs and by providing guidance and help when needed, calling upon other sources if necessary.

The same principles should be followed in supervising health aides as are used in supervising professional staff. The following guidelines may be helpful:

1. The supervisor should be selected on the basis of interest, skill, and experience in supervision. He/she should be able to support and encourage the confidence of the aide as well as provide technical guidance when necessary.

2. Each aide should be assigned to one person for supervision. When an aide must receive guidance from more than one person the nature and limits of each person's supervision should be agreed upon and clearly spelled out.

3. Supervision should involve personal contacts, observations of the aide's work, discussions with the aide and periodic reviews of work. Job performance should be formally evaluated at least once a year, (perhaps quarterly or biannually) in writing, and discussed with the supervisor.

4. Interaction between the aides and their supervisors should be frequent enough to provide adequate support and direction when needed. The supervisor may need to schedule periodic sessions on a weekly or more frequent basis to provide necessary guidance to the aides.

5. The supervisor should be clear and specific about the aide's role and function and should be careful that the aide does not exceed his responsibilities and capabilities. This should be done, however, in an atmosphere which provides room for growth.

6. Whenever possible, the supervisor should be involved in the auxiliary worker's training program, for the supervisor is then able to see the need for improvement of present skills used on the job, to note when other associated skills might improve present functioning, and also to pinpoint an on-the-job problem which is directly related to the training given.

7. Being in a position to observe the aide's growth in skills and competence and his/her readiness for additional areas of responsibility, the supervisor should support and encourage the growth and the extention of the aide. These observations and suggestions should be fed into the training program so that the required skills, knowledges, and attitudes can be taught.

IX. TRAINING FOR SUPERVISORS

Health aides are usually assigned to staff members for supervision and it is assumed that staff personnel will be able to give adequate guidance and direction to workers. This assumption is more often wrong than right. Staff level jobs frequently have not included supervisory duties and the professionals in these jobs have not been taught the necessary skills.

Professional staff should, therefore, be given supervisory training where such skills do not already exist. Training should teach professional staff how to perform the following:

1. Describe the nature of the new careers approach and how it contributes to the agency's goals.

2. With a job description as a guide, explain in a clear and understandable manner to an aide the importance of the job, each of the duties that are listed, and the quality and limits of performance.

3. Explain the role of an aide and his importance as a member of the health team.

4. State the basic criteria for recruiting health aides and describe how to use this criteria in selecting aides.

5. Communicate effectively with health aides.

6. Identify the common barriers to good supervision and describe how each can be overcome, e.g., poor communication, prejudice, personal and family problems.

7. Counsel an aide in a helpful manner about a personal problem.

8. Discuss with an aide in an accepting and understanding way a problem encountered on the job and give guidance in a helpful manner to resolve the problem.

9. Diagram a work schedule for supervisor and supervisee which allows time for periodic supervision and guidance.

10. Outline a program which contains the desires and goals of the aide for job accomplishments and personal development and lists opportunities and resources for achieving these goals.

11. Conduct a performance appraisal in a non-threatening and constructive manner.

12. Delegate responsibility to an aide for work assignments and grant him adequate freedom to perform the work.

13. Involve the aide in staff meetings and planning sessions and encourage him to participate as a responsible team member.

Resources for such training might exist in state or local health departments, professional health associations such as the American Public Health Association, nursing, sanitation or health education organizations, schools of public health or in local state or junior colleges.

X. CHECKLIST FOR UTILIZING AUXILIARY HEALTH PERSONNEL

No doubt as more agencies begin to use auxiliary workers, and as more new careerists begin organizing for their own interest, benefit, and advancement, the developing system of New Careers will establish revised goals, procedures, and techniques. However, the checklist below is a group of questions which should be answered in a positive way if an adequate career development program is to function. Each questions arises from some related section of these guidelines and may be reviewed as necessary.

1. Have tasks been identified which relate to the objectives of the program?
2. Is there a job description which includes these tasks?
3. Is there a list of minimum qualifications for recruiting and selecting individuals?
4. Are jobs part of regular civil service or agency personnel system?
5. Are salaries competitive with similar jobs in the area?
6. Are the same benefits as are received by other employees included?
7. Is there are training program that is relevant to the job?
8. Are there opportunities for continued education?
9. Are the supervisors clearly designated and are they prepared to give the required guidance?
10. Is there a plan to evaluate work performance?
11. Are there opportunities to advance in a health career?

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Explores the rationale for the use of indigenous workers, their training and utilization.

Reiff, R., and Riesman, F.: The indigenous non-professional, a strategy of change in community action and community mental health programs. Community Mental Health Journal Monograph Ser. No. 1, Lexington, Mass., 1965.

Discusses how nonprofessionals serve more appropriately than professionals.

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After training, the aides were as effective as medical students in counseling parents.

Wise, H.B., et al.: The family health worker. Amer J Public Health 58: 1828-1838, October 1968.

Describes how local residents can be trained to serve in areas of home nursing and social advocacy.

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Allied Education Medical Newsletter (monthly). Department of Allied Medical Professions and Services, American Medical Association, 535 North Dearborn Street, Chicago, Ill, 60610.

Announces current activities in the development of allied health professions.

IRCD Bulletin (bimonthly). ERIC (Educational Resources Information Center, Office of Education) Information Retrieval Center on the Disadvantaged, Teachers College, Columbia University, 525 West 120th Street, New York City 10027.

Contains articles and announcements of activities on the training and employment of the disadvantaged in health and other fields. Issue of September 1966 contains 200 references on the nonprofessional in the human services.

New Careers Newsletter (quarterly). New Careers Development Center, Room 238, New York University, 239 Greene Street, New York City 10003.

Provides information on new careers and other new careers programs.

New Careers Program Assistance Bulletin (issued irregularly). New Careers Information Clearinghouse, National Institute for New Careers, University Research Corp., 4301 Connecticut Avenue NW., Washington, D.C. 20008.

Newsletter with stories about what New Careers Program is doing nationwide.

Occupational Education Bulletin (monthly). American Association of Junior Colleges, Suite 410, 1 Dupont Circle, NW., Washington, D.C. 20036.

Describes programs, materials and publications relating to training health careerists in 2-year colleges.

PHRA -- Poverty and Human Resources Abstracts (bimonthly). Institute of Labor and Industrial Relations. University of Michigan, Post Office Box 1567, Ann Arbor, Michigan. 48106.

Abstracts and survey of current literature in field of povery and human resources.

APPENDIX I

Sample Job Description for Outreach Worker

This is a sample job description. It may not include the particular requirements or tasks performed by an outreach worker in your agency. It is an example of what a job description should include.

Title: Community Health Aide, or Family Health Worker

Salary Range: $481- $584 per month; paid twice a month.

Minimum Qualifications:

Minimum 21 years of age
Completion of 8th grade
Six months experience working with groups in a povery community preferred.
Valid California driver's license

General Description:

Contacts individuals and families in specific neighborhoods, obtains prescribed information about health conditions and problems, describes specific problems, programs or services that are available translates for or between client and another health worker, discusses problems and conditions of concern to the client and makes appropriate referrals or appointments with the objectives of making clients aware of personal and environmental health problems and conditions and informing them about proper action and/or getting them in contact with a service to prevent, remedy, or control the condition.

Typical Tasks:

Locates and contacts specified individuals and families in a neighborhood; asks questions and listens to client to obtain prescribed information about health conditions and problems, and to identify attitudinal, cultural, or other barriers that may prevent client from using a service; gives specific information about a health program or other services that are available; discusses health problems of concern and coaches client about how to prevent, remedy, or control the situation; refers client or makes an appointment to health or other agency for a service appropriate to the problem or condition;

observes prescribed behavior of client for signs and symptoms of ill health required for record; completes forms and records of client visit and files or routes forms to prescribed place or person for further action; interprets or translates verbally in understandable language for patient and/or other health worker an instruction, message, or other information about a health problem or condition; makes follow-up visit if necessary to carry out prescribed action with client.

Advancement Opportunities:

Community Health Aides will be eligible to obtain training and certification for Home Health Aide or for promotion to Health Education Assistant (level II) position.

Certificate Of Completion
Of
Basic Training

KERN COUNTY HEALTH DEPARTMENT

This is to certify that

_____

HAS SUCCESSFULLY COMPLETED BASIC TRAINING
AS A COMMUNITY HEALTH AIDE IN THE
SEASONAL FARM WORKERS' HEALTH PROJECT.

_____
Carl W. Miller, M.P.H
Project Director

_____
Owen A. Kearns, M.D., M.P.H.
Health Director

Date _____

VT 013 993
LEHMANN, ELIZABETH, AND OTHERS
STATLER FOUNDATION PROJECT REPORT, JULY 1970.

SYRACUSE CITY SCHOOL DISTRICT, N.Y.
STATLER FOUNDATION, NEW YORK, N.Y.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - JUL70 40P.

DESCRIPTORS - *DISADVANTAGED YOUTH; HANDICAPPED STUDENTS; *SECONDARY SCHOOL STUDENTS; *WORK STUDY PROGRAMS; INNER CITY; *PILOT PROJECTS; INDIVIDUAL COUNSELING; VOCATIONAL COUNSELING; *STUDENT MOTIVATION; CASE STUDIES

ABSTRACT - THIS 10-WEEK PROJECT, FUNDED BY THE STATLER FOUNDATION AND DIRECTED BY A CORE TEACHER AND A VOCATIONAL CONSULTANT, WAS INTENDED TO DEVELOP A WORK-STUDY PLAN, THROUGH A PILOT PROGRAM, TO SERVE THE NEEDS OF THE MOST DISADVANTAGED AND DISINTERESTED STUDENTS. THE THIRTEEN STUDENT PARTICIPANTS WERE SELECTED BY THE ADMINISTRATION OF ONE SENIOR HIGH SCHOOL FROM AMONG THEIR WORST DISCIPLINE AND ATTENDANCE PROBLEM CASES. AT THE END OF THE PROGRAM, DURING WHICH THE STUDENTS WERE PLACED IN JOBS AND COUNSELED DAILY, IT WAS FOUND THAT NINE OF THE 13 STUDENTS HAD A SUCCESSFUL EXPERIENCE, SHOWED SIGNIFICANT IMPROVEMENT IN THEIR BASIC SKILLS, IMPROVED THEIR READING LEVELS AND MATHEMATICAL ABILITIES, AND MADE PROGRESS IN DEVELOPING SCIENTIFIC DECISION-MAKING. AS A RESULT OF THIS PILOT PROGRAM, SIMILAR PROGRAMS WERE RECOMMENDED FOR OTHER DISADVANTAGED STUDENTS. A CASE STUDY REPORT FOR ALL 13 STUDENTS INVOLVED IN THE PILOT PROJECT IS PROVIDED IN THIS DOCUMENT. (GEB)

VT 013 993

S T A T L E R F O U N D A T I O N

PROJECT REPORT

July 1970

Elizabeth Lehmann Vocational Counselor

Lionel Meno Inter-Disciplinary Instructor

Vincent Brennan Special Needs & Work Study Programs

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
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Robert Capone, Principal
Central Technical High School

Sidney Johnson
Assistant Superintendent
Secondary & Continuing Education

VT013993

I N T R O D U C T I O N

The City of Syracuse was selected by the Statler Foundation as a representative community to study how the work-study concept in education could be most effectively used, especially in serving the needs of dropouts and potential dropouts. The Statler Foundation employed the Syracuse University Research Corporation to make a feasibility study of this entire problem in Syracuse. The results of this study were published in the following two reports: "New Directions for Work-Study Programs in Syracuse - Preliminary Report", April 1, 1969; and "Broadening the Experiential Base of Education", June, 1969.

Our City School District was encouraged and urged to expand its existing work-study programs in order to make education more relevant and better serve the real needs of more students. Greater emphasis on occupational education was given by our Syracuse Board of Education when it passed a resolution in January, 1970, mandating that occupational education become an integral part of all general education instruction in grades K through 12.

In December, 1969, we submitted a proposal to our State Education Department which was forwarded to the U. S. Office of Education before 1/1/70 for an Exemplary Grant under the Vocational Education Act. This proposal included a request for one work-study teacher in each of our four senior high schools to work with those students identified as potential dropouts. In our inner city high school we asked for one core (general education) teacher to assist students not achieving in their regular classes.

Because of the delay in approval and the uncertainty of when funding would be received, the Statler Foundation made funds available to the Syracuse School District in March, 1970, to develop a work-study plan, including related instruction designed to serve the needs of our most disadvantaged and disinterested students. We decided that the best way to plan might be to conduct a pilot work-study instructional program for a limited number of students who were not succeeding in any of their regular classes.

A core teacher and a vocational consultant were employed to work as a team in discovering the needs (and how these needs could be satisfied) of thirteen selected Central High School non-achievers. We learned much from this project and are pleased to report the following:

1. Definition of the problem
2. Discussion of the pilot work-study - instructional project
3. The results of this program
4. A proposal for a summer program
5. A proposal for September, 1970, resulting from the pilot study findings

DEFINITION OF THE PROBLEM:

Many of our young people of secondary school age are not interested in the regular school program. In the Junior High School these students are totally frustrated with the instructional program offered. They come to school realizing that they are forced to remain there until the age of 16. In the Senior High School these disinterested students eventually become dropouts or come to school only for social reasons. Many students are in the school but do not attend their classes. Youth who will drop out of school are generally unprepared and unable to adjust to our complex social and economic society of today. The potential dropout can be identified by his excessive absenteeism, his behavior ranging from open hostility to apathy, and his lack of progress, as he is at least two years or more behind his age level in basic learning skills.

In reviewing our Research Department's reports on dropouts for 1968-69, it was noted that 549 were reported as dropouts from our Senior High School and 100 from our Junior High Schools. The largest number leave in the tenth grade. This year at least 20% of the students in one of our Senior High Schools were failing in all or more than half of their scheduled classes two months before the end of the year.

Our City School District has attempted to provide for many of these students with special needs through work experience programs, modified curriculums and specially designed occupational programs. The present limitation of facilities, personnel, class size, group instruction, etc., make it impossible to serve these most disadvantaged young adults.

Our Statler Foundation pilot project was started on March 20, 1970, under the direction of Lionel Leno, Core Teacher, and Mrs. Elizabeth Lehmann, Vocational Counselor. Although the project was conducted for only ten weeks, the staff feels that a concept and procedure have been found that can be implemented to interest and serve many students who are not able to find satisfaction or experience success in our regular group instructional program.

DESCRIPTION OF THE PILOT WORK-STUDY - INSTRUCTIONAL PROJECT:

The students selected for this project were referred to us by administration of one Senior High School. The administration selected these students from among their worst discipline and attendance problem cases. Our initial research in the students' files revealed that they were all failing more subjects than they were passing. In seventy-five percent of the cases, they were failing every course they were taking. Furthermore, inspection of their past academic records revealed the same pattern of failure. In the field of attendance, some students range as high as ninety percent attendance in school, but the great majority of these students were near zero percent in class attendance. They were, therefore, attending school regularly but were, in fact, not attending their scheduled classes at all. From teachers' reports that the staff requested, it was learned that when these students did attend class, they were disruptive.

After the problem students had been identified by the administration they were interviewed by our staff. In all but one case, we found them very receptive to our program and its potentials as we described it to them. In this one-on-one type of interview these students were most cooperative and polite. It was from these interviews that we concluded that there was an interest on the part of the students to try something different.

Standardizing testing of these students revealed that their achievement levels were greatly retarded. The majority scored between second and fifth grade level on the Stanford Advanced Reading Test. Their abilities in the field of mathematics were also greatly retarded. Many had difficulty doing the mechanics of addition and subtraction. There was almost no understanding of what they were doing when they undertook these mechanics.

The student's level of experience was the most outstanding factor in his retarded development. The majority had been outside the core area of the city only one or two times. Most had no concept of distance over ten miles. Almost anything discussed that was not a part of city life was unknown to them. Closely connected with this lack of experience was their lack of exposure to scientific method in decision making. Together these two factors made their decision appear totally illogical on first inspection.

As a result of these findings the staff decided to institute a two period (an hour and a half) class of instruction for these students. A maximum student-teacher ratio of 7;1 was established. Because of the variety and range of problems faced by these students, a method of individualized instruction was chosen. The disparity in age and achievement level made it difficult, if not impossible, to find materials that would meet the student's needs without humiliating him with the child-like nature of the materials. Most of these materials had to be produced by our staff.

A part-time work station was instituted as an integral part of our program. The staff found it important that the student be freed from the failure situation that school represented to him. It was our plan to replace this with a successful experience at a work station. Because the students in our program were deeply affected by the failure situation in which they had been living for many years, we made our highest objective a successful experience for the students anywhere within the framework of this program. Successful experiences, we hoped, would bring about a change in attitude among the students upon which further advances could be made. Secondly, and not alien to the first objective, we hoped to provide a successful school experience for these students. The word 'failure' and 'school' had become synonomous to these students. Next, we hoped to provide some type of vocational readiness for the group. Our fourth objective was to raise the basic skill levels of the group.

The first month of the program proved to be a frustrating experience for the staff. Students were distrustful of our intentions and motivations. During this time we moved in two directions. First, it was necessary to prove to the students that they could succeed in our program. This was done by providing them with individualized instruction (through the wonders of modern hardware). Each student was provided with materials at the

achievement level presently held by the student. All instruction was approached with a positive attitude by the instructor, who provided positive reenforcement for any progress, however small. There were no penalties for mistakes. In this manner students soon came to accept the fact that they could succeed.

Secondly, it was necessary to find some way of gaining peer group approval of our program. This we found could be accomplished through job placement. We discovered that a good job and the money it brings have a high level of status within our students' peer group. Therefore, as our students were placed at work stations, peer group pressure to quit the program decreased. In fact, many members of our students' peer group have expressed an interest in our program.

The vocational counselor interviewed each student to determine the field or fields of interest for each. Most of the young men had not given much thought to the type of work that they would like to try. Their main concern was to have any job that would pay them a salary. It was evident from these initial talks that these young men had not considered their abilities, skills, interests or the kinds of work that they could do. The meaning of work, the habits of industry, their responsibility to an employer, etc., were concepts little thought of, if considered at all. All of these students could have profited from group and individual job readiness programs; however, the staff had promised them a work station as a part of this program, so that the job readiness had to be taught while the student was actually on the job.

All jobs used in this program were found and accepted under the following criteria:

1. a job in which a new skill could be learned
2. a job in a congenial setting
3. a job where close supervision could be provided daily
4. a job in which the student had expressed interest

The students were totally unable to apply for these jobs on their own. Three of these work stations were about five miles from the inner city and these students were fearful of traveling there. They had to be taught how to get their Social Security number, how to fill out the proper

working papers, how to fill out an application blank, how to get an appointment at the health center, and many other necessary details that one must go through before reporting for a job. This process is often long and drawn-out. These students would not have had the perseverance to carry out these seemingly hugh amounts of red tape. It was essential that the staff guide them and support them through this initial ordeal.

As soon as the students were on the job, there was a noticeable change in their attitude. They began to trust the staff and be more accepting. The staff had promised these students two things - instruction that they could handle and a job in the real world. When we, in fact, came through with these promises, the students began to accept us. During this time, when the counselor spent a part of each day with each student, a good rapport was established. Without this mutual respect, little vocational guidance could have been accomplished.

RESULTS OF THIS PROGRAM

At the end of the program we found the following results. First, nine of the thirteen students enrolled in our program had a successful experience from it. All nine also had a positive experience within a school framework. Nine students showed significant improvement in their basic skills. Reading levels improved from a half to three full grade levels. All nine students showed marked improvement in the field of mathematics, particularly in understanding the principles behind the mechanics of math. Some progress was made in developing scientific decision-making. The most important factor in this area was the significant change in the level of experience of these students. Due to their experience at work and in the classroom, their level of experience has shown great growth. This helped enlarge the base upon which students made decisions. However, the most striking change in our students has been their attitude. They now realize that they can succeed in school if they are in an appropriate program.

The on-the-job supervisors gave excellent job reports on each student. Their attendance was good, with the exception of one. Every one of the young men performed their jobs satisfactorily and above the standards required by their employers. They were all accepted and got along exceptionally well with their co-workers. There was no discipline problem reported at all.

There was a definite increase in the student's ability to think about his future and plan for it. There was also evidence that a job made reading, writing and computing more meaningful. The successful experiences, both in the classroom and on the job, gave the student a feeling of competence, and the good feeling that they were making a real contribution. As a result, the students in this program had a more positive self-concept and could see themselves as worthwhile human beings.

In summary, the staff feels that the four goals of the pilot program were met. The students had a successful experience both in school and at a job. They had support and instruction in the job-seeking process and through that got some job readiness. The basic skill levels of the group, by and large, improved.

PROPOSAL FOR A SUMMER WORKSHOP

The results of the Statler Foundation pilot study were exciting enough to stimulate other programs to carry on what work was started. The staff decided that since we were able to help these students, it would be worthwhile to continue the program. A proposal was submitted to the Bureau of Occupational Education, State Education Department, to provide an occupational readiness workshop for 36 pre-selected disadvantaged students entering Central High School in September, 1970.

The objectives we sought in the Statler pilot study and experience we gained from this project enabled us to write a specific plan for the occupational readiness workshop. This proposal was, in fact, accepted, and the summer project, using many of the insights we gained through the Statler project is in progress at this writing.

PROPOSAL FOR A WORK CENTERED CURRICULUM IN HIGH SCHOOL

The Statler Foundation pilot study proved to the staff that a work-centered curriculum, individualized instruction and supervised job opportunities could be highly successful and meet the needs of many students who could not be reached in other programs. To bring this work-centered curriculum and job experience to more high school students, it was proposed that a center be established to serve the most disadvantaged high school students.

The next section of this report will discuss the following:

1. how the student will be chosen for the program
2. the curriculum this program will offer
3. the work portion of this program

This outgrowth of the Statler Foundation project is included here to indicate the specific gains from the pilot study - lessons we could not have learned had we not been able to have the Statler Foundation pilot program.

STUDENT POPULATION

The population of this center will be selected from among those students who are unable to find success in the traditional school program. These students will be referred to the center by the administration of the high school from the students they find they are unable to serve. Drop-outs of high school age will also be eligible for the program. Initially, the student population of the center will be approximately thirty.

Students participating in the program will be enrolled on a contract basis. The exact relationship between the center and the student, as well as the responsibilities of the student will be compiled in the contract. It will then be signed by the student and the members of the center's staff. From our experience with the Statler Foundation project, we found this method most effective in eliminating misunderstandings between students and staff with regards to the program.

The students will continue to be considered members of their original high school for extra-curricular activities. It has been learned that this brings about greater student and parent acceptance of our program because it enables the student to take part in athletics, graduation and other related activities with his peer group.

The program will be individualized to the particular needs of each student. The student will contract for a minimum program of eight hours of core instruction - twenty hours of work experience and two hours of group guidance each week. Beyond these minimum requirements for participation in the program, the student's program has great flexibility. The student may work full time if necessary or advantageous to his situation.

He may enroll for as much instructional time at the center as the student can successfully utilize. This maximizes the student's potential rate of progress and advancement. Due to the wide variety of student schedules that will undoubtedly arise from such a program, the center will be open for instruction from 8:00 a.m. until 9:00 p.m. This allows for flexibility in scheduling of work experiences and also allows the student to receive instruction when most convenient to him, enlarging the likelihood that he will attend.

The curriculum will be vocational rather than academic in focus. It will utilize an inter-disciplinary and continuous program approach. The curriculum will encompass a high school age interest level, while developing achievement levels K-12. In instituting this program, a basic core of programmed study is being developed. This will be utilized as the backbone of each student's course of study. However, the center's staff will develop an individualized course of study for each student dependent on his specific needs and interests. This will include the work segment of our program. Each student participating in our program will begin work at his present level of achievement. His level will be established by his progress through the programmed core curriculum on a pre-test - post-test basis. The pre-tests are to be designed as reviews of necessary materials, as well as accurate evaluation of the student's ability to do the work included in the unit.

Therefore, the student will be gaining a valuable review of the basic skills establishing his present achievement level in contrast to having that achievement level established by a time-consuming and inconclusive battery of tests. Throughout the program, the student will be allowed to advance as rapidly as his abilities allow, or as slowly as they necessitate.

WORK PROGRAM

Each student who wants to work will be given that opportunity. Those who do not want to work need vocational counseling to motivate them to seek employment. The staff will help determine with the student the kind of jobs he would like to try. For those students who are undecided about the specific job area, two work stations could be provided - one in a high interest area for the first six months, followed by another job that

may be appealing for the last part of the year. Some students already have jobs and may wish to continue in them. The work program will be flexible enough to both meet the needs of each student and comply with an employer's preference.

Jobs will be picked carefully, as will the supervisors that will be working with the students daily. There will be an understanding with the employers that this is a training and habilitation program for disadvantaged students and all its implications.

When the student is on the job, weekly progress reports or ratings will be sent from the work supervisor to the staff. These evaluation reports throughout the year will help the staff determine each student's progress. Group counseling and individual counseling regarding the work experience will be an important part of this program. Problems that arise on the job, feelings about work, what tasks are involved in each of several jobs, how to make career decisions, etc., will be some of the areas discussed in groups.

The Statler Foundation project was indeed a learning experience for the staff as well as for the students involved. The staff learned what requisites are necessary for a program that will reach the disadvantaged student. As a result, they were able to inaugurate a summer program to help prepare junior high school students prepare for entrance into high school, and develop a vocationally oriented curriculum to offer certain students in the fall. The students who participated in the Statler Foundation project had a successful experience and will be able to continue in high school with a more positive attitude, both toward themselves and toward the learning process itself.

The impact of the Statler Foundation project is yet to be felt, however. A proposal has been written to have a center within the high school system to meet the specific needs of the students like those in the Statler Foundation project. There are many such young adults, who, if given the opportunity to grow and develop in the proper program, can graduate from high school not only with the necessary basic skills, but with the ability to make wise decisions and hold a meaningful job.

The remaining part of this report is an in-depth case history of each student in the Statler Foundation project. It is hoped that this summary and the specific reports on each student have highlighted the results of this innovative project. This total report emphasizes the need and necessity to establish a continuing education center for educationally disadvantaged secondary youth that will combine work experience with individualized instruction.

Statler Foundation Case Study Report: Student No.1

Entrance

Age 18 Grade Level 11

School Attendance (days attended over possible days)
3/5 3/5 2/5 3/5 2/5 0/4 1/5 1/5 3/5 2/4

Schedule of classes	Grade	Behavior	Attendance
World Georgraphy	F	Not Present	0%
Biology (Regents)	F	Withdrawn	10%
World History	F	Not Present	1%
English	F	Not Present	1%
Health	F	Loud	50%

Attitude

The student displayed the attitude that everything should be put off until tomorrow rather than be done today.

Results of Pre-testing

1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 3.6
   Vocabulary 3.3
2. Math Able to do the mechanics of addition and substraction but without understanding.
3. General Experience Extremely limited.
4. Decision making process Logical for achievement level, generally scientific in nature.

Overview at Entrance

The student's greatest problem is his low reading level which has made it impossible to gain success in any of his course work. He has therefore adopted an outward attitude of not wanting to undertake anything today. His past records show that he was constantly promoted to high grade before he was ready because of his size (6'4", 220 lbs.) a chronic promiser of work to be done tomorrow who is terribly afraid of failing again. He is an excellent football player. This sport appears to be his only reason for existence. Despite his low achievement level and lack of general experience, he has developed good decision making processes and is the natural leader within his peer group. Reading appears to be the key to this student's future. The student is also a convicted felon (two charges) who is awaiting sentencing. He is hoping to have the sentence reduced to probation.

School attendance by weeks (days attended over possible days)
3/5 2/5 1/5 0/5 3/4 2/3 4/5 2/5 3/5

Schedule
World Georgraphy
Core
Lunch
Core
Health

Statler Foundation Case Study Report : Student No. 1 Con't

Regular Classes	Attendance	Behavior
World Georgraphy	0%	Not Present
Health	20%	Loud

Core Class attendance (days attended over day in school)
3/5 2/2 1/1 0/0 3/3 2/2 4/4 1/1 2/3 3/3

Behavior in core class
During the first few weeks of the program, the student was quietly disruptive and attempted to put everything off until the next day. However, as he began to experience success, he became courteous and hard working through his attention span was extremely short (5 to 10 minutes per topic).

Program designed for this individual
We developed a program which emphasized the student's need to learn to read and the reasons why this was important. At the beginning of the program, all reading was centered around sports, particularly American sports. However, as his acceptance of the program grew, reading material was utilized from other related fields of interest. In coordination with this, film and film strips were used whenever possible in an attempt to widen background of general experiences. However, the student was complicated by the numerous court appearances that he was required to make (8) and days he spent in the hospital to have an operation on his knee so that he could play football next fall (8 school days).

Results

Changes in school attendance
The student's school attendance remained about the same due to court appearances and doctor's appointments.

Changes in regular class attendance and behavior
The student's regular class attendance dropped below his pre-entrance standard and his class behavior was unchanged. The drop in attendance in the one class he was previously attending (Health) was probably due to his greater number of legal absences as described above.

Changes in attendance and behavior patters from regular core classes
His attendance after the first week of the program was almost 100% as contrasted to his near 0% attendance in regular classes. Charles behavior changed from loud and disruptive at worst and apathetic at best to hard working and courteous in only a few weeks.

Results of Post-testing
1. Reading Stanford Achievement Advanced Reading - Paragraph Reading 4.7
   Vocabularly
2. Math Mechanics of multiplication and division
3. General experience level Greater exposure, long range effects questionable without further instruction
4. Decision making process - improved due to upgrading of experience level

Outlook

The student's future is going to be one of constant failure when further and concentrated instruction is given him in the future. The fact that the student already has a criminal record, is an indication of the problem this individual will create for our society unless he is given the help he needs. It is our opinion that with further instruction along the line of that given the student this spring with the addition f a part time job where he can experience success, this young man could become a constructive member of our society.

Vocational sophistication

The student has never worked at any job for an extended period of time. When first interviewed, he spoke about his favorite "job" or chore at Industry - working in the dairy. Since he particularly liked this work I suggeste that together we could investigate what part time work was available at the local dairies. The student expressed an urgent desire to work after school, so I contacted all the dairies within a reasonable distance. There were no part time jobs available, but one dairy owner wanted to interview the student in the event that a job opening would arise. I took the student to the dairy where he talked at length with Mr. Marble, owner of Marble Farms. I obtained a job for the student at Will & Baumer Candle Company which he could have started immediately. I took him there for the interview, but he never followed it up or even called back to refuse the offer. The student told me he had a job at P.E.A.C.E. but on further questioning he, in fact, had no real job offer there. The studnet indicated from his behavior that he really has no desire to work. He has glided along these eighteen years without it so he feels he need not exert himself.

Work Attitude

The Student dreams of one day of being a football star. This fantasy makes it unnecessary for him to be more realistic. He has never taken responsibility nor felt any commitment to either his family or his peer group.

Vocational outlook

Unless the student is given intensive vocational counseling he will probably become either a criminal or a welfare recipient. He is physically able to do many kinds of work and has a pleasing personality. With daily support and a meaningful part time job that will not interfere with his athletic activities, the student may be helped.

Statler Foundation Case Study Report: Student No. 2

Entrance

Age 17 Grade Level 10

School Attendance (days attended over possible days)
3/5 5/5 4/5 3/5 3/4 4/5 5/5 4/4 4/5 4/5

Schedule of classes	Grade	Behavior	Attendance
Spanish	F	Not Present	0%
World History (Regents)	F	Passive	80%
English (Regents)	c-/b-	Disruptive Short Attention	80%
Biology (Regents)	F	Noisy Disruptive	50%

Attitude
The student was extremely hostile towards school and anything white. He was also extremely distrustful of our staffs intentions and let us know that he felt that way.

Results of Pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 4.0
   Vocabulary 4.2
2. Math Addition and Subtraction of whole numbers with understanding.
3. General Experience Level limited, only inner city
4. Decision Working Process very unscientific, limited by experience level.

Overview
At the time of his entrance into the program, the student was very hostile towards the school, program and staff. He was really not interested in taking part in the program, and did so finally because he realized he had not a chance of passing his other courses. He seemed worried that we were trying to put something over on him.

Program

School Attendance (days attended over possible days)
5/5 5/5 4/5 5/5 5/5 3/3 4/5 4/4 4/5 5/5

Schedule of classes
Core
World History
English
Workstation at General Electric

Regular classes	Attendance	Behavior
World History	90%	Quiet
English	90%	Improved

Core Class Attendance (days attended over day in school)
5/5 5/5 4/4 5/5 5/5 3/3 4/4 4/4 4/4 5/5

Statler Foundation Case Study Report: Student No. 2 con't

Behavior in Core Class

After the first two weeks, the student began to open up to the staff. At first he was very hostile and disruptive. Then as we continued the program and he experienced some success, the student became withdrawn. Finally as he settled into the routine of his work station at General Electric and found himself making progress in the classroom, the student became hard working and cooperative though he questioned everything new that was presented to him.

Program designed for this individual

Since the student's problem appeared to be his inability to experience success, we designed a program in which he could succeed if he only tried. All materials were presented at his achievement level while keeping his interest level at high school age. We removed all negative elements from the program such as penalities for work not done or done incorrectly and emphasized only those items that were done correctly. In this way, the student was given help in removing his fear of failure no matter what he attempted.

Results

Changes in school attendance

The student's school attendance improved from about 80% to over 90%.

Changes in regular class attendance and behavior

At the start of our program, the student was disruptive and hostile in all of his classes. By the end of the year, this had been deduced to a quiet, withdrawn behavior. His attendance improved 10 to 15% which enabled him to pass two subjects (World History and English) with D's though he failed the regents exam.

Changes in attendance and behavior patterns from regular to core classes

The student's behavior changed drastically from being a disruptive and hostile boy in the classroom to being a cooperative and hard working boy. His attendance improved from 20 to 100% depending upon which regular class he was measured.

Results of Post-testing

1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 6.5
   Vocabulary 7.0
2. Math Understanding of the addition and substraction of fractions and mechanics of percentage.
3. General Experience Level Greatly expanded (work experience important)
4. Decision making process Signs of an orderly process developing

Outlook

This student requires another year of this type of program before he will be ready to re-enter a regular high school program. It is questionable if that is the goal that this student should pursue. He is a young man of above average intelligence when with the proper help could have a bright future.

Vocational sophistication

The student when first interviewed, wanted a job with computers. He did not believe me when I told him I felt we could find a job in this area. However, when I informed him that such a job was available he was very cooperative. He brought the necessary paper work and patiently sat through all the pre-job red tape. He complained about the location of the job as it was about five miles from the inner city. He was also in need of help when the doctor who examined him for the job advised further tests. However, once an appointment was made at the Neighborhood Health Center, he was diligent about keeping his appointments. The student was transported to work every day for about four weeks. Then he was given a bus pass and advised on the exact time and place where he could catch the bus. However, he was unable to take this responsibility and missed a day of work. For a few days the Vocational Counselor accompanied him to his job so that the bus trip was no longer a frightening experience. The student was well liked on the job and did good work. His attendance was excellent and when he did have to miss a day he phoned his employer.

Work Attitude

The student is a responsible young man who realizes the important of learning a skill in order to hold a meaningful job.

Vocational outlook

The student need a great deal of exposure to various kind of job opportunities. His experience, in general, has been extremely limited. Once he is more knowledgeable about the options available to him and the skills he will need to bring to a job, I feel he will become a competent and reliable worker. The student needs a work oriented program for the next year.

Statler Foundation Case Study Report: Student No. 3

Entrance

Age 17 Grade Level 11

School Attendance (days attended over possible days)
4/5 4/5 1/5 2/4

Schedule of classes	Grade	Behavior	Attendance
Algebra (Regents)	F	Quiet, apathic	0%
World History (Regents)	F	Quiet, apathic	10%
English (Regents)	F	Withdrawn	10%

Attitude
The student's attitude was one of a defeated person. He was very hostile towards school because he felt he could not succeed and furthermore, he saw no reason in succeeding in the program in which he was enrolled.

Results of Pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 4.7
   Vocabulary - 4.6
2. Math Multiply and divide with some understanding
3. General Experience Level limited, no travel outside city since arrived six years ago.
4. Decision Making Process logical for experience level, generally scientific in nature.

Overview at Entrance
The student's past record show that he did well in school until the seventh grade. From that point on, he seems to have regressed. This appears to be due to his inability to find any meaning in the school work that he is being required to do. At the time of entrance, the student was working afternoons at Carol's and was reported to be a steady worker by his employer.

Program

School attendance (days attended over possible days)
3/5 2/5 0/5 0/5 Dropped out of school

Schedule
Core
English

Regular Class	Attendance	Behavior
English	0%	Not Present

Core class attendance (days attended over days in school)
2/3 1/2 0/0 0/0 Dropped out of school

Behavior in core class
Though quiet and withdrawn, the student made his hostility toward school and school work by our staff.

Statler Foundation Case Study Report: Student No. 3 con't

Program designed for this individual

Due to the student's low level of experience and his low reading level, these two factors were primary concern. Since the student appeared interested in the world of work, we attempted to approach these factors from the vocational angle. Unfortunately the student dropped out of school before we could get him involved in our program.

Results

We offered this student too little too late. Therefore we lost him. He is now working ten hours a day at two dead end jobs. It is our feeling that if we had been able to reach this student with our program even a month earlier, we would have been able to keep him in the program through the use of a vocationally focused curriculum and on the job experience. Unfortunately, the student got involved with paying for an automobile before he got involved with us.

Outlook

It is our feeling that with a work study program combined with the proper subject matter that the student can be reached and helped. It is our hope that he will return to school next year and re-enter our program.

Vocational sophistication

The student has a strong determination to earn money. He does not care how he does so nor does he give any thought to the future. The student wanted to work at General Electric but before this could be arranged he dropped out of the program and got a job at a local hambruger stand. He worked there all semester from eleven in the morning until late at night. When I approached him at work to encourage him to come to school at least part-time and keep his job as well, he brushed me off.

Work attitude

The student is a hard worker who is highly motivated on the job. This energy need to be channelled in more constructive work. The student has the raw material to be taught a skill.

Vocational outlook

Student needs to be taught the many different kinds of jobs that are available to him. His level of experience is so low that he is ignorant of the vocational choices he has. If this student is able to have a traineeship in a local industry and learn while earning, I feel he has an excellent chance of completing his high school education and be adequately prepared for a vocation.

Statler Foundation Case Study Report: Student No.4

Entrance

Age 16 Grade Level 9

School attendance (days attended over possible days)
1/5 0/5 2/5 1/5 3/5 3/4 3/5 1/5 4/5 3/5

Schedule of classes	Grade	Behavior	Attendance
World Georgraphy	F	Disruptive	50%
English	D	Quiet	50%
General Science	F	Withdrawn	50%

Work station at Carrier Corporation

Attitude
The student is experiencing problems with his academic subjects. He is very interested in the work that he is doing at Carrier. His only interest in high school is that it will give him the degree that he needs in order to work full time at Carrier.

Results of Pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 8.9
   Vocabulary 9.9
2. Math Mechanics of multiplication and division - absolutely no understanding of principle behind any mathematical mechanics.
3. General Experience Level extremely low, nothing outside of center city.
4. Decision Making Process extremely good for experience level.

Overview on Entrance
The student is a student who's records show that he has always worked hard in school. However, he has continued to fall further and further behind his fellow students in achievement level. Because he has worked hard, he has all the mechanics of the basic skills but has no understanding principles behind them.

Program

School attendance (days attended over possible days)
5/5 5/5 4/5 3/5 4/4 3/3 5/5 4/5 1/5 2/3

Schedule of classes
World Georgraphy
English
Core
Work Station at Carrier Corp.

Regular class	Attendance	Behavior
World Geography	70%	Quiet
English	70%	Quiet

Core class attendance (days attended over days in school)
5/5 5/5 4/5 3/5 4/4 3/3 5/5 4/5 1/5 2/3

Statler Foundation Case Study Report: Student No. 4 con't

Behavior in core class

During the first week of the program, the student was withdrawn and secretive. However, after that initial week, he became progressively more open and cooperative.

Type of program designed for the individual

The student's greatest problem is his low general experience level. Due to this factor, anything he reads is of little value to him for their is nothing in his background to relate to it. Therefore, he can pronounce, spell and identify different words without any real understanding of what they mean. For this reason, the staff focused their energies on training the student's general experience level as rapidly as possible.

Results

Changes in school attendance

The student showed a over 100% increase in his school attendance in this period he was enrolled in our program as contrasted with an equal period of time directly before his entrance. There was also a dramatic drop in the number of times he was tardy.

Changes in regular class attendance and behavior

The student showed an increase in his attendance in these classes. Though he remained quiet and withdrawn, he made an honest attempt to master the course work. He was successful in one of the two courses where he received a C.

Changes in behavior and attendance patterns from regular to core class

The changes were dramatic. The student went from 50% attendance of his regular classes to 100% of his core classes. His behavior changed from disruptive to most constructive. In the class at the end of the year, it was difficult for our staff to imagine the student as a disruptive student.

Results of Post-Testing

1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 9.4
   Vocabulary 10.4
2. Math The student gained an understanding of mathematical principles up through addition and substraction of fractions.
3. General Experience Level greatly expanded
4. Decision making process still hesitant but developing.

Outlook

The student has been very successful at his work station. He has never missed a day of work. The student views school only as a road block in the way of full time employment at something he enjoys. It is obvious that our present educational system has failed this student completely. However, this student has found success at his work station and it is hoped that he will return to our program next year so that he will have the basic skill necessary for on the job promotion.

Statler Foundation Case Study Report: Student No. 5

Entrance

Age 17 Grade Level 10

School Attendance (days attended over possible days)
5/5 6/5 5/5 5/5 5/5

Schedule of classes	Grade	Behavior	Attendance
Small Engines	F	Unattentive	90%
English	F	Not Present	0%
World History	F	Indifferent	10%

Attitude
The student is just waiting for something to happen to him. The only reason he is attending school is that he enjoys working with automobile engines. Otherwise, he is convinced that he is stupid and can not make it in an academic program.

Results of pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 2.2
   Vocabulary 2.3
2. Math Encounters trouble with the mechanics of addition and subtraction of whole numbers.
3. General Experience Level - very limited
4. Decision making process - Totally unscientific, fragmented, hampered by low experience level.

Overview at Entrance
This student is a student whose records indicate that he has been given special promotion to the point where he is now eight or more achievement levels below his grade level. For this student to be forced to attempt high school course work at his present achievement level was and is a drastic mistake. Any positive self concept that he may have held has now been destroyed.

Program
The student only attended our core class three times. He required a totally work oriented program with emphasis on the basic skills. Since we were not prepared to offer such a course of study at the time he entered our program, he can not be blamed for his lack of attendance. This student can be reached and helped with a work centered program.

Statler Foundation Case Study Report: Student No. 6

Entrance

Age 17 Grade Level 10

School attendance
4/5 3/5 3/5 4/5 3/5 3/4 4/5 3/5 3/4 4/5 (days attended over possible days)

Schedule of classes	Grade	Behavior	Attendance
English	F	Boisterous	10%
Health	F	Uninterested	10%
Black History	F	Swivel Headed	2%
World Geography	F	Disruptive	10%
Typing	F	Not Present	0%

Attitude
The student's outward signs reflects an attitude of being carefree. However, he is deeply troubled by his inability to perform up to every aspect of the minimum standards of academic abilities held by his peer group.

Results of Pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 2.9
   Vocabulary 3.2
2. Math - Experience trouble with addition of whole numbers.
3. General Experience Level - limited.
4. Decision Making Process - limited by experience level, but scientific in approach.

Overview at Entrance
The student has been met with failure in school since about third grade. He is another example of a student pushed up the grade ladder before he is ready to advance. The student is now totally involved in athletics and gambling, the two things in which he can experience success.

Program

School Attendance (days attended over days in school)
5/5 4/5 5/5 4/5 3/4 3/3 4/5 4/4 5/5 5/5

Schedule of classes
Core
Black History
World History
Work Station at General Electric

Regular class	Attendance	Behavior
Black History	10%	Withdrawn
World History	10%	Withdrawn

Core class attendance (days attended over days in school)
4/5 3/4 5/5 3/5 2/4 3/3 3/5 1/4 3/5 3/5

Statler Foundation Case Study Report: Student No. 6 con't

Behavior in Core Class
During the first two weeks of the program, the student was disruptive and appeared uninterested. This was the period of time it took the staff to evaluate just how far the student was behind his age group. When this evaluation was finally brought to its correct level and work given at that level, the student became progressively less disruptive and appeared more interested in the material at hand. Where in the first two weeks of the program when the material was too difficult for him, the student would refuse to attempt it, he later would work quietly for a long as forty-five minutes by himself.

Type of program designed for this individual
The student's low reading and general experience levels appeared to the staff to be his most pressing problem. We therefore developed a program for widening his scope of experience through film, film strips, tapes and reading selections requiring low reading ability but high in interest.

Results

Changes in school attendance
This student's school attendance improved dramatically while he was enrolled in the program. His absences were cut by 50%. His attendance record while enrolled in our program was very good. He attended school 41 of 46 days during that period.

Changes in attendance and behavior patterns from regular to core classes
The student's class attendance improved from 0% in some of his regular classes to 70% in the core classes. His behavior changed from totally disruptive to quiet and cooperative.

Results of Post-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 4.0
   Vocabulary 4.2
2. Math Understanding of multiplication and division of whole numbers, mechanics of addition and subtraction of fractions.
3. General Experience Level - expanded, especially by work experience.
4. Decision Working Process - greater ability to make rational decision as his experience levrl rises.

Outlook
The student's future is a bleak one unless he received immediate and appropriate help. Because of his very low achievement level, it would be difficult for the student to hold any but a dead end job. However, with a concentrated program focusing on his individual needs, provided an adult work situtation, this student could be a constructive rather than a destructive member of society.

Vocational sophistication
The student expressed interest in hard manual work. He would have liked hauling heavy materials or working outside doing manual labor. However, when this type ob job was not available he was willing to try a job in industry. He was unable to do the simplest tasks in preparation for a job. He had lost his social security number so the counselor helped him fill out the application to get this number. He did not have a birth certificate so the staff helped him write a letter requesting his birth certificate. The student was very impatient and

uncooperative during the pre-job process and needed daily support and encouragement to stick with it. He was well received in his job and learned many complicated tasks readily. His supervisor was exceptionally pleased with his ability to learn as well as his willingness to work. In spite of this ideal set up, the student often preferred to play basketball than to go to work. He gambled whatever earnings he made. The staff extended themselves to try to help this student think about himself, his plans, his future. The student needed a great deal of attention and someone to encourage him every step of the way. The counselor often took the student out of the school or work setting to talk with him. His mother was contacted both by phone and at her home. At the end of school, after much discussion, the student decided to stay on the job for the summer.

Vocational outlook

The student is a very likeable and hard working young man. He needs to develop better work habits, and gain more insight into his behavior. This will require individual and group counseling over the next two years.

Statler Foundation Case Study Report: Student No.7

Entrance

Age 17 Grade Level 10

School Attendance (days attended over possible days)
0/5 0/5 0/5 2/5

Schedule of Classes	Grade	Behavior	Attendance
English	F	Hostile	2%
Algebra (Regents)	F	Disruptive	10%
World History (Regents)	F	Not Present	0%
Biology (Regents)	F	Not Present	0%

Attitude
Extremely hostile towards school and standard curriculum. He expressed feeling that he should be allowed to attend school and choose when he sees fit as long as he is passing his subjects. He seems to be caught up in black-white conflict.

Results of Pre-testing
1. Reading - No test given
2. Math - mechanics of general math
3. General Experience Level - limited
4. Decision making process - limited by his hosility

Overview
The student's records reveal that he did excellent school work until the middle of seventh grade. At that point both his marks and his attendance declined markedly. Since that time, the student's attendance record has grown worse by the year. He apparently has the native intelligence and more importantly, motivation to do college preparatory work, but has unfortunately missed so much work to this point that he is several years behind in achievement level.

Program

School Attendance
1/5 1/5 0/5 0/5

Schedule of classes
All work to be done in core

Core Class Attendance
1/5 1/5 0/5 0/5

Behavior in core class
He is extremely hostile towards our program because it was viewed as an extention of regular school.

Type of program designed for this individual
Due to the student's hostility to standard class schedule, the staff decided to allow him to work in any subject area he chooses during his four class period stay in the core class. At all times he would have the power to change this organization of his individual program, the only requirement being that he attend class.

Results

The student dropped out of school on May 29th, after attending our program only twice. In the staff's opinion he had quit school long before we ever met him. Our program was too little too late for this student.

Outlook

It appears at this time that the student must try it in the world outside of school before and if ever he will be able to return to school with a positive attitude. This is unfortunate because he is a student of above average potential who could probably make it in college after the proper preparation. However, the student is caught up in a racial hostily that is too much at this time to even help himself.

Statler Foundation Case Study Report: Student No. 8

Entrance

Age 17 Grade Level 10

School Attendance (days attended over possible days)
3/5 4/5 5/5 4/5 5/5 4/5 4/5 3/5 4/5 4/4

Schedule of classes	Grade	Behavior	Attendance
World History	F	Inattentive	50%
English	F	Day dreaming	60%
Business arithmatic	F	Sleeps or talks	50%
Black History	D	Disruptive	60%
Biology (Regents)	F	Unbelievably disruptive	10%

Attitude
The student appeared uninterested in his high school work to the point of not caring whether he passed or failed. However, he seemed very interested in getting a job.

Results of pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 6.5
   Vocabulary 7.0
2. Math Mechancis of multiplication and division
3. General Experience Level Lacking, no experience outside center city.
4. Decision Making Process Totally unscientific

Overview
The student's record shows two main problems. First, a basic dislike or disinterest in an academically oriented program. Second, a constant need to prove his blackness to his peer group because of his mixed parentage. This makes him a very disruptive force in a regular classroom. These two factors have combined to spell failure in school.

Program

School Attendance
5/5 5/5 5/5 5/5 4/4 3/3 5/5 4/4 5/5 5/5

Schedule of classes
Core
World History
Black History
Work station at General Electric

Regular class	Attendance	Behavior
World History	10%	Disruptive
Black History	20%	Disruptive

Core class attendance (day attended class over day attended school
5/5 5/5 5/5 5/5 3/4 3/3 5/5 4/4 5/5 3/5

2401

Statler Foundation Case Study Report: Student No. 8 con't

Behavior in core class
Though the student's attention span was extremely short, he was very co-operative and studious after the first week and a half.

Type of program designed for this individual
The student's two greatest interests are sports and arts. The staff therefore placed him in a position with an art department of a large company. The staff then tied the work station into the core curriculum wherever possible. Also utilized was the sports centered type of curriculum discussed above.

Results

Changes in school attendance
The student's school attendance improved from less than eighty percent to one hundred percent during his participation in our program.

Changes in regular class attendance and behavior
The student's behavior remained the same in those classes while his attendance record worsened.

Changes in attendance and behavior patterns from regular to core classes
In this area there was a remarkable change. The student's class attendance went from 60% at best to over 90% in the core class. Though his behavior was disruptive and contined to be disruptive in his regular classes, the student was cooperative and hard working in the core class.

Results of Post-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 8.9
   Vocabulary 9.1
2. Math mechanics of fractions and percentages with some understanding.
3. General Experience Level expanded, work station important
4. Decision Making Process beginning to develop scientific method for making decisions

Outlook
The student's performance in the program gives much to be hopeful about. He responded positively both to his work station and the vocational and sports focused core classes. The staff feels that with the student's continued participation in such a program over the next two year, that he will be ready for the world of work upon his graduation.

Vocational sophistication
The student was one of the most vocationally mature students in this program. He expressed strong interest in art and requested a job in an art department. He was given this opportunity and succeeded to please his supervisor with both his good performance and attendance. The student needed very little assistance with job details or transportation to work. He continued in his job for the summer.

Attitude toward work

The student sees this job in the art department of a big industry as a traineeship. He is eager to learn and realize the value of such an apprenticeship. When he is in the adult world his behavior is exemplary.

Vocational Outlook

The student will be an excellent worker. He needs more training in his elected field - art. He needs to make a real contribution in the adult world to feel adequate. He appears to having a difficult identity problem during this adolescent period and the success he gained on the job is helping him through this developmental stage.

Statler Foundation Case Study Report: Student No. 9

Entrance

Age 16 Grade Level 10

School Attendance (days attended over possible days)
5/5 4/5 4/5 4/5 5/5

Schedule of classes	Grade	Behavior	Attendance
Business Math	F	Not Present	10%
English 10	F	Withdrawn	20%
Biology (Regents)	F	Quiet	10%
World History	D	Disruptive	50%
Black History	F	Disruptive	50%

Attitude
This student seemed extremely interested in our program and what it could do for him. He expressed a positive attitude about himself and his entrance into the program.

Results of Pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 6.5
Vocabulary

Overview at Entrance
The student is failing 4 out of 5 subjects and is losing all interest in high school. He is interested in getting a job and it is in the staff's hope that we can get him a part time job and keep him in school before he obtains a full time job and drops out.

Program and Results
The student met with our staff only once. After that meeting the staff decided that it was of immediate importance that we find him a work station. However, though a work station that filled his needs was located only two days later, the student left school for a full time job. However, the student never officially was dropped from the roles of Central High School though he attended only about once in two weeks. He returned to take his finals and failed all of them. Shortly thereafter he asked a member of our staff how he could enter our program next year.

Outlook
If a suitable work station and an accompanying work center school program can be made avilable to the student next year, he can be reached and helped. It is the staff's hope that he will be enrolled in our program next year despite his disappointing performance this year.

Statler Foundation Case Study Report: Student No. 10

Entrance

Age 17 Grade Level 10

School Attendance (days attended over possible days)
4/5 3/5 4/5 3/5 3/4 3/5 3/5 4/4 5/5 4/4

Schedule of classes	Grade	Behavior	Attendance
World History	D	Loud	80%
Typing	F	Undesirable	10%
English	C	A follower - disruptive	80%
Business Arithmetic	F	Disruptive	50%

Attitude
The student is quietly hostile and distrustful of everyone related to schools. He reflects this through his disruptive behavior.

Results of Pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 6.5
   Vocabulary 7.0
2. Math - mechancis of multiplying and dividing whole numbers without any understanding.
3. General Experience Level - limited to inner city
4. Decision making process - hesitant, not confident, unscientific

Overview
The student's school records reveal that he did well in school until the seventh grade. At that point his limited level of general experience seems to have caught up with him. At this point his marks decrease while his attendance remains high. It is not until he is forced to repeat eighth grade that his attendance starts to decrease. From that point on his attitude towards school changed drastically to the negative.

Program

School attendance (days attended over possible days)
3/5 3/5 5/5 4/5 4/4 2/2 4/5 3/4 5/5 3/3

Schedule of classes
World History
English
Core
Work Station

Regular Classes	Attendance	Behavior
World History	90%	Quiet, spasmodically disruptive
English	90%	Withdrawn

Core Class Attendance
3/3 3/3 4/5 4/4 2/4 2/2 4/4 3/3 5/5 3/3

Statler Foundation Case Study Report: Student No. 10 con't

Behavior in Core Class
During the first several weeks in our program, the student was very withdrawn and never offered anything of himself to the class. However, as the program progressed, the student began to open up to the staff and become one of our best students.

Type of program designed for the individual
The student's main problem was his low level of general experience as reflected in all areas of his academic performance. Given a problem containing elements that he understood, the student would correctly solve the problem almost regardless of its difficulty. We therefore attempted to widen his scope of experience through the use of films, tapes, film strips and other audio-visual materials. In addition to these interests, the staff found or created short reading exercises with this objective in mind. The whole program was kept vocational in focus to keep the student's interest since he wants part time employment.

Results

Changes in school attendance This student's school attendance improved 15% after he was enrolled in the program. His school attendance while participating in our program was over 85%.

Change in regular class attendance and behavior
The student's attendance and behavior improved in both of his regular classes after entrance into our program. Specifically, his attendance improved about 10% while his behavior went from disruptiveness to apathy.

Changes in attendance and behavior patterns from regular to core classes
The student's attendance was almost perfect in our program. His behavior changed from disruptive to cooperative and hard working.

Results of Post-testing
1. Reading - Sanford Achievement Advanced Reading Test - Paragraph Reading 6.2
   Vocabulary 9.9
2. Math - mechanics of fraction and percentage with understanding.
3. General Experience Level greatly expanded as reflected in the rise of his vocabulary and his ability to understand math problems.
4. Decision Making Process signs of development of scientific processes in decision making.

Outlook
As our program ended for the year, the student was really beginning to make progress. As his level of experience grew, he started to develop an interest in obtaining further information. The student has also made great progress in assessing his own weaknesses (in a crude but realistic manner) and has been working very hard during the second half of the program to overcome them. Our staff feel that the best way the school can help this student obtain that goal is through his continued attendance in this type of program.

Statler Foundation Case Study Report: No. 10 con't

Vocational sophistication

The student has very little idea of the kinds of work he would like to try. The student was extremely anxious to work. He was taken to an upholstery shop and asked if he might be interested in learning this trade. He agreed, worked for two weeks and quit. He was extremely uncommunicative and upon questioning simply said he didn't like that work after all. At the end of school the student was offered a full time summer job in industry.

Vocational outlook

The student needs a great deal of individual and group counseling. He needs to be helped to assess his abilities, liabilities and goals for his future. He may have to try several different kinds of work until he finds the type of job that appeals to him. He needs desperately to succeed at work. The staff feels with two more years of a vocational oriented work study program this student can succeed at any work station.

Statler Foundation Case Study Report: Student No. 11

Entrance

Age 17 Grade Level 10

School Attendance (days attended over possible days)
5/5 5/5 4/5 4/5 3/4 3/5 3/5 3/5 2/4

Schedule of classes	Grade	Behavior	Attendance
Urban Sociology	F	Not Present	0%
American History	F	Apathic	50%
English 10	F	Disruptive	0%
Health	F	Disruptive	50%

Attitude
Verbally the student was extremely hostile toward our staff. The only apparent reason that he enrolled in our program was his total dislike for his regular subjects. In class the student was always looking for the attention that he did not get elsewhere. When he did not get it in class, the student would become disruptive.

Results of Pre-testing
1. Reading Sanford Achievement Advanced Reading Test - Paragraph Reading 2.9
   Vocabulary 2.9
2. Math Mechanics of addition and subtraction of whole numbers.
3. General Experience Level extremely limited never outside the city.
4. Decision Making Process - Limited by experience level, irratic and irrational.

Overview at Entrance
The student's past school record reveals a regular pattern of special promotions. He was always pushed on to the next grade before he was ready for it. In this way the student got to hate school and all it stands for with the major exception of athletics. In this area he has experienced moderate success. The student's reading and math levels were extremely low thus making it impossible for him to successfully complete high school level work.

Program

School attendance (days attended over possible days)
3/5 4/4 5/5 4/5 4/4 3/3 4/5 4/4 5/5 4/5

Schedule of classes
Core
English
Health

Regular classes	Attendance	Behavior
English	30%	Withdrawn
Health	40%	Disruptive and childish

Core class attendance (days attended class over school days)
3/3 3/4 4/5 3/4 3/4 3/3 4/4 4/4 5/5 4/4

2408

Statler Foundation Case Study Report: Student No.11 con't

Behavior in Core Class
The student's behavior during the first two weeks of the program was extremely disruptive. The staff then discovered his need for attention and adjusted our program to it. Shortly thereafter, he became most cooperative and helpful.

Type of Program Designed for this Individual
The staff experienced great difficulty in deciding upon which areas to concentrate their efforts on the student's behalf since they were all in need of immediate attention. However, reading and general experience level were chosen as the most important areas. They were approached through the medium of sports (mostly football at first) and audio visual aides such as film and film strips.

Results

Changes in School Attendance
The student's attendance rose from less than 75% before entrance into our program to over 90% during his participation in the program.

Changes in regular class attendance and behavior
The student showed a slight increase in attendance in one subject and a slight decrease in another. His behavior remained about the same though he became less disruptive in English.

Changes in attendance and behavior patters from regular to core classes
The student showed both improved attendance and behavior in the core classes. His attendance increased from 50% or less to 80%. The student's behavior became much less hostile and disruptive, even to the point of being cooperative.

Results of Post-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 4.9
   Vocabulary 3.3
2. Math mechanics of addition and subtraction of whole numbers and fractions with considerable understanding.
3. General Experience Level widened, especially due to films and film strips.
4. Decision Making Process - developing but still unscientific.

Outlook
The student needs a vocationally centered program if he is to be ready to enter the world of work when he leaves school. He now has the interest and belief that he can succeed so that rapid progress would be possible if he were entered in the appropriate type of program. However, if the student is unable to receive this type of help, he willundoubtedlybecome a burden to society on his past criminal record (now on probation) and family financial picture (welfare) would indicate. Our staff is hopeful that the student will again be in our program next year.

Statler Foundation Case Study Report: Student No. 12

Entrance

Age 17 Grade Level 9

School attendance (days attended over possible days)
3/5 2/5 2/5 3/5 3/5 3/4 4/5 2/5 3/5 2/4

Schedule of classes	Grade	Behavior	Attendance
Algebra (Regents)	F	Not Present	0%
English 10	F	Polite	50%
Biology (Regents)	F	Not Present	0%
World History	F	Group follower	10%

Attitude
The student's attitude as revealed outwardly is excellent. He believes that he can do anthing if he only attempts and works at it. However in reality, he is afraid to try anything different.

Results of Pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 2.6
   Vocabulary 2.9
2. Math recognition of whole numbers.
3. General Experience Level extremely limited.
4. Decision Making Process none, a total follower.

Overview
The student's records reveal that he was a special education student in seventh and eighth grade. Special education classes in Syracuse work with student of 75 or lower I.Q.'s. The student then started a high school special education class but was expelled from school for excess abuses. Then through the bureaucracy of the city schools, the student next entered the tenth grade at Central High School in a regents program. The results of such scheduling are apparent. The student after being out of special education classes had no intention of returning to them. We therefore accepted him into our program with the hope that our staff could get him interested in on the job training for some type of occupation.

Program

School Attendance (days attended over possible days)
4/5 4/5 5/5 5/5 4/4 3/3 5/5 3/4 3/5 5/5

Schedule of classes
Core
English
World History

Core Class Attendance
1/4 1/4 2/5 2/5 1/4 2/3 4/5 2/3 2/3 4/5

Behavior in Core Class
The student's behavior in the program was always polite and cooperative when the staff left him alone. However, when the staff attempted to get to the root of the student's problems and have him face them, he became hostile and most uncooperative. He would then skip several of our core classes until the staff could find him and pursuade him to return. Near the end of the year the staff was beginning to make progress on this problem and school ended.

Type of program designed for this individual
In this student's case, the staff decided that we should set two goals. First, the student should be placed in a part time job where he could get training for the future. Second, the student's basic skills should be improved to the best of his and our ability. As in many other cases, the staff decided to use athletics as the initial medium of basic skills work.

Results

Changes in school attendance
The student's school attendance improved considerably. Before entrance he was attending about 60% of time. After he entered the program, the student's attendance increased to 85%.

Changes in regular class attendance and behavior
There was no change in the student's behavior. In English where he was allowed to sit and day dream, he was polite and cooperative. In World History where something was demanded of him, he was disruptive. His attendance rose slightly in health and dropped an equal amount in English.

Changes in attendance and behavior patterns from regular to core classes
The student's attendance was somewhat better than his regular class attendance over the whole program and dramatically so during the last half of the program. At the end of the year, his beahvior in the core class was at an acceptable level though he was being forced to attempt to better himself.

Results of Post-testing
1. Reading Stanford Achievement Advanced Reading test - Paragraph Reading 2.9
   Vocabulary 3.2
2. Math mechanics of addition.
3. General Experience Level slightly improved by film
4. Decision Making Process remains the same.

Outlook
The student could reach his full potential if he were either to accept special education classes or on the job training. However, since his present condition and our program control have made this impossible at the present time, our program represents a middle ground between what training the student should be getting and what he will accept. It is hoped that next year with a co-ordinated effort of all educational personnel involved in this student's case, he will be convinced of the logic of one of the above routes that will be choosen. Our staff has taken steps to see that this will take place.

Statler Foundation Case Study Report: Student No. 13 con't

Regular classes	Attendance	Behavior
World Georgraphy	95%	Quiet
English	100%	Co-operative
Algebra	90%	Quiet
General Science	95%	Quiet

Core Class Attendance (days attended over day in school)
4/4 4/4 5/5 5/5 4/4 2/2 4/4 3/3 4/4 3/3

Behavior in core class
The student's behavior was quiet but always cooperative. During the time he was in the program he worked very hard.

Type of program designed for the individual
The student was a rarity within the group of students with which the program was working. He was only slightly behind in achievement leveal and academically could do the work easily. However, the student had not the self motivation to do the work or the interest in developing himself to his potential. The staff therefore decided to expose the student to as many varied experiences as was possible in the short time available. It was hoped that in this way the student might become interested in his academic high school courses. The staff also encouraged the student to use his superior intelligence when circumstances allowed. The whole thrust of our program for this student was to explore a number of areas looking for the start of interest that could be utilized to keep this student in school.

Results

Differences in behavior and attendance between regular and core classes
The student showed a slightly higher rate of attendance in the core program than in his regular classes. His behavior was also more co-operative and open than in his regular classes.

Results of Post-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 11.0
   Vocabulary 11.9
2. Math First year algebra up to understanding of unknown.
3. General Experience Level greatly expanded by films, discussions and field trips.
4. Decision Making Process signs of developing scientific processes.

Outlook
The student's one goal in life at this time is to drop out of high school, as his older brother and sister did in previous years. This program was useful to the student,in that it gave him the undivided attention he needs. However, it will take an all-out and coordinated effort of the school staff, plus a new type of program, to keep this student in school after his 16th birthday. Otherwise we are afraid that he may join his father and step-father in the State Correctional Institution.

Statler Foundation Case Study Report: Student No. 13

Entrance

Age 14 Grade Level 9

School Attendance
Entered from State Reform school.

Schedule of classes
World Geography
English
Algebra
General Science

Attitude
The student appears to have disliked his last stay at a State institution and he seems determined not to return. Other than that, the student sees little reason in attending school.

Results of Pre-testing
1. Reading Stanford Achievement Advanced Reading Test - Paragraph Reading 9.4
   Vocabulary 10.4
2. Math General Math background, excellent mechanics and generally good understanding.
3. General Experience Level limited, only travel was to and from state institution.
4. Decision Making Process totally unscientific and irrational

Overview at Entrance
The student indicated that he did excellently in school until seventh grade. At that time he was involved in an automobile accident and hospitalized for over nine months. He received no schooling while in the hospital. Upon his return to school, the student found himself far behind the other students. At first he tried to catch up but finally gave up and started to skip school and get into other forms of trouble. The next year and a half he spent in a correctional institution. The student is now almost fifteen years old, very bright, talented and ready to drop out of school for what he calls the better life.

Program

School Attendance (day attended over possible days)
4/4 4/4 5/5 5/5 4/4 2/3 4/5 3/4 4/5 3/3

Schedule
World Georgraphy
English
Algebra
General Science
Core

VT 014 006

LEWIS, WILEY B.; LEWIS, ANNABELLE M.
UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS. FINAL REPORT.

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG. COLL. OF ARTS AND SCIENCES.
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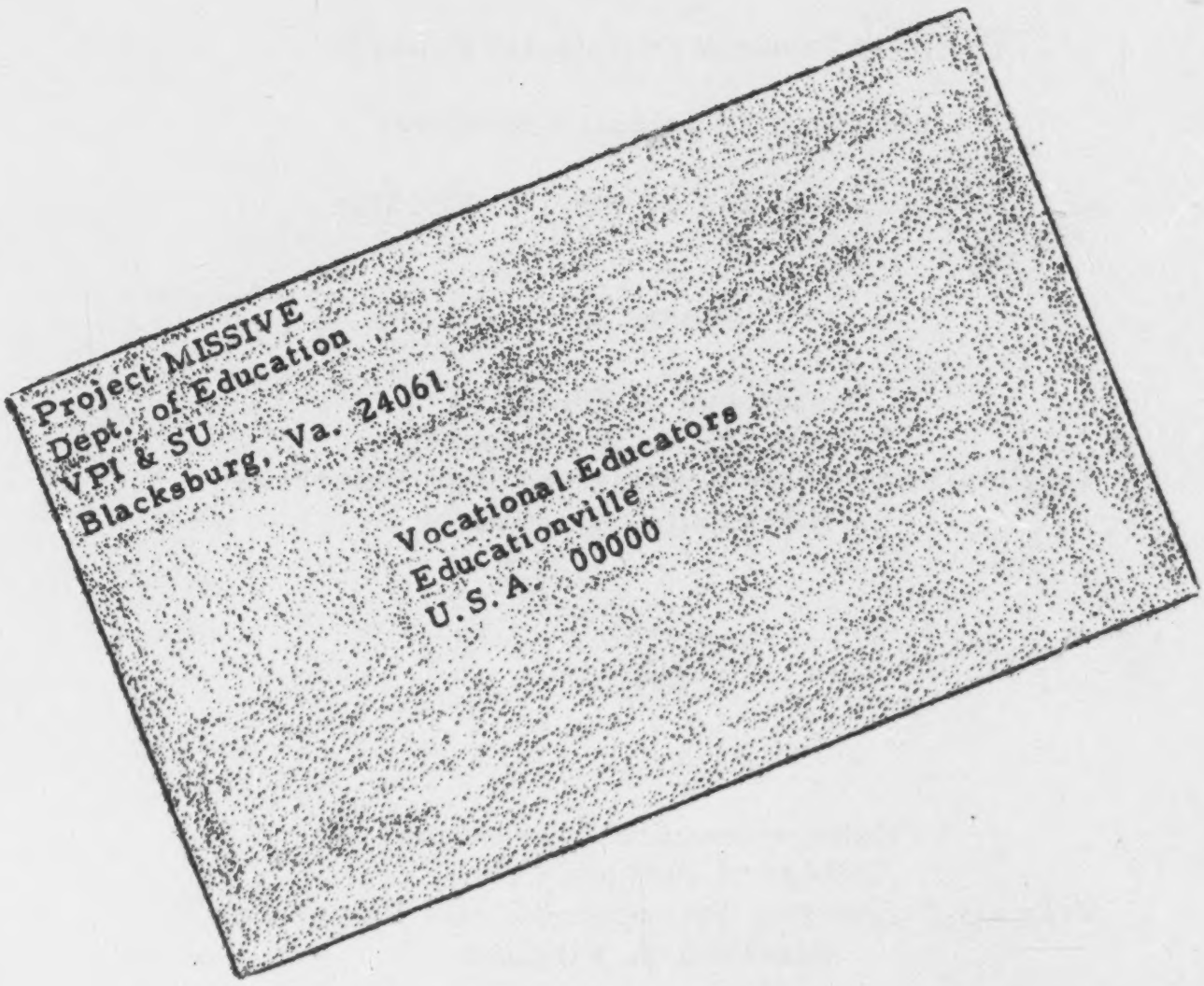
DESCRIPTORS - *VOCATIONAL EDUCATION; *OCCUPATIONAL INFORMATION; EDUCATIONAL RESOURCES; *INSTRUCTIONAL MATERIALS; *PUBLIC SCHOOLS; ANNOTATED BIBLIOGRAPHIES; *INFORMATION SOURCES; INFORMATION NEEDS; TEACHING TECHNIQUES; RESEARCH UTILIZATION; PROGRAM IMPROVEMENT
IDENTIFIERS - *MILITARY RESOURCES

ABSTRACT - THE PURPOSE OF THIS STUDY WAS TO DETERMINE HOW BEST TO DEAL WITH THE PROBLEM OF IDENTIFYING INFORMATION FROM MILITARY RESOURCES WHICH MIGHT BE OF VALUE TO VOCATIONAL EDUCATORS IN THE PUBLIC SCHOOLS. A REVIEW OF AVAILABLE LITERATURE WAS CONDUCTED AND THE RESULTS INDICATE THAT LITTLE EFFORT HAS BEEN MADE TO PROMOTE THE USE OF THIS MATERIAL IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS. THE OBJECTIVES OF DETERMINING THE PERCEIVED VALUES AND NEEDS OF SELECTED VOCATIONAL EDUCATORS CONCERNING MILITARY INFORMATION, AND OF IDENTIFYING POSSIBLE SOURCES OF MILITARY MATERIALS AND TECHNIQUES WHICH MIGHT BE OF VALUE TO VOCATIONAL EDUCATORS ARE DISCUSSED IN THE FIRST TWO CHAPTERS OF THIS REPORT, WITH AN ANNOTATED BIBLIOGRAPHY OF SOME MATERIALS PRESENTLY AVAILABLE INCLUDED IN THE THIRD. SPECIFIC CONCLUSIONS WERE THAT MILITARY INFORMATION RELATED TO OCCUPATIONAL PROGRAMS EXISTED BUT WAS NOT WIDELY USED, THAT EDUCATORS HAVE NOT RECOGNIZED THEIR RESPONSIBILITY IN MAKING THE INFORMATION AVAILABLE, AND THAT AN INCREASED USE WOULD RESULT IN REDUCED FINANCIAL WASTE AND INCREASED PROGRAM EFFICIENCY. (GEB)

VT 014 006

Utilization of Military Information In Public School Vocational Education Programs



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VT014006

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Final Report of

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(Military Information Selected to Serve

Interested Vocational Educators)

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Blacksburg, Virginia

Principal Investigator: Wiley B. Lewis

2416

UTILIZATION OF MILITARY INFORMATION IN PUBLIC SCHOOL VOCATIONAL EDUCATION PROGRAMS

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AND
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CURRICULUM MATERIALS DEVELOPMENT
DEPARTMENT OF EDUCATION
COLLEGE OF ARTS AND SCIENCES
VIRGINIA POLYTECHNIC INSTITUTE AND
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2417

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2418

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	ii
LIST OF TABLES	iv
CHAPTER	
I. INTRODUCTION TO THE STUDY	1
II. VALUE OF MILITARY INFORMATION	8
III. AVAILABILITY OF MILITARY INFORMATION	26
IV. AVAILABLE MILITARY INFORMATION	35
V. CONCLUSIONS AND RECOMMENDATIONS	45
APPENDIXES	
A	50
B	55
BIBLIOGRAPHY	62

2419

LIST OF TABLES

Table		Page
1.	MEDIAN AND RANGE OF IMPORTANCE SCALE RATINGS GIVEN SPECIFIC ITEMS BY VOCATIONAL EDUCATORS. .	12
2.	GROUP SIMILARITY INDEXES BASED UPON INDIVIDUAL RATINGS OF THE ITEMS LISTED IN TABLE 1 AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED.	15
3.	INDIVIDUAL SIMILARITY INDEXES BASED UPON RATINGS OF THE ITEMS LISTED IN TABLE 1 AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED	16
4.	YEARS OF ACTIVE MILITARY SERVICE COMPLETED BY RESPONDENTS	18
5.	MEDIAN AND RANGE OF IMPORTANCE SCALE RATINGS GIVEN SPECIFIC ITEMS BY VOCATIONAL EDUCATORS WHO HAVE COMPLETED TWO YEARS OR LESS OF ACTIVE MILITARY SERVICE	19
6.	MEDIAN AND RANGE OF IMPORTANCE SCALE RATINGS GIVEN SPECIFIC ITEMS BY VOCATIONAL EDUCATORS WHO HAVE COMPLETED OVER TWO YEARS OF ACTIVE MILITARY SERVICE	20
7.	GROUP SIMILARITY INDEXES BASED UPON RATINGS OF THE ITEMS LISTED IN TABLE 5 BY INDIVIDUALS WHO HAVE COMPLETED TWO YEARS OR LESS OF ACTIVE MILITARY SERVICE AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED . . .	21
8.	GROUP SIMILARITY INDEXES BASED UPON RATINGS OF THE ITEMS LISTED IN TABLE 6 BY INDIVIDUALS WHO HAVE COMPLETED OVER TWO YEARS OF ACTIVE MILITARY SERVICE AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED.	22

2420

LIST OF TABLES--Continued

Table		Page
9.	INDIVIDUAL SIMILARITY INDEXES BASED UPON RATINGS OF THE ITEMS LISTED IN TABLE 5 BY INDIVIDUALS WHO HAVE COMPLETED TWO YEARS OR LESS OF ACTIVE MILITARY SERVICE AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED	23
10.	INDIVIDUAL SIMILARITY INDEXES BASED UPON IMPORTANCE RATINGS OF THE ITEMS LISTED IN TABLE 6 BY INDIVIDUALS WHO HAVE COMPLETED OVER TWO YEARS OF ACTIVE MILITARY SERVICE AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED.	24
11.	NUMBER AND PERCENTAGE OF VOCATIONAL EDUCATORS GIVING VARIOUS RESPONSES WHEN ASKED TO LIST LITERATURE CONTAINING A LISTING OF SOURCES OR A DISCUSSION OF THE UTILIZATION OF MILITARY RESOURCE INFORMATION IN VOCATIONAL EDUCATION PROGRAMS.	28
12.	NUMBER AND PERCENTAGE OF VOCATIONAL EDUCATORS GIVING VARIOUS RESPONSES WHEN ASKED TO LIST THE INSTRUCTIONAL AREAS IN VOCATIONAL EDUCATION IN WHICH MILITARY RESOURCE INFORMATION WOULD BE OF VALUE	30

2421

CHAPTER I

INTRODUCTION TO THE STUDY

> The effectiveness of every craftsman or professional worker depends upon circumstances surrounding his work. These include having the tools necessary for his specific job. The mechanic may know what causes an automobile engine to knock and yet without proper tools or parts be unable to correct the difficulty. . . .
>
> Knowledge, understanding, and the ability to do what needs to be done are essential. Experience expands and develops them. But just knowing and being able are seldom enough. If the task is to be performed with the ease and delicate skill possible or the swiftness which may be necessary for success, ready access to appropriate tools is also important. Tools are a means through which knowledge and skill are applied.
>
> Teachers need tools to do an effective instructional job. While blackboard and textbook are a substantial beginning, learning can be both accelerated and enriched when teachers have a wide range of materials to assist in the process. The quality of any school program is closely associated with the extent to which many different types of instructional materials are available and are used by skillful teachers.

These comments by McCarthy and Hartsell (1959) are applicable to the educational situation today, especially that confronting vocational educators. In our public schools, these educators are facing a great dilemma--how to provide the quality and quantity of educational experiences considered necessary to prepare individuals for making a contribution toward the attainment of our national goals. Preparing the citizenry for meeting the goals identified by Lecht (1968), especially those related to employment, is made difficult because of several events occurring in our society. Among these events, Venn (1966) considered the following to be of great importance: (1) technological changes; (2) increased mobility of people; (3) tremendous increases in population; (4) changes in the nature of work; and (5) relatively high unemployment and underemployment rates which exist in a period of great economic growth.

Because of these conditions, vocational educators throughout the United States are continually searching for new and improved teaching techniques and materials. These educators along with those in other educational areas are becoming increasingly aware of the value of military techniques and materials in providing direction to their educational activities. However, current efforts designed to relate the instruction in these areas--public school vocational education programs and military programs--generally have been piecemeal in nature.

The Study

Statement of the problem

The major problem considered in this study was how best to prepare for an organized assault on the problem of identifying information from military resources--for example, publications, teaching aids such as films and models, courses of study, and techniques--which might be of value to vocational educators in the public schools. Such information was envisioned as involving all accessible audio-visual sensory teaching-learning materials and devices which might be used by the teacher and/or learner to teach or master learning required as a worker and as a citizen. Specifically, an attempt was to be made to show the value of such materials, to identify specific sources of useful materials, and to prepare a brief annotated bibliography of some of the materials presently available.

Objectives

Specific objectives considered necessary for accomplishing the major purpose of this study were:

1. To conduct a review of available literature related to this topic.

2. To determine the perceived values and needs of selected vocational educators concerning military information.

3. To identify possible sources of military materials and techniques which might be of value to vocational educators.

4. To prepare an annotated bibliography of some of the military materials currently available.

Review of Literature

By 1944, educators had recognized that the education and training programs being carried on by the armed forces would provide a source of rich material of very great significance for civilian education in the United States. With this concept as a basis, the American Council on Education appointed educators to serve as members of a Commission on Implications of Armed Services Educational Programs. This Commission was assigned the task of preparing, with the support of the Secretary of War and the Secretary of The Navy, a descriptive statement of significant educational and training programs conducted by the armed forces.

In its general report (Grace and Others, 1948) and its special phase reports such as Audio-Visual Aids in the Armed Services (Miles and Spain, 1947) and Curriculum Implications of Armed Services Educational Programs (Goodman, 1947), the Commission and its investigators noted several implications for civilian education, particularly in terms of procedure and technique. However, none of the implications in these reports indicated a possibility of using military materials in civilian education courses.

In 1965 Chase reported that military training had often proven to be relevant for civilian occupations and for an understanding of our own and other societies. He wrote:

> . . . The Armed Forces are operating what is probably the largest adult education program in the country--a program which enrolls close to 400,000 men annually. Of greater significance is the fact that these educational programs affect practically all young men, including many who drop out before completing high school. . . .
>
> The training in the Armed Forces obviously is focused on military objectives. These objectives, however, demand education and training of great breadth because men in the services must be competent to perform a wide variety of tasks and to adapt to many types of contingency, although most of these may not be encountered during the tour of duty. The training aims to provide not only the technical knowledge and skill essential to proficiency with present weapon systems, but also the technological understanding adequate to the mastery of new systems and techniques.

> Because of such considerations, education in the Armed Forces seeks outcomes which often are relevant for civilian occupations and for an understanding of our own and other societies. The Department of Defense serves, therefore, as an important training establishment for industry and for civilian life. . . .

On the basis of these statements, one might conclude that the materials and techniques used for training individuals in the Armed Forces could be of value in other educational systems, particularly those related to vocational education. This concept was supported by Wyman (1967) when he noted that:

> There are certainly large differences in the overall goals of schools, industry, government agencies, and the military. There are also some surprising similarities in some of the lessons, topics, or units taught by all three [sic] groups, particularly in the area of vocational education.
>
> The goals of vocational education and the nonschool groups are near enough so that some of the materials could very profitably be used by both. Even if only a small percentage was available and useful, it would represent a substantial amount of material. . . .
>
> The needs of vocational education for newer media are great, probably much greater than for students in regular schools. Vocational students tend to be less print oriented. They choose material with more graphic and pictorial illustrations. Their interest in newer media tends to be high. They spend much time with television and movies. There is less need for simple and easily described skills, and a rapidly increasing need for complex and difficult skills. Newer media have proved very effective with these students in these subject areas.
>
> Vocational schools seem to have made less use and less effective use of newer media than industry or government in the same subject areas. . . .
>
> . . . . . .
>
> There seems no doubt that a dramatic improvement in vocational education could result in the near future if newer media were effectively employed. Industry and government agencies already have large quantities of high quality

materials that were specifically designed to teach much of what is currently taught, or should be taught, in vocational schools.

Most of the existing material is not now so used. One of the author's visits was to the First Naval District Headquarters in Boston. Five very large looseleaf books of unclassified transparency masters were studied for several hours. Most of them would be of interest only in Navy training and they were ignored. There were also many hundreds of masters on mathematics, welding, metal working, electricity, electronics and safety that would be equally useful in vocational education. The man in charge was asked, "What use have the schools in the Boston area made of these excellent materials?" He queried an assistant, "Didn't one of the trade schools use some of our stuff three or four years ago?"

These comments by Wyman (1967) accurately represent the present situation as described by educators with whom the writers have discussed the availability and use of military materials. This is not meant to indicate such materials are not being used. Educators in Virginia reported the use of military publications such as Principles of Automotive Vehicles (Department of The Army and The Air Force, 1956) and General Drafting (Department of The Army and The Air Force, 1962) as references in several of the State's vocational education programs.

Straubel (HEW News, 1970) reported that the Utah project (Straubel, 1969 and Straubel, 1970) in which his research team experimented with the use of Air Force courses for preparing adults and youth for critical jobs had produced promising results. He noted that "this was the first full-scale test of whether military experience in vocational-technical education could be transferred to the civilian educational system."

Furthermore, Straubel (1969) reported:

> The definite conclusion that it is feasible to use Air Force techniques and materials in Utah's civilian classrooms is supported by the positive reaction of Utah educators to the experiment. In each subject area studied, Air Force techniques and materials have been integrated into the regular curriculum in each of the test schools, and in other schools as well. . . . All evidence points to the conclusion that other states could share this Utah experience.

With this as a basis, he recommended:

> That military educational concepts, techniques, course materials and equipment requirements, on a broad scale be inventoried and assessed in terms of their applicability and dissemination to civilian education, with full cognizance of this experience in Utah; that further study be made of Air Force techniques and course materials, based on this Utah project, to determine how more effective use of them might be made by civilian institutions; that a specific study be made of the Air Force use of performance objectives, and of the ability of civilian educators to relate such objectives to their own requirements, with guidelines for the effective application of such objectives to civilian vocational-technical education.

The writers believe that these conclusions and recommendations imply that other military materials--Army and Navy--will also prove to be of value in public school vocational education programs. In attempting to make appropriate materials available to vocational educators, the following ideas expressed by Wyman (1967) should be considered.

1. High level decisions would be necessary to free much of the material for school use.

2. Competent educators must evaluate and select materials to be duplicated and distributed.

3. Suitable credit must be given to the originator on each copy.

4. Catalogs with illustrations and descriptions of the available materials must be prepared.

5. Utilization notes should be prepared and distributed with the materials.

6. Corrections, adaptations or other changes may need to be made for school use, with the permission of the originators.

7. Ideas gained from the materials may be of as much help to vocational education as the materials themselves.

Summary

This study was initiated in an effort to determine how best to prepare for an organized assault on the problem of identifying information from military resources which might be of value to vocational educators in the public schools. To do this, it was believed that several specific objectives should be considered.

First, a review of available literature related to this topic was necessary. The review, as presented in this chapter, indicates that while educators have recognized the value of such materials, little concerted effort has been made to promote their use in public school vocational education programs.

The second objective, "to determine the perceived values and needs of selected vocational educators concerning military information," is discussed in Chapter II while efforts "to identify possible sources of military materials and techniques which might be of value to vocational educators" are examined in Chapter III. In Chapter IV, the annotated bibliography prepared as a result of objective four is presented. Finally, the conclusions and recommendations related to this report are recorded in Chapter V.

CHAPTER II

VALUE OF MILITARY INFORMATION

To what extent is military information related to occupational concerns in public school vocational education programs presently being utilized in such programs? To what extent should it be utilized in future programs? In an effort to obtain at least a partial answer to these major questions which express the intent of objective number two of this study, related data were obtained from vocational educators throughout the Nation.

Methodology

Instrumentation

The mail questionnaire, "Utilization of Military Information in Programs of Vocational Education" (Appendix A) was prepared for use in soliciting the required data. It was designed to determine the educator's perceived value of military information in present and future vocational education programs. The individual was asked to evaluate seven statements related to this matter on the basis of the importance scale shown below.

Importance Scale

4 Of Extreme Importance	3 Of Considerable Importance	2 Of Some Importance	1 Of Limited Importance	0 Of No Importance

Note that the use of this scale gives a higher numerical value to ratings as their degree of importance increases. This fact will be important to the reader in interpreting the material presented in the findings section of this chapter.

In addition to these evaluation ratings, the educator was requested to identify literature with which he was familiar which contained listings of sources or discussions concerning the utilization of military information in vocational education programs. He was also asked to list

specific instructional areas in vocational education in which he believed such information would be of value. These two latter concerns will be discussed in detail in Chapter III of this report.

Participants

On April 23, 1971, a copy of the instrument with its cover letter (Appendix A) was mailed to the head vocational educator in the department of education for each of the fifty states, District of Columbia, Virgin Islands, and Puerto Rico.[1] This individual was asked to complete or to ask the person on his staff who was most familiar with the utilization of instructional materials in the programs of all vocational areas to complete the questionnaire and return it to the investigators. On May 10, 1971 a follow-up letter (Appendix A) was mailed to each of the educators from whom a response had not been received.

As a result of these mailings, usable returns were received from educators in forty-one of the governmental entities involved or about 77 per cent of the group surveyed. In reflecting on this percentage of returns, the comments of one vocational educator should be considered. In explaining why he and his staff members did not complete the form as requested, he reported that:

> . . . it would not be fair to your questionnaire to attempt to answer these questions at this time. Much of the effort is being made through the local school divisions, and, although we have encouraged the utilization of certain military instructional information . . . , it would be impossible to accurately estimate its effectiveness at this time.[2]

It is possible that similar situations may have existed in other divisions from which responses were not received.

---

[1]The name and address of this individual was taken from: "Federal and State Officials--A Directory," School Shop, XXX (April, 1971), pp. 30, 32, 39-44, 47-48, 50, 52-54, 56, 58.

[2]Excerpt from a letter addressed to Charles W. Ross and Wiley B. Lewis concerning this study.

Analysis of Data

The questionnaire used in this study was designed so that computer data cards could be used in compiling most of the data. After the responses were coded and key punched into the cards, the data were tabulated through the facilities of the Virginia Polytechnic Institute and State University Computer Center. The Center's I. B. M. 360 processor and a computer program prepared for this study (Appendix B) were used in computing frequency counts and percentages of response for the various questionnaire items in addition to group and individual similarity indexes. These indexes were formulated to obtain a measure of the similarity of ratings between any two items rated on the importance scale.

A group similarity index was considered to be of value as an indicator

$$\text{Group Similarity Index} = \frac{\sum_{i=1}^{N} (A_i - B_i)}{N}$$

A - Individual's importance rating of first item
B - Individual's importance rating of second item
N - Total number of individuals whose ratings are being considered

of the extent to which the members of a group, as a group, gave two items similar ratings on the importance scale. This index represents a measurement of the average difference between the individual ratings of group members.

The group similarity index may have values ranging from -4 to +4. A value of 0 indicates, based upon an average of the individual responses, a similar rating for the two items while a -4 or +4 denotes ratings of a dissimilar nature--at opposite ends of the scale. A minus sign preceding the value of the group similarity index reveals that the second item received a higher average rating than the first item while a positive value indicates that the opposite was true.

The individual similarity index, on the other hand, was formulated to

$$\text{Individual Similarity Index} = \frac{\sum_{i=1}^{N} (A_i - B_i)^2}{NS}$$

S - Maximum possible scale rating

indicate the extent to which individual members of a group gave two items similar ratings on the importance scale. This index represents a measurement of the actual differences in individual ratings and may have a value from 0 to +4. A value of 0 indicates, based upon individual responses, a similar rating for the two items while a +4 denotes ratings of a dissimilar nature--at opposite ends of the scale.

Use of these indexes might cause difficulty in that they tend to be interpreted differently by different individuals. The investigators in this report used them solely as indicators of group and individual reactions to the specified statements. For example, if an individual similarity index of +4 and a group similarity index of 0 resulted from the comparison of the ratings for the same items, one would readily realize that the individual respondents had varied greatly in their ratings of these items. However, an individual similarity index of +1.70 and a group similarity index of -2.30 would be interpreted as indicating that the individuals tended to give uniform ratings to the two items.

Findings

Importance Ratings

Analysis of the data collected through the use of the mail questionnaire described earlier provided much information concerning the value of military information in public school vocational education programs as perceived by vocational educators at the state level. For example, the importance scale ratings summarized in Table 1 indicate that such information is currently of limited importance in these programs but that it should be utilized to a much greater extent in future programs. A median rating of 1.16 for item number 1, "extent to which military resource information is currently utilized in vocational education programs," and a median rating of 3.18 for item number 3, "extent to which military resource information should be utilized in future vocational education programs" suggest that these educators

TABLE 1

MEDIAN AND RANGE OF IMPORTANCE SCALE RATINGS GIVEN SPECIFIC ITEMS BY VOCATIONAL EDUCATORS

Item	N	Range	Median
1. Extent to which military resource information is presently utilized in vocational education programs.	39	0-3	1.16
2. Extent to which improved access to military resource information would be of assistance to those educators presently responsible for vocational education programs.	41	1-4	3.13
3. Extent to which military resource information should be utilized in future vocational education programs.	41	1-4	3.18
4. Extent to which present dissemination systems are providing adequate access to military resource information of value to vocational education personnel.	40	0-3	0.71
5. Extent to which the establishment of a State system (your State) for disseminating military resource information would be of value to vocational education personnel.	40	1-4	3.09
6. Extent to which the establishment of a National system for disseminating military resource information would be of value to vocational education personnel.	41	0-4	3.18
7. Extent to which military resource information is presently used in the vocational education programs of other states.	25	0-3	1.64

expect the usage of this information to show a marked increase in future programs.

One of the major problems encountered in the present utilization of such information appeared to be its accessibility. The median rating of 3.13 for item number 2, "extent to which improved access to military resource information would be of assistance to those educators presently responsible for vocational education programs" emphasizes the educator's perceived need for development of an improved access mechanism.

This need was confirmed by the median rating of 0.71 for item number 4, "extent to which present dissemination systems are providing access to military resource information of value to vocational education personnel." Further confirmation of the need for improved dissemination systems was given by the high median ratings for items number 5 and 6. Item number 5, "extent to which the establishment of a State system (your State) for disseminating military resource information would be of value to vocational education personnel" had a median rating of 3.09 while item number 6, "extent to which the establishment of a National system for disseminating military resource information would be of value to vocational education personnel" received a median rating of 3.18.

These ratings indicate that educators believe present dissemination systems are failing to operate effectively in this area. Because of this, there appears to be a need for improved systems at both the State and National level to disseminate military information which might be of value to vocational educators.

Additional data revealed that there is not only a need for militarv information dissemination systems but for educational information dissemination systems as well. When asked to rate item number 7, "extent to which military resource information is presently used in the vocational education programs of other states," a median rating of 1.64 resulted. While this rating suggests that most of the respondents considered such information to be of limited importance in these programs, one must recognize that only twenty-five of the forty-one respondents or 61 per cent provided a rating for this item. This fact in itself implies a need for a system through which program information can be disseminated to all interested parties.

Similarity Indexes

Further comparisons were made by using the group and individual similarity indexes presented in Tables 2 and 3, respectively, to determine if the findings based on median ratings were substantiated. These indexes, as presented in this report, make it possible to compare responses on any two of the seven items receiving median ratings in Table 1.

For example, suppose that one desires to determine if the indexes support the earlier finding that the responding educators expect the usage of military information to show a marked increase in future programs. The group similarity index for item number 1, "extent to which military resource information is presently utilized in vocational education programs," and item number 3, "extent to which military resource information should be utilized in future vocational programs," was found to be -2.00 while the individual similarity index was +1.27. An interpretation of these indexes indicated item 3 received much higher importance ratings than item 1 and that the individual respondents generally agreed as to the direction of the item ratings. Thus the indexes support the earlier finding.

Indexes obtained by comparing ratings of items number 2, 4, 5, and 6 might be used to substantiate a need for improved dissemination systems. Note that when one examines the indexes for the various combinations of items 2, 5, and 6 (2 and 5, 2 and 6, and 5 and 6), each index is near 0 in value, indicating little difference in the ratings given the three items. These index values, when considered with the positive wording of the statements concerning a need for dissemination systems, and the high median ratings for each item confirm the educators' perceived needs for better systems.

Additional support is obtained when the indexes for items 2 and 4, 4 and 5, and 4 and 6 are reviewed. These index values indicate that item 4 received much lower importance ratings than either of the other three items. Since item number 4 concerned an evaluation of present dissemination systems, the index values support the finding that educators perceive a need for better dissemination systems.

Further consideration of the indexes presented in Tables 2 and 3 by the writers supported each of the findings based on the median ratings. But as was noted earlier, interpretation of these indexes may vary with the individuals considering them.

TABLE 2

GROUP SIMILARITY INDEXES BASED UPON INDIVIDUAL RATINGS OF THE ITEMS LISTED IN TABLE 1 AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED

Item Number	Item Number 1	2	3	4	5	6	7
1	0.00 39	-1.95 39	-2.00 39	0.46 39	-1.87 39	-1.82 39	-0.13 24
2		0.00 41	-0.05 41	2.35 40	0.05 40	0.12 41	1.60 25
3			0.00 41	2.40 40	0.10 40	0.17 41	1.60 25
4				0.00 40	-2.30 40	-2.27 40	-0.52 25
5					0.00 40	0.02 40	1.56 25
6						0.00 41	1.68 25
7							0.00 25

TABLE 3

INDIVIDUAL SIMILARITY INDEXES BASED UPON INDIVIDUAL RATINGS OF THE ITEMS LISTED IN TABLE 1 AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED

Item Number	Item Number 1	2	3	4	5	6	7
1	0.00 39	1.21 39	1.27 39	0.15 39	1.17 39	1.19 39	0.22 24
2		0.00 41	0.06 41	1.65 40	0.10 40	0.25 41	1.12 25
3			0.00 41	1.70 40	0.11 40	0.24 41	1.08 25
4				0.00 40	1.57 40	1.62 40	0.27 25
5					0.00 40	0.24 40	1.01 25
6						0.00 41	1.22 25
7							0.00 25

Affect of Military Service on Responses

Because of the very nature of the concerns discussed in this chapter, one might expect the number of years of active military service completed by the respondent to affect his responses to the items under consideration. To check on this situation, the respondents were divided into two groups as shown in Table 4. Group A was composed of those individuals who had completed two years or less of active duty while members of Group B had completed over two years of active duty. Note that while the average years of active military service for all respondents were 3.6 years, the average for Group A was 0.7 and Group B was 6.9. It was believed that comparison of the responses from these two groups would reveal any differences in rating patterns.

Importance Ratings

Tables 5 and 6 contain the medians of the importance ratings assigned to the various items by members of these two groups. A comparison of these ratings revealed that those persons who had completed over two years of active military service rated all items but one of greater importance than did those respondents who had completed less than two years of active duty. However, in the opinion of the writers, these differences were considered to be of little consequence.

Similarity Indexes

Group similarity indexes for the two groups, persons who had completed two years or less of active military duty and those who had completed over two years, are presented in Tables 7 and 8, respectively. The individual similarity indexes for these two groups are shown in Tables 9 and 10. As a result of a comparison of the indexes for each of the two groups, the writers concluded that while differences existed in the values of both the group and individual indexes, these differences were not of significant importance.

TABLE 4

YEARS OF ACTIVE MILITARY SERVICE
COMPLETED BY RESPONDENTS

Years	All Respondents N=41	Group A N=22	Group B N=19
0	13	13	0
1-2	9	9	0
3-4	11	0	11
4 or more	8	0	8
Average	3.6	0.7	6.9

TABLE 5

MEDIAN AND RANGE OF IMPORTANCE SCALE RATINGS GIVEN SPECIFIC ITEMS BY VOCATIONAL EDUCATORS WHO HAVE COMPLETED TWO YEARS OR LESS OF ACTIVE MILITARY SERVICE

Item	N	Range	Median
1. Extent to which military resource information is presently utilized in vocational education programs.	20	0-3	1.00
2. Extent to which improved access to military resource information would be of assistance to those educators presently responsible for vocational education programs.	22	1-4	3.20
3. Extent to which military resource information should be utilized in future vocational education programs.	22	1-4	3.17
4. Extent to which present dissemination systems are providing adequate access to military resource information of value to vocational education personnel.	21	0-2	0.56
5. Extent to which the establishment of a State system (your State) for disseminating military resource information would be of value to vocational education personnel.	21	1-4	3.05
6. Extent to which the establishment of a National system for disseminating military resource information would be of value to vocational education personnel.	22	1-4	3.06
7. Extent to which military resource information is presently used in the vocational education programs of other states.	13	0-3	1.58

TABLE 6

MEDIAN AND RANGE OF IMPORTANCE SCALE RATINGS GIVEN SPECIFIC ITEMS BY VOCATIONAL EDUCATORS WHO HAVE COMPLETED OVER TWO YEARS OF ACTIVE MILITARY SERVICE

Item	N	Range	Median
1. Extent of which military resource information is presently utilized in vocational education programs.	19	0-3	1.33
2. Extent to which improved access to military resource information would be of assistance to those educators presently responsible for vocational education programs.	19	2-4	3.05
3. Extent to which military resource information should be utilized in future vocational education programs.	19	2-4	3.19
4. Extent to which present dissemination systems are providing adequate access to military resource information of value to vocational education personnel.	19	0-3	0.85
5. Extent to which the establishment of a State system (your State) for disseminating military resource information would be of value to vocational education personnel.	19	1-4	3.13
6. Extent to which the establishment of a National system for disseminating military resource information would be of value to vocational education personnel.	19	0-4	3.40
7. Extent to which military resource information is presently used in the vocational education programs of other states.	12	0-3	1.70

TABLE 7

GROUP SIMILARITY INDEXES BASED UPON RATINGS OF THE ITEMS LISTED IN TABLE 5 BY INDIVIDUALS WHO HAVE COMPLETED TWO YEARS OR LESS OF ACTIVE MILITARY SERVICE AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED

Item Number	Item Number 1	2	3	4	5	6	7
1	0.00 20	-2.20 20	-2.20 20	0.45 20	-2.00 20	-2.00 20	-0.08 12
2		0.00 22	0.00 22	2.52 21	0.14 21	0.18 22	1.69 13
3			0.00 22	2.52 21	0.14 21	0.18 22	1.62 13
4				0.00 21	-2.38 21	-2.43 21	-0.54 13
5					0.00 21	-0.05 21	1.69 13
6						0.00 22	1.69 13
7							0.00 13

TABLE 8

GROUP SIMILARITY INDEXES BASED UPON RATINGS OF THE ITEMS LISTED IN TABLE 6 BY INDIVIDUALS WHO HAVE COMPLETED OVER TWO YEARS OF ACTIVE MILITARY SERVICE AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED

Item Number	Item Number 1	2	3	4	5	6	7
1	0.00 19	-1.68 19	-1.79 19	0.47 19	-1.74 19	-1.63 19	-0.17 12
2		0.00 19	0.11 19	2.16 19	-0.05 19	0.05 19	1.50 12
3			0.00 19	2.26 19	0.05 19	0.16 19	1.58 12
4				0.00 19	-2.21 19	-2.11 19	-0.50 12
5					0.00 19	0.11 19	1.42 12
6						0.00 19	1.67 12
7							0.00 12

TABLE 9

INDIVIDUAL SIMILARITY INDEXES BASED UPON RATINGS OF THE ITEMS LISTED IN TABLE 5 BY INDIVIDUALS WHO HAVE COMPLETED TWO YEARS OR LESS OF ACTIVE MILITARY SERVICE AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED

Item Number	Item Number 1	2	3	4	5	6	7
1	0.00 20	1.42 20	1.45 20	0.11 20	1.32 20	1.25 20	0.27 12
2		0.00 22	0.05 22	1.87 21	0.11 21	0.23 22	1.23 13
3			0.00 22	1.89 21	0.13 21	0.23 22	1.21 13
4				0.00 21	1.67 21	1.65 21	0.33 13
5					0.00 21	0.15 21	1.12 13
6						0.00 22	1.15 13
7							0.00 13

TABLE 10

INDIVIDUAL SIMILARITY INDEXES BASED UPON IMPORTANCE RATINGS OF THE ITEMS LISTED IN TABLE 6 BY INDIVIDUALS WHO HAVE COMPLETED OVER TWO YEARS OF ACTIVE MILITARY SERVICE AND THE NUMBER OF RESPONDENTS WHOSE RATINGS WERE COMPARED

Item Number	Item Number 1	2	3	4	5	6	7
1	0.00 19	0.97 19	1.08 19	0.20 19	1.01 19	1.12 19	0.17 12
2		0.00 19	0.08 19	1.41 19	0.09 19	0.28 19	1.00 12
3			0.00 19	1.49 19	0.09 19	0.25 19	0.94 12
4				0.00 19	1.47 19	1.58 19	0.21 12
5					0.00 19	0.34 19	0.90 12
6						0.00 19	1.29 12
7							0.00 12

Summary

Using a mail questionnaire, data were obtained from forty-one vocational educators in an effort to determine their perceived values of military information in present and future vocational education programs. Analysis of these data indicated that the respondents believed that:

1. Military information was of limited importance in current vocational education programs but that it should be utilized to a much greater extent in future programs.

2. One of the major problems encountered in the present utilization of such information was its accessibility.

3. Present dissemination systems are not providing sufficient access to military information of value to vocational education personnel.

4. An improved access mechanism should be developed to enable educators to obtain useful military information.

5. Improved systems are needed at both the State and National level to disseminate military information which might be of value to vocational educators.

6. Educational information systems should be developed to ensure the dissemination of program information to all interested parties.

CHAPTER III

AVAILABILITY OF MILITARY INFORMATION

Earlier in this report it was noted that military resources--for example, publications, teaching aids such as films and models, courses of study, and techniques--were believed capable of providing information of value related to occupational concerns in public school vocational education programs. However, there appears to be several obstacles which are hindering the utilization of such materials. First, there is the problem of securing funds in sufficient quantities to finance undertakings designed to identify, evaluate, and disseminate military information.

But even with adequate financing, two other problems would remain--problems which are of primary concern to this study. One is the problem of identification of information sources while the other is the problem of accessibility. Since these problems are directly related, elimination of the second would probably cause the first to become a matter of little concern.

If this should occur, evaluation and dissemination would become the matters of prime concern. Because the value of such information has been shown by previous research and practical application in educational situations and because there is a need for such information in vocational education, these latter tasks--evaluation and dissemination--while complicated, could be carried out rather simply if adequate funding was available.

Sources of Military Information

How can one identify the sources from which access to the needed information can be obtained? Immediately one might consider the Department of Defense. Furthermore, specific sources might be the Departments of The Air Force, The Army, or The Navy. But these organizations are composed of highly structured elements, each of which has its own specific duties, none of which involve a direct responsibility for the education of America's public school children. The question then becomes one of how educators can secure the needed information from military sources.

Sources Listed By Educators

Because of this, each respondent to the questionnaire described in Chapter II was asked to "list any literature with which you are familiar which contains a listing of sources or a discussion of the utilization of military resource information in vocational education programs." Responses to this question are summarized in Table 11.

An examination of these responses indicated that while approximately 54 per cent of the respondents listed one or more sources, no one source was consistently favored. This implied that the vocational educators responding did not consider any of the sources of such materials presently available to be of significant value to those persons conducting vocational education programs.

It should be noted that while item number 4 has been completed, one of the writers was informed by Mr. William Rogers, Director of the Aerospace Education Foundation, that the course materials identified in this document are not available from his organization at this time. It is anticipated that these materials may be available in the future.

The writers believe that special attention should be directed to item number 12 in Table 11. While the release of military information is controlled by those individuals in responsible positions, vocational educators can aid each other by sharing information of immediate sources. A sharing of this information would in all probability lend support to educators who are attempting to obtain information from higher sources. It is evident that the educator must take the initiative to bring the desired military materials into the public school's educational environment. Military personnel will not, and indeed, because of their own pressing responsibilities, should not accept the full responsibility for making such materials available. On the other hand, as has been exhibited by the cooperation of military personnel with the Commission created by the American Council on Education in the 1940's and by the cooperation of Air Force personnel with Aerospace Education Foundation investigators, educators can expect the cooperation of the military in identifying, reproducing, and disseminating these materials if the proper basis is established.

The responses summarized in Table 11 were interpreted as implying that the educators did not consider any of the sources of such materials presently available to be of significant value to those persons conducting vocational education programs. However, responses discussed in Chapter II indicated that the educators really recognize the need for establishing and/or identifying such sources.

TABLE 11

NUMBER AND PERCENTAGE OF VOCATIONAL EDUCATORS GIVING VARIOUS RESPONSES WHEN ASKED TO LIST LITERATURE CONTAINING A LISTING OF SOURCES OR A DISCUSSION OF THE UTILIZATION OF MILITARY RESOURCE INFORMATION IN VOCATIONAL EDUCATION PROGRAMS

N = 41

Item	N	%
1. U.S. Government Printing Office Publications	5	12
2. Northwest Regional Educational Laboratory	5	12
3. The Evaluation of Three U.S. Air Force Instructional Systems Within Civilian Education, Final Report by James H. Straubel	1	2
4. Inventory of U.S. Air Force Vocational Course Materials for Possible Adaptation to the Civilian School System by James H. Straubel	1	2
5. Abstracts of Instructional Materials in Vocational and Technical Education (AIM)	1	2
6. Abstracts of Research and Related Materials in Vocational and Technical Education (ARM)	1	2
7. A Guide for the Development of Curriculum in Vocational-Technical Education	1	2
8. Publications of the Educational Research Information Center, The Ohio State University, Columbus, Ohio	1	2
9. Publications of the Human Resources Research Organization, Alexandria, Virginia	1	2
10. Catalogs borrowed from ROTC personnel	1	2
11. U.S. Air Force Base Materials	1	2
12. What does the Pentagon have that they will release? Ask this question of the source, not the consumer.	1	2
13. None	4	10
14. No response	19	46

Data presented in Table 12 tend to support this concept of their recognition. When the respondents to the questionnaire discussed earlier in this report were asked to list the "specific instructional areas in vocational education in which you believe military resource information would be of value," approximately 88 per cent listed one or more instructional areas. A list of the specific responses with the number and percentage of individuals reporting each is presented in Table 12.

Specific Sources

Based on information supplied by the respondents to the questionnaire and information gathered by the writers, generalized statements can be formulated concerning the immediate values of specific sources of military information. Each of the following sources should be considered by vocational educators, but this listing is not intended to be all inclusive.

Aerospace Education Foundation

While personnel of this Foundation have investigated the availability and usability of Air Force course materials in civilian vocational education programs (Straubel, 1969; Straubel, 1970; and Straubel, 1971), such materials are not currently available for general use. Though this is the case at the present time, vocational educators should monitor the work of this organization for it is attempting to release complete Air Force courses for civilian use.

Depository Libraries

Federal law now in force in the United States provides a class of libraries in which certain government publications are deposited for the use of the public. These depository libraries are permitted to receive one copy of all publications of the United States Government, except those determined by their issuing components to be required for official use only or those required for strictly administrative or operational purposes which have no educational value, and publications classified for reasons of national security. Publications made available from the government must be requested by library personnel in advance of printing (Joint Committee on Printing, 1970).

TABLE 12

NUMBER AND PERCENTAGE OF VOCATIONAL EDUCATORS GIVING VARIOUS RESPONSES WHEN ASKED TO LIST THE INSTRUCTIONAL AREAS IN VOCATIONAL EDUCATION IN WHICH MILITARY RESOURCE INFORMATION WOULD BE OF VALUE

N = 41

Response	N	%
1. Health Occupations	12	29
2. Electricity/Electronics	11	27
3. Trade and Industrial Education Areas	10	24
4. Automotive Mechanics	9	22
5. Vocational-technical Areas	7	17
6. Business and Office Education	5	12
7. Many Occupational Areas	5	12
8. Diesel Mechanics	4	10
9. Food Preparation and Service	4	10
10. Machine Shop	3	7
11. Welding	3	7
12. Aero Mechanics	3	7
13. Data Processing	3	7
14. Sheet Metal	2	5
15. Drafting	2	5
16. Building Trades	2	5
17. Maintenance	2	5
18. Leadership Training	2	5
19. Teacher Education	2	5
20. Heavy Equipment	1	2

TABLE 12--Continued

Response	N	%
21. Quality Control	1	2
22. Marine Education	1	2
23. Air Conditioning	1	2
24. Transportation	1	2
25. Appliance Repair	1	2
26. Business Machine Repair	1	2
27. Aviation	1	2
28. Hydraulics	1	2
29. Photography	1	2
30. Small Aircraft Engine Repair	1	2
31. Communications	1	2
32. Youth Organizations	1	2
33. Job and Task Analysis	1	2
34. Curriculum Guides	1	2
35. Depending on What's Available	1	2
36. No Response	5	12

Such libraries give vocational educators an opportunity to review and use many military publications--primarily military manuals. However, the specific publications available depend upon those released by governmental agencies, upon decisions made by library personnel to secure the publications, and upon efforts by library personnel to make the publications available once they are obtained.

While the printed material available in these libraries is of value, there are many military materials not available at this location. For example, military training aids and service school courses of study are not included as part of the depository materials.

Educational Resources Information Center (ERIC)

Publications of or associated with the Educational Resources Information Center (ERIC), specifically

Abstracts of Instructional Materials in Vocational and Technical Education (AIM), Fall 1967--Spring 1971.

Abstracts of Research and Related Materials in Vocational and Technical Education (ARM), Fall 1967--Spring 1971.

Research in Education (RIE), Volumes I-V; Volume VI, Numbers 1-6.

were searched manually by one of the writers in an attempt to identify military materials of value to vocational educators. Results of the searches of these publications led the writers to conclude that little military information of interest in this study could be identified from these sources.

Military Agencies

Military agencies--the Department of Defense located in the Pentagon; its components, the Departments of The Air Force, The Army, or The Navy; ROTC units; and other military organizations--have proven to be excellent sources of educational materials for a limited number of educators. Many vocational educators have found military personnel, especially at the local level, to be cooperative in the educators' efforts to identify and secure suitable materials. Personnel of the Aerospace Education Foundation have obtained the support of Air Force personnel at the national level in an attempt to make Air Force courses available for civilian use. Efforts to maintain and extend this cooperation should be continued at all levels.

Wyman (1967) noted in his report that " . . . military agencies seem to have centralized media libraries . . . " Though efforts were made to locate libraries of this type which would be of value to vocational educators, only one was identified. This was the HQ USAF Information and Reference Library (DADPL), located in the Pentagon. However, the material in this facility is limited to official Air Force publications. Because of this, the Library would probably be of only limited value.

National Audiovisual Center

The National Audiovisual Center has been established to serve as a central information, distribution, and sales outlet for audiovisual materials produced or distributed by agencies of the Federal Government, including the military agencies. In its catalog, U.S. Government Films (1969), this Center lists motion pictures and filmstrips which it offers for sale.

Though the present catalog includes only military motion pictures and filmstrips offered for sale, future plans call for listing those films to be loaned or rented. Individuals interested in securing these items other than by purchase should contact the Center for specific details.

Northwest Regional Educational Laboratory (NWREL)

As one of the fifteen regional educational laboratories, the Northwest Regional Educational Laboratory[3] was founded to aid in the systematic conversion of research knowledge into improved educational practice. Schmidtlein (1970) wrote that the primary mission of this Laboratory was "to develop and disseminate instructional systems meeting selected educational needs."

In carrying out its mission, this Laboratory has directed a portion of its efforts toward making Navy training aids available for public use. Its publication Making U.S. Navy Training Aids Available for Use in Manpower Training Programs, Community Colleges and Schools for Occupational Education was reported as being of value to vocational educators by several respondents to the questionnaire described earlier as shown in Table 11. While the writers were not able to obtain additional information concerning this publication or the availability of the training aids, one respondent noted that "access to [the] material is most difficult."

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[3] The Northwest Regional Educational Laboratory is located at: 400 Lindsay Building, 710 Southwest Second Avenue, Portland, Oregon 97204.

United States Government Printing Office

In its Monthly Catalog of United States Government Publications, the Government Printing Office lists the publications produced by its printing facility and available to various organizations and/or individuals. Many of the military publications listed in the various issues of the Monthly Catalog may be purchased for civilian use. However, purchases from this Office are limited to printed material while many other materials with a potential value are not available from this source.

Three other publications from this Office which should be considered are:

Air Force. Aviation, Civil Aviation, Naval Aviation, and Federal Aviation Administration. Price List 79.

Army. Field Manuals and Technical Manuals. Price List 19.

Navy. Marine Corps and Coast Guard. Price List 63.

Entries in these publications show the stock available at the time the lists went to press. The lists are issued free of charge by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Summary

Of the several specific sources identified, only four appeared to offer immediate aid to the vocational educator in gaining access to military information which might be of value in his educational program. These sources--depository libraries, military agencies, the National Audiovisual Center, and the United States Government Printing Office--are, however, limited as to the types of materials they can provide. Though this limitation exists, vocational educators should make maximum use of the available services.

CHAPTER IV

AVAILABLE MILITARY INFORMATION

As has been indicated in the previous sections of this report, military information of potential value in vocational education programs exists if only it could be made available. Because of this, a portion of this study was devoted to identifying available military materials which might be of value to vocational educators and to the preparation of an annotated bibliography of these materials.

Bibliographical Entries

Entries in the annotated bibliography which appears as the next section of this chapter will serve as indicators of the types of materials readily accessible to vocational educators throughout the United States. The materials cited are not intended to represent the several types of materials available or to be indicative of the many sources from which materials might be secured.

Books and periodicals cited in the first section of the annotated bibliography are generally available to the public through the efforts of two of the sources described earlier--depository libraries and the United States Government Printing Office. The motion pictures and filmstrips identified in section two of the annotated bibliography were selected from the National Audiovisual Center's catalog, U.S. Government Films (1969) and may be obtained from the Center.

Annotated Bibliography

Books and Periodicals[4]

Books

United States Bureau of Naval Personnel. Basic Electricity. NAVPERS 10086-B. Washington, D.C.: U.S. Government Printing Office, 1969. Cost - $4.25. Catalog No. D 208.11:El 2/3/969.

Prepared to present the fundamentals of electricity, this text contains information on topics such as safety, fundamental concepts of electricity, batteries, series d-c circuits, parallel d-c circuits, electrical conductors and wiring techniques, electromagnetism and magnetic circuits, introduction to alternating-current electricity, inductance, capacitance, inductive and capactive reactance, circuit protective and control devices, electrical indicating instruments, a-c generators and transformers, a-c motors, d-c generators and motors, magnetic amplifiers, and synchros and servomechanisms.

United States Bureau of Naval Personnel. Basic Electronics. Vol. 1. NAVPERS 10087-C. Washington, D.C.: U.S. Government Printing Office, 1971. Cost - $4.00. Catalog No. D 208.11:El 2/10/971--V.1.

The opening chapters of this publication treat general information concerning Naval electronics equipment, testing devices, and safety procedures. This is followed by a study of fundamental electonic devices such as transistors and electron tubes, and some of the basic circuit arrangements in which they are frequently found. Finally, communications theory, transmission lines, antennas, and wave propagation are discussed.

United States Bureau of Naval Personnel. Basic Handtools. NAVPERS 10085-A. Washington, D.C.: U.S. Government Printing Office, 1963. Cost - $1.50. Catalog No. D 208.11:H 19/963.

This book presents, in concise form, the basic operations required for the performance of a large variety of jobs requiring the use of handtools. The individual operations described herein cover the following broad areas: measuring skills; layout skills; testing, checking, and setting; woodcutting skills; grinding and filing; and metal cutting skills.

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[4] Books and periodicals listed in this annotated bibliography may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

United States Bureau of Naval Personnel. Blueprint Reading and Sketching. NAVPERS 10077-B. Washington, D.C.: U.S. Government Printing Office, 1968. Cost - $1.25. Catalog No. D 208.11:B 62/968.

This book will serve as a basic reference to those individuals who require a knowledge of blueprint reading and sketching. It contains a general discussion of the uses and kinds of blueprints, the language of a blueprint, technical sketching, wiring and schematic diagrams, piping prints, machine prints, structural prints, architectural prints, and the fundamentals of map-reading.

United States Bureau of Naval Personnel. Builder 3 & 2. NAVPERS 10648-F. Washington, D.C.: U.S. Government Printing Office, 1970. Cost - $4.25. Catalog No. D 208.11:B 86/3/970.

Topics discussed in this publication include drawing and specifications; the engineer's level; grading and excavating; materials handling and scaffolding; concrete; masonry; woodworking tools, equipment and fastenings; woodworking materials and methods; foundation construction and floor and wall framing; roof framing; exterior finish; interior finish; plastering, stuccoing, and tile setting; field structures; heavy construction; logging operations; paints and preservatives; and construction safety.

United States Bureau of Naval Personnel. Commissaryman 3 & 2. NAVPERS 10279-C. Washington, D.C.: U.S. Government Printing Office, 1966. Cost - $1.25. Catalog No. D 208.11:C 73/2/966.

Chapters of this publication contain discussions concerning the inspection of foods, food storage and care, equipment used in food preparation, nutrition and menu planning, expenditure of subsistence items, sanitation, food conservation, meats, general instructions for food preparation, baking, and food service.

United States Bureau of Naval Personnel. Data Processing Tech 3 & 2. NAVPERS 10264-B. Washington, D.C.: U.S. Government Printing Office, 1970. Cost - $2.75. Catalog No. D 208.11:D 26/3.

A training manual designed to help the individual meet the occupational requirements for a data processing technician. Subjects such as automatic data processing, card punches, verifiers, data communications, card sorters, interpreters, automatic punches, collators, accounting machines, electronic data processing, input/output procedures and data flow, programming and documentation, operation and control, and maintenance and material management systems are discussed.

United States Bureau of Naval Personnel. Dentalman. NAVPERS 10681. Washington, D.C.: U.S. Government Printing Office, 1969. Cost - $3.00. Catalog No. D 208.11:D 43/8/969.

Designed to aid in the preparation of the dental technician, this book contains units on anatomy and physiology, dental histology, dental anatomy, bacteriology, oral pathology, dental pharmacology, and oral roentgenography.

United States Bureau of Naval Personnel. Equipment Operator 3 & 2. NAVPERS 10640-C. Washington, D.C.: U.S. Government Printing Office, 1959. Cost - $1.25. Catalog No. D 208.11:Eq 5.

Material in this book deals with the work and responsibilities of an equipment operator, safety precautions to be observed in operating equipment, types of equipment used, principles of earthwork, specific instructions for earth moving and automotive equipment, and preventive maintenance.

United States Bureau of Naval Personnel. Illustrator Draftsman 3 & 2. NAVPERS 10469. Washington, D.C.: U.S. Government Printing Office, 1967. Cost - $2.50. Catalog No. D 208.11:D 78/5.

Information related to the theoretical knowledge and operational skills required of the illustrator draftsman is presented in this book. The topics discussed include mathematics, drafting instruments and equipment, general drafting practices, development of surfaces, machine and structural drawings, mechanical and electrical drawings, office machines and equipment, lettering, the four basic mediums (pencil, ink, wash, and opaque drawings), drawing human figures, composition and design, color, cartooning, and visual presentations.

United States Bureau of Naval Personnel. Lithographer 3 & 2. NAVPERS 10452-B. Washington, D.C.: U.S. Government Printing Office, 1969. Cost - $5.25. Catalog No. D 208.11:L 71/969.

Material presented in this book describes the processes in use and gives general instructions on how to operate the various types of equipment likely to be encountered in the print shop. The background material and theory are intended to enable the operator to devise expedients and adapt these processes to the equipment he has on hand.

United States Bureau of Naval Personnel. Machinist's Mate 3 & 2. NAVPERS 10524-C. Washington, D.C.: U.S. Government Printing Office, 1968. Cost - $2.50. Catalog No. D 208.11:M 18/7/968.

A basic manual for the naval machinist's mate in which information related to such topics as steam turbines, pumps, piping and valves, heat exchangers and air ejectors, refrigeration, air conditioning, and lathes is presented.

United States Bureau of Naval Personnel. Metalsmith 3 & 2. NAVPERS 10565-B. Washington, D.C.: U.S. Government Printing Office, 1956. Cost - $1.75. Catalog No. D 208.11:M 56/2/956.

Material in this book is concerned with the tools, equipment, and materials used in the metalsmith's work; with metal testing, soldering, brazing, oxyacetylene and arc welding and cutting, sheet metal measurement, layout, and fabrication; and with blacksmith work and heat treating.

United States Bureau of Naval Personnel. Photographer's Mate 3 & 2. NAVPERS 10355. Washington, D.C.: U.S. Government Printing Office, 1966. Cost - $3.75. Catalog No. D 208.11:P 56/6/966.

This manual presents an extensive coverage and introduction to the field of photography including areas such as light, optics, filters, exposure controls and meters, chemical mixtures, press cameras, view cameras, copying, color photography, motion picture cameras, aerial cameras, aerial photography, and processing and printing films.

United States Bureau of Naval Personnel. Steelworker 3 & 2. NAVPERS 10653-E. Washington, D.C.: U.S. Government Printing Office, 1970. Cost - $4.75. Catalog No. D 208.11:St 3/2/970.

Material in this publication contains a discussion of the following topics related to the work performed by steelworkers: properties and uses of metals; blacksmithing and forging; sheet metal layout and fabrication; plate and pipe layout and fabrication; introduction to welding; oxy-acetylene welding and cutting; metal arc welding; gas shielded-arc welding; soldering; fiber line; wire rope; fundamentals of rigging; hoisting devices; reinforcing steel; nomenclature of steel structures and blueprints; and erecting buildings and towers.

United States Department of The Army. Carpentry and Building Construction. Army TM 5-460. Washington, D.C.: U.S. Government Printing Office, 1960. Cost - $0.75. Catalog No. D 101.11:5-460.

Information in this manual is applicable for use in instructing and guiding personnel engaged in or responsible for carpentry and building construction. The functions of and the methods used by the carpenter in maintaining, repairing, and constructing buildings and other wooden structures are discussed. Material concerning prefabricated buildings, including proper erection and recommended procedures, is also presented.

United States Department of The Army. Concrete and Masonry. Army TM 5-742. Washington, D.C.: U.S. Government Printing Office, 1964. Cost - $1.00. Catalog No. D 101.11:5-742.

The physical characteristics and properties of concrete materials, the selection of proportions for concrete mixtures, the use of forms and joints, and the placing, finishing, and curing of concrete are discussed in detail. Explanations concerning the use of reinforced and prestressed concrete and accepted practices in the use of masonry materials, tools, and scaffolding are included.

United States Department of The Army. Use and Care of Handtools and Measuring Tools. Army TM 9-243. Washington, D.C.: U.S. Government Printing Office, 1960. Cost - $1.00. Catalog No. D 101.11:9-243.

Published for the use of individuals concerned with such items, this manual provides a ready reference on the proper use, care, and application of handtools and measuring tools. Individual chapters covering measuring

tools, non-edged handtools, and edged handtools explain the many types of tools in these categories and their function. Safety in use is stressed.

United States Departments of The Army and The Air Force. General Drafting. Army TM 5-230 and Air Force TO 00-25-103. Washington, D.C.: U.S. Government Printing Office, 1962. Cost - $1.50. Catalog No. D 101.11:5-230.

Information for the instruction of personnel in general drafting procedures is presented in this manual. Material included herein covers the care and use of instruments; geometrical constructions and orthographic projection; third angle projection; selection of views; charts and graphs; working drawings; and notes and dimensions. Information concerning auxiliary views; isometrics; fasteners--screws, rivets, and welding; detail and assembly drawing; development and intersections; elements of construction and cartographic drawing; and reproductions is also presented.

United States Departments of The Army and The Air Force. Interior Wiring. Army TM 5-760 and Air Force AFM 85-24. Washington, D.C.: U.S. Government Printing Office, 1968. Cost - $0.50. Catalog No. D 101.11:5-760.

This manual provides practical information useful in the design, layout, installation, and maintenance of electrical wiring systems. Design of interior wiring systems, construction methods, and tools and materials used by electrical construction personnel are discussed in detail.

United States Departments of The Army, The Navy, and The Air Force. Armed Forces Recipe Service. Army TM 10-412, Navy NASUP Publication 7, and Air Force AFM 146-12. Washington, D.C.: U.S. Government Printing Office, 1969. Cost - $18.50. Catalog No. D 101.11:10-412/2.

This extensive collection of over 600 recipes is designed for the preparation of meals for large groups of people. Each recipe is based on service for 100 individuals but scales are supplied for easy adjustment to larger or smaller quantities. Recipes in this collection are arranged under general categories such as: beverages; breads; cereal; cheese and egg dishes; desserts; meats, fish, and poultry; salads and salad dressings; sauces; soups; and vegetables.

United States Departments of The Army, The Navy, and The Air Force. Paints and Protective Coatings. Army TM 5-618, Navy NAVFAC MO-110, and Air Force AFM 85-3. Washington, D.C.: U.S. Government Printing Office, 1969. Cost - $7.25. Catalog No. D 101.11:5-618.

This manual furnishes information about products, practices, materials, equipment, methods, and safety measures used in the protective coating of buildings and other structures and equipment. Principal causes of failures of protective coatings are identified and specific corrective measures are suggested. Standards and methods prescribed are intended to accomplish the protective coating of such property in the most effective and economical manner.

Periodicals

United States Air Force Instructors Journal. Randolph AFB, Texas: DCS/ Technical Training, Hq. ATC. (Quarterly.) Cost - $1.50 per year domestic, $0.50 additional for foreign mailing, and $0.40 a single copy.

Articles in this publication aid in disseminating news of professional developments in the fields of education and training with emphasis on new methods and technology.

United States Naval Training Bulletin. Washington, D.C.: Training Publications Branch, Bureau of Naval Personnel. (Quarterly.) Cost - $1.00 per year domestic, $0.25 additional for foreign mailing, and $0.25 a single copy.

Articles in this bulletin describe Navy training methods and techniques, explain plans and programs of the Navy Department, describe the training of other U.S. Government agencies and foreign agencies of interest to naval personnel, and discuss training developments that have application to naval personnel.

Motion Pictures and Filmstrips[5]

Motion Pictures

United States Department of The Army. Automotive Trouble Shooting. Part 2. Engine Tune-Up.
Projection time--33 minutes
Sound, black and white, 16mm.
Order No. TF 9-2194, Cost - $56.75

Explains the procedures and techniques employed in engine tune-up of wheeled vehicles, including manifold vacuum and compression tests, battery and ignition cable checks, spark plug check, distributor and ignition timing check, battery clearance, manifold and heat control valve check, fuel system test, carburetor check, and idling speed and mixture adjustments.

United States Department of The Army. Basic Care of Patients--Part III--Making an Occupied Bed.
Projection time--17 minutes
Sound, black and white, 16mm.
Order No. TF 8-2473, Cost - $30.50.

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[5] Motion pictures and filmstrips listed in this annotated bibliography may be purchased from the National Audiovisual Center, National Archives and Records Service, General Services Administration, Washington, D.C. 20409.

Positioning the patient--Sequence and technique for removing foundation linen, draw sheets, top sheets, and pillow cases--Replacing them with clean counterparts.

United States Department of The Army. Carburetor, Principles of Operation.
Projection time--25 minutes
Sound, black and white, 16mm.
Order No. TF 9-2253, Cost - $43.75

Explains the major components of a carburetor (bore, bowl, and air throttle); how air pressure differential is utilized; application of the Venturi principle; metering; atomization, vaporization, and the operation of carburetor circuits (float, low speed, high speed, accelerator pump, and choke).

United States Department of The Army. Carpentry--Part III--Sawing and Boring Tools.
Projection time--34 minutes
Sound, black and white, 16mm., 1965
Order No. TF 5-3550, Cost - $58.75

Teaches use, capabilities, care and maintenance, and safety measures pertaining to the handtools and power tools commonly used in carpentry for sawing and boring.

United States Department of The Army. Hospital Food Service Personnel Training. Part IV: Serving Food.
Projection time--15 minutes
Sound, color, 16mm.
Order No. TF 8-1578, Cost - $51.75

Emphasizes principles of good food preparation and service in hospitals--proper temperature, correct quantity, selection of food to meet patients' requirements, and courteous attention by food service personnel.

United States Department of The Army. Wrenches.
Projection time--19 minutes
Sound, black and white, 16mm.
Order No. TF 9-2026, Cost - $33.75

Explains the uses and advantages of various wrenches and shows the damage which may result from incorrect and dangerous practices in using them.

United States Department of The Navy. Amperes, Volts, and Ohms.
Projection time--8 minutes
Sound, black and white, 16mm.
Order No. MN 1540-u, Cost - $14.25

Explains the meaning, relationship, and measurement of amperes, volts, and ohms.

United States Department of The Navy. The Diesel Engine.
Projection time--29 minutes
Sound, black and white, 16mm.
Order No. MN 42-a, Cost - $50.25

Shows how ignition may be achieved by compression; describes basic diesel types; discusses forms of air heaters and fuel injectors. Introductory survey film.

United States Department of The Navy. First Aid for Bleeding.
Projection time--21 minutes
Sound, color, 16mm.
Order No. MN 8182, Cost - $71.50

Shows how to recognize the three types of bleeding--arterial, venous, and capillary--and how to treat each type.

United States Department of The Navy. Framing: Rafter Principles and Common Rafters.
Projection time--15 minutes
Sound, black and white, 16mm.
Order No. MN 6719-c, Cost - $27.00

Illustrates laying out and cutting of rafters.

United States Department of The Navy. An Introduction to Hand Tools--Part I.
Projection time--11 minutes
Sound, black and white, 16mm.
Order No. MN 7831-a, Cost - $19.25

Discusses the general principles governing the use of handtools in the Navy; choosing the right tool for the job; using the tool correctly; using it safely; and keeping the tool in good condition.

United States Department of The Navy. Wood Preservation: Inspection For Wood Destroying Organisms.
Projection time--18 minutes
Sound, color, 16mm.
Order No. MN 8167-a, Cost - $61.75

Describes problems faced by the Navy in maintaining its wooden structures. Explains that wood does not naturally decay, but is destroyed by living organisms--fungi and insects--and shows how to inspect for and identify these wood destroying organisms.

Filmstrips

United States Department of The Navy. The Coppersmith--Flaring and Reducing.
Frames--43
Silent, black and white, 35mm.
Order No. SN-2346-M, Cost - $1.50

Shows how to flare and reduce small and large tubing and techniques of annealing, bumping, cleaning, and finishing.

United States Department of The Navy. The Coppersmith--Working Out Branches From a Line.
Frames--63
Silent, black and white, 35mm.
Order No. SN-2346-N, Cost - $1.50

Describes cutting, working out, and installation process; marking, cutting, and raising of the cup to conform with the branch; tack-welding and fitting; and installation of a saddle branch.

Summary

The annotated bibliography included in this chapter contains thirty-eight entries which will serve as indicators of the types of materials accessible to vocational educators. Though the items listed are restricted to books, periodicals, motion pictures, and filmstrips, these can be of great value in vocational education programs. While the bibliography is recognized as being limited in scope since it does not include a wide range of teaching aids, courses of study, and other materials from special service schools, it might serve as an initiating point for vocational educators in the utilization of military information in their educational programs.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Material presented in this chapter was organized into two major sections--conclusions and recommendations. The conclusions listed below were specified after considering the data and findings presented in this study. Based upon the conclusions, the recommendations appearing in the second section were proposed.

Conclusions

The following comprehensive conclusions were reached after evaluating the information presented in earlier chapters of this report:

1. Military information related to occupational concerns in public school vocational education programs existed but was not widely utilized.

2. Many educators associated with the area of curriculum materials recognized the potential value of military information to vocational education programs but generally found such information to be inaccessible.

3. Present sources of military information for use in these programs were unable to supply the various types of information in sufficient quantities to meet present educational needs.

4. Present sources of such military information have not been utilized fully by educators--partly because the sources have not devoted enough effort to disseminating their materials.

5. Educators have not recognized their responsibility in attempting to make military information available for use in public school vocational education programs.

6. While limited consideration has been given to the use of military information in these programs, additional consideration and emphasis must be placed on this topic in the literature and in actual educational practice.

7. Military personnel and/or organizations have cooperated with educators in making military information accessible for use in public school vocational education programs.

8. An increased and more efficient usage of military information in vocational education programs would result in reduced financial waste and increased program efficiency by reducing the amount of duplication which presently exists in materials and systems development in the two areas--vocational education and the military.

Recommendations

Since this report was not intended as an end in itself but only as an initiating point, it was believed that the following recommendations should receive consideration:

1. Present sources--primary sources such as The Departments of The Air Force, The Army, and The Navy or secondary sources such as the Aerospace Education Foundation and the Northwest Regional Educational Laboratory--of military information should be expanded and be made more sensitive to the needs of vocational educators.

2. Additional sources of such information should be developed.

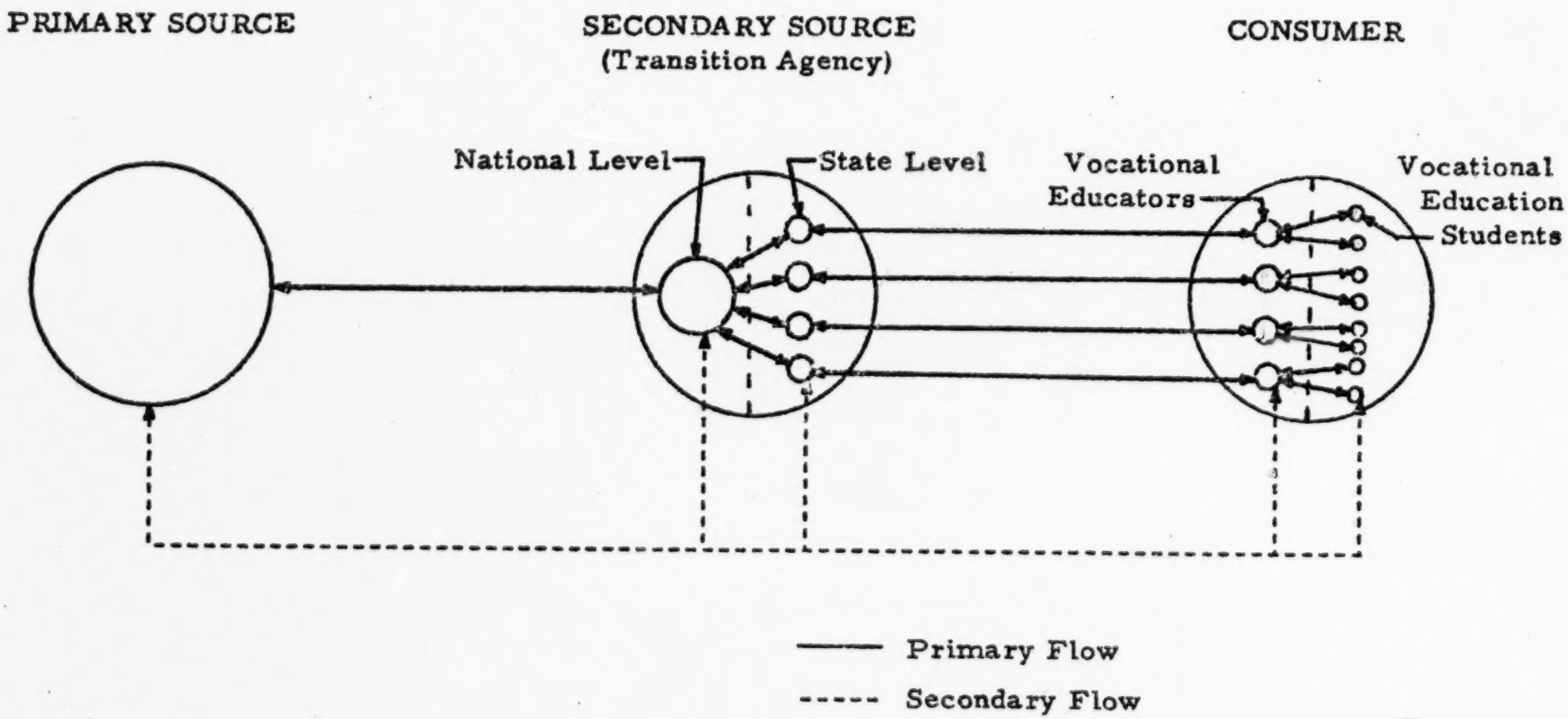
3. Secondary sources should be developed for each of the military service areas--The Air Force, The Army, and The Navy--using the ideas expressed by Wyman (1967) as listed on page 6 of this report as guides. Since the Aerospace Education Foundation has begun its work with Air Force materials, it should continue its efforts but expand its area of interest to include all educational materials, not just instructional systems.

4. All secondary sources should employ an utilization system similar to that shown in Figure 1. Such sources should include mechanisms designed to identify, reproduce, disseminate, evaluate, and revise educational materials.

5. Vocational educators should be involved in all efforts to make such materials available.

FIGURE 1

UTILIZATION SYSTEM FOR MILITARY INFORMATION



2468

6. Divisions of the secondary sources should be placed at both the State and National levels to aid in establishing a working dissemination system.

7. Efforts should be expanded at all levels to acquaint vocational educators with the types of materials available and explain how they should be used.

8. Efforts should be expanded at all levels to acquaint military personnel with the types of information required by vocational educators.

9. Vocational educators should establish an information system or use an existing system to acquaint other vocational educators with the types of military information currently available and being used in public school vocational education programs.

APPENDIXES

2470

APPENDIX A

2471

UTILIZATION OF MILITARY INFORMATION IN

PROGRAMS OF VOCATIONAL EDUCATION

The purpose of this instrument is to obtain data from vocational educators at the state level concerning the present and possible future utilization of military resource information related to occupational concerns in vocational education programs, either by teachers, students, or other personnel. You are requested to respond to each item even though some require judgmental responses.

Section A: Provide name and address of person completing form:

NAME _____

ADDRESS _____

_____
City State Zip Code

YEARS OF ACTIVE MILITARY SERVICE COMPLETED _____

Section B: To the right of statements one through seven, a set of numerical values (4-3-2-1-0) is found. These values correspond to the alternatives in the scale below:

Importance Scale

4	3	2	1	0
Of Extreme Importance	Of Considerable Importance	Of Some Importance	Of Limited Importance	Of No Importance

Please circle the number which most nearly indicates your evaluation of the importance of each statement to vocational education programs in <u>your State</u>. Your comments will also be appreciated.

The extent to which:

1. Military resource information is presently utilized in vocational education programs. 4 3 2 1 0

2. Improved access to military resource information would be of assistance to those educators presently responsible for vocational education programs. 4 3 2 1 0

3. Military resource information should be utilized in future vocational education programs. 4 3 2 1 0

4. Present dissemination systems are providing adequate access to military resource information of value to vocational education personnel. 4 3 2 1 0

5. The establishment of a State system (your State) for disseminating military resource information would be of value to vocational education personnel. 4 3 2 1 0

6. The establishment of a National system for disseminating military resource information would be of value to vocational education personnel. 4 3 2 1 0

7. Military resource information is presently used in the vocational education programs of <u>other</u> states. 4 3 2 1 0

Section C: Respond to the following statements:

8. List any literature with which you are familiar which contains a listing of sources or a discussion of the utilization of military resource information in vocational education programs.

_____

_____

_____

_____

9. Are there specific instructional areas in vocational education in which you believe military resource information would be of value?
☐ YES ☐ NO If yes, which areas?

_____

_____

_____

10. Do you wish to receive a copy of the final report concerning our investigation related to the utilization of military resource information in vocational education programs?
☐ YES ☐ NO

VIRGINIA POLYTECHNIC INSTITUTE and STATE UNIVERSITY 53

BLACKSBURG, VIRGINIA 24061

'ARTMENT OF EDUCATION

April 19, 1971

Dear Sir:

In recent years, much effort has been directed toward improving our Nation's vocational education programs. It has become increasingly obvious that since approximately eighty percent of the future employment opportunities will not require a college degree, a major portion of the urgency and emphasis in education is in the direction of vocational preparation and upgrading.

As a result of this condition, personnel of the Curriculum Materials Service, Division of Vocational-Technical Education, VPI&SU are investigating the extent of present and possible future utilization of the vast military resources (publications, teaching aids such as films and models, techniques, etc.) related to occupational concerns in public school vocational education programs. Military organizations, such as the Department of Army and the Bureau of Naval Personnel, throughout the years have created tremendous libraries of educational materials. Some of these materials have been shown to have high transferability to settings in public education. It is believed that other materials would be useful in the conduct of vocational education programs, either as class references or as guides for course structure, if such materials could be identified and obtained for public use.

Your cooperation and assistance is needed in providing data as to what use is being made and could be made of military resource information. The enclosed questionnaire has been designed to assist in this effort. Please complete or ask the person on your staff who is most familiar with the utilization of instructional materials in the programs of all vocational areas to complete the questionnaire and return it to us in the enclosed, stamped, self-addressed envelope.

Your cooperation in this matter will be greatly appreciated.

Sincerely,

Charles W. Ross
Information Officer

Wiley B. Lewis
Curriculum Materials Specialist

2474

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
Blacksburg, Virginia 24061

Department of Education

May 10, 1971

Dear Sir:

Personnel of the Curriculum Materials Service, Division of Vocational-Technical Education, VPI&SU are currently investigating the extent of present and possible future utilization of the vast military resources (publications, teaching aids such as films and models, techniques, etc.) related to occupational concerns in public school vocational education programs. Several weeks ago you were requested to aid us by completing a questionnaire designed to provide information as to what use is being made and could be made of military resource information. It is believed that such information will be useful in strengthening instruction offered in the several areas of vocational education.

Each person asked to participate in this endeavor was selected so as to represent a specific state or other major governmental entity such as Washington, D. C.; Puerto Rico; or the Virgin Islands. A response from an individual in each of these areas is essential to the ultimate worth of this survey.

I would like to take this opportunity to again ask you to participate in this investigation by completing the questionnaire mailed to you earlier. I am sure that your reply will contribute a great deal to the value of the results of this study.

Please disregard this request if your questionnaire has been placed in the mail.

Thank you for your cooperation in this matter.

Sincerely,

Wiley B. Lewis
Curriculum Materials Specialist
Department of Education, VPI&SU
2088 Derring Hall

APPENDIX B

2476

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C         PROGRAM PREPARED FOR DATA COLLECTED THROUGH PROJECT MISSIVE.
C         DIMENSION AND INITIALIZATION STATEMENTS
      DIMENSION L(80,10), J(80), PER(80,10), PCT(80,10), SUM(80), C(80,1
     *0), IGRO(20,20), INDI(20,20), IYEAR(20), RSUM(20), JACK(80),
     2JAHN(2), NO(20,20), AGRO(20,20), ANDI(20,20)
      DATA JAHN, IYEAR, IGRO, INDI, L, NO, PER, PCT, RSUM, SUM, ANDI,
     *AGRO, JACK/2H* , 1H , 2020*0, 2500*0., 70*1H , 1H0, 1H1, 1H2, 1H3,
     21H4, 1H5, 1H6, 1H7, 1H8, 1H9/
      N = 0
C         NEXT STATEMENT POSITIONS PAPER FOR OUTPUT AND PRINTS HEADING
      WRITE(6,15)
   15 FORMAT(1H1/////50X, 'DATA'///)
C         INPUT SECTION
C         DATA CARDS MUST BE SET UP IN THE FOLLOWING MANNER
C         COLUMNS 1 AND 2--IDENTIFICATION NUMBER--JACK(1)
C         COLUMNS 3 AND 4--NUMBER OF YEARS OF ACTIVE MILITARY SERVICE
C              --JACK(2)
C         COLUMNS 5 THROUGH 13--RATINGS OR OTHER NUMERICAL VALUES--JACK(I
C              ), I = 3, 11)
  100 READ(5,1) (JACK(I), I = 1, 11)
    1 FORMAT(1A2, 1I2, 9A1)
C         LAST DATA CARD MUST HAVE AN ASTERISK (*) IN COLUMN 1.  REMAINDER
C         OF CARD MUST BE BLANK.  THIS ASTERISK DENOTES COMPLETION OF DATA
C         INPUT.
      IF(JACK(1).EQ.JAHN(1)) GO TO 200
C         JAHN(1) IS TERMINATION INDICATOR FOR DATA
C         COMPUTATIONS BEGIN HERE
      DO 31 I = 3, 11
      IF(JACK(I).EQ.JAHN(2)) GO TO 31
      IF(JACK(I).EQ.JACK(71)) J(I) = 0
      IF(JACK(I).EQ.JACK(72)) J(I) = 1
      IF(JACK(I).EQ.JACK(73)) J(I) = 2
      IF(JACK(I).EQ.JACK(74)) J(I) = 3
      IF(JACK(I).EQ.JACK(75)) J(I) = 4
   31 CONTINUE
```

```
      J(2) = JACK(2)
C       - INPUT DATA IS PRINTED OUT IN THIS SECTION
      WRITE(6,16) (JACK(I), I = 1, 11)
   16 FORMAT(6X, A2, 6X, I2, 9(6X, A1)/)
C       YEARS OF ACTIVE MILITARY SERVICE ARRANGED
      IYEAR(1) = IYEAR(1) + J(2)
C       IYEAR IS NUMBER OF YEARS OF MILITARY SERVICE COMPLETED
      N = N + 1
C       N IS NUMBER OF INDIVIDUALS RESPONDING
      IF(J(2).EQ.0) IYEAR(2) = IYEAR(2) + 1
      IF(J(2).GT.0.AND.J(2).LE.2) IYEAR(3) = IYEAR(3) + 1
      IF(J(2).GT.2.AND.J(2).LE.4) IYEAR(4) = IYEAR(4) + 1
      IF(J(2).GT.4) IYEAR(5) = IYEAR(5) + 1
C       DATA SUMMARY ARRANGED
      DO 30 I = 3, 11
      DO 30 K = 1, 5
      IF(JACK(I).EQ.JAHN(2)) GO TO 30
      IF(J(I).EQ.(K-1)) L(I,K) = L(I,K) + 1
   30 CONTINUE
C       GROUP AND INDIVIDUAL SIMILARITY INDEXES CALCULATED
      DO 25 I = 3, 11
      DO 25 K = I, 11
      IF(JACK(I).EQ.JAHN(2).OR.JACK(K).EQ.JAHN(2)) GO TO 25
      IGRO(I,K) = IGRO(I,K) + (J(I) - J(K))
C       IGRO IS GROUP SIMILARITY INDEX
      INDI(I,K) = INDI(I,K) + (J(I) - J(K))**2
C       INDI IS INDIVIDUAL SIMILARITY INDEX
      NO(I,K) = NO(I,K) + 1
   25 CONTINUE
      GO TO 100
  200 AYEAR = FLOAT(IYEAR(1)) / FLOAT(N)
C       AYEAR IS CONVERSION OF IYEAR(1)--YEARS OF MILIATRY SERVICE
      DO 26 I = 3, 11
      DO 26 K = I, 11
      IF(NO(I,K).EQ.0) GO TO 26
```


2478

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      IF(IGRO(I,K).EQ.0) GO TO 29
      AGRO(I,K) = FLOAT(IGRO(I,K)) / FLOAT(NO(I,K))
C        AGRO IS CONVERSION OF GROUP SIMILARITY INDEX
   29 IF(INDI(I,K).EQ.0) GO TO 26
      ANDI(I,K) = FLOAT(INDI(I,K)) / FLOAT(NO(I,K))
C        ANDI IS CONVERSION OF INDIVIDUAL SIMILARITY INDEX
   26 CONTINUE
      DO 27 I = 3, 11
      DO 27 K = I, 11
   27 ANDI(I,K) = ANDI(I,K)/4.
C        ADDITIONAL PORTIONS OF DATA SUMMARY CALCULATED
      DO 50 I = 3, 11
      DO 50 K = 1, 10
      C(I,K) = L(I,K)
      RSUM(I) = RSUM(I) + C(I,K)
C        RSUM IS TOTAL NUMBER OF RESPONDANTS RATING AN ITEM
      IF(K.LT.2) GO TO 50
      SUM(I) = SUM(I) + C(I,K)
C        SUM IT TOTAL NUMBER OF RESPONDANTS RATING AN ITEM ABOVE 0
   50 CONTINUE
      DO 60 I = 3, 11
      DO 60 K = 1, 10
      IF(C(I,K).EQ.0..OR.RSUM(I).EQ.0.) GO TO 60
      PCT(I,K) = (C(I,K)/RSUM(I)) * 100.
C        PCT IS PERCENTAGES OF RESPONDENTS REPORTING VARIOUS RATINGS FOR
C              AN ITEM
      IF(K.LT.2) GO TO 60
      IF(SUM(I).EQ.0.) GO TO 60
      PER(I,K) = (C(I,K)/SUM(I)) * 100.
C        PER IS PERCENTAGES OF RESPONDENTS REPORTING VARIOUS RATINGS
C              ABOVE 0 FOR AN ITEM
   60 CONTINUE
C        SUMMARY OF INPUT DATA IS PRINTED OUT IN THIS SECTION
   61 WRITE(6,2)
```

```
    2 FORMAT(1H1/////50X, 'DATA SUMMARY'//7H COLUMN,6X,1H0,6X,1H1,6X,1H2
     *,6X,1H3,6X,1H4,6X,1H5,6X,1H6,6X,1H7,6X,1H8,6X,1H9//)
      DO 40 I = 3, 11
      JIT = I - 2
      WRITE(6,3) JIT, (L(I,K), K = 1, 10)
    3 FORMAT(I6, 2X, 10I7)
      WRITE(6,4) JIT, (PCT(I,K), K = 1, 10)
    4 FORMAT(I6, 2X, 10F7.2)
      WRITE(6,14) JIT, (PER(I,K), K = 1, 10)
   14 FORMAT(I6, 2X, 10F7.2/)
   40 CONTINUE
C        GROUP SIMILARITY INDEX IS PRINTED OUT IN THIS SECTION
      WRITE(6,5)
    5 FORMAT(1H1/////50X, 'GROUP SIMILARITY INDEX')
      WRITE(6,6)
    6 FORMAT(//7H COLUMN,6X,1H1,6X,1H2,6X,1H3,6X,1H4,6X,1H5,6X,1H6,6X,
     *1H7//)
      DO 8 I = 3, 9
      JIT = I - 2
      WRITE(6,7) JIT, (AGRO(I,K), K = 3, 9)
    7 FORMAT(I6, 2X,  7F7.2)
      WRITE(6,9) JIT, (NO(I,K), K = 3, 9)
    9 FORMAT(I6, 2X,  7I7//)
    8 CONTINUE
C        INDIVIDUAL SIMILARITY INDEX IS PRINTED OUT IN THIS SECTION
      WRITE(6,10)
   10 FORMAT(1H1/////50X, 'INDIVIDUAL SIMILARITY INDEX'//)
      WRITE(6,6)
      DO 11 I = 3, 9
      JIT = I - 2
      WRITE(6,7) JIT, (ANDI(I,K), K = 3, 9)
      WRITE(6,9) JIT, (NO(I,K), K = 3, 9)
   11 CONTINUE
```

```
C         SUMMARY OF MILITARY SERVICE INFORMATION IS PRINTED OUT IN THIS SECTION
      WRITE(6,12)
   12 FORMAT(1H1/////50X, 'MISCELLANEOUS INFORMATION'//)
      WRITE(6,13) AYEAR, (IYEAR(I), I = 2, 5), N
   13 FORMAT(' AVERAGE YEARS OF MILITARY SERVICE = ', F7.2//
     *' ZERO YEARS SERVICE = ', I7//
     2' GREATER THAN 0 BUT NOT MORE THAN 2 YEARS SERVICE = ', I7//
     3' GREATER THAN 2 BUT NOT MORE THAN 4 YEARS SERVICE = ', I7//
     4' GREATER THAN 4 YEARS SERVICE = ', I7//
     5' NUMBER OF RESPONDANTS = ', I7)
C         PROGRAM TERMINATES
      STOP
      END
```


2481

DATA CODING SHEET

Data Card Column(s)	Information
1 - 2	Respondent Identification Number (Assigned)
3 - 4	Years of Active Military Service Completed (Questionnaire: Section A)
5	Importance Scale Rating of Statement 1 (Questionnaire: Section B)
6	Importance Scale Rating of Statement 2 (Questionnaire: Section B)
7	Importance Scale Rating of Statement 3 (Questionnaire: Section B)
8	Importance Scale Rating of Statement 4 (Questionnaire: Section B)
9	Importance Scale Rating of Statement 5 (Questionnaire: Section B)
10	Importance Scale Rating of Statement 6 (Questionnaire: Section B)
11	Importance Scale Rating of Statement 7 (Questionnaire: Section B)
12	Yes (1) or No (2) Response to Question 9 (Questionnaire: Section C)
13	Yes (1) or No (2) Response to Question 10 (Questionnaire: Section C)

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VT 014 064
WEST, LEONARD J.
EFFECTS OF PROGRAMED VERSUS CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS.

CITY UNIV. OF NEW YORK, N.Y. DIV. OF TEACHER EDUCATION.
NEW YORK CITY BOARD OF EDUCATION, BRONX, N.Y.
MF AVAILABLE IN VT-ERIC SET.
RES-REP-71-8
PUB DATE - SEP71

DESCRIPTORS - VOCATIONAL HIGH SCHOOLS; EDUCATIONAL RESEARCH; PROGRAMED INSTRUCTION; *TYPEWRITING; *ACADEMIC ACHIEVEMENT; *EDUCATIONAL EXPERIMENTS; COMPARATIVE ANALYSIS; *LOW ABILITY STUDENTS; *TEACHING METHODS; DISADVANTAGED YOUTH

ABSTRACT - IN ORDER TO ASSESS THE RELATIVE EFFECTS OF PROGRAMED VERSUS CONVENTIONAL TYPEWRITING INSTRUCTION ON PROFICIENCY AT THREE MAJOR CLASSES OF VOCATIONAL TASKS--BUSINESS LETTERS, TABLES, MANUSCRIPTS--A COMPARATIVE ANALYSIS WAS MADE USING FIRST AND SECOND YEAR TYPING STUDENTS. MORE SPECIFICALLY, THE CONTRAST WAS BETWEEN THE EFFECTS OF "LIVE" INSTRUCTION AND THE EFFECTS OF AN AMALGAM OF LIVE PLUS PROGRAMED INSTRUCTION. FIRST AND SECOND YEAR LOW ABILITY STUDENTS WERE TESTED ON THE TYPING TASKS AND SCORED FOR SPEED, FORM ERRORS, AND FOR UNCORRECTED TYPOGRAPHICAL ERRORS; STRAIGHT COPY PERFORMANCE WAS SCORED FOR SPEED AND ERRORS. A MAJOR FINDING OF THE STUDY IS THAT DESPITE SUBSTANTIALLY LESS PRACTICE AT ORDINARY STROKING SKILLS IN PROGRAMED CLASSES NEITHER PROGRAMED NOR CONVENTIONAL STUDENTS DIFFER SIGNIFICANTLY IN STRAIGHT COPY PERFORMANCE, AS MEASURED BY GROSS WORDS PER MINUTE AND NUMBER OF ERRORS. THIS LED TO THE CONCLUSION THAT THE CONVENTIONAL ASSUMPTION THAT ORDINARY COPYING SKILLS MAKE AN IMPORTANT CONTRIBUTION TO PROFICIENCY AT VOCATIONAL TYPING TASKS AND THE CONSEQUENT SUBSTANTIAL ATTENTION TO COPYING SKILLS THROUGHOUT TRAINING ARE SERIOUSLY IN ERROR. OTHER FINDINGS AND CONCLUSIONS, ALONG WITH RECOMMENDATIONS, ARE PRESENTED. (AUTHOR/JS)

VT 014 064

EFFECTS OF PROGRAMED VS. CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS

Leonard J. West

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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EFFECTS OF PROGRAMED VS. CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS

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The research reported herein was performed pursuant to a contract with the Board of Education of New York City: Proposal No. 1, 1969-70, entitled "Implementation and Validation of 'Programed' Curricular Materials for Developing Marketable Typing Skills among Disadvantaged High School Students." The points of view or opinions stated are those of the author and do not, therefore, necessarily represent official Board of Education position or policy.

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Table of Contents

	Page
Table of contents	i
List of tables and figures	iii
Acknowledgments	iv
Abstract	v
Major purpose	2
Related research	2
Programed materials	4
Procedures	12
Experimental design	12
Teachers	16
Selection	16
Teaching experience	17
Rating of teaching skills	17
Training and supervision of teachers	17
Subjects	18
Sample size	20
Instructional procedures	22
Conventional vs. programed conditions	22
Scope of programed and conventional typing curricula	23
Procedures for student work at the program	25
Supplementary materials for programed classes	26
Teacher behaviors	31
Criterion (and interim) measures	35
Criterion test items	36
Test administration conditions	36
Test scoring	38
Data analyses	40
Summary of purposes	40
Results and discussion	42
Vocabulary scores	43
Role of teacher behaviors in programed instruction	45
Same vs. different teachers	45
Live teaching support for programed instruction	48
Terminal performance--conventional vs. programed instruction	51
Production typing speed	55
Form errors in production typing	58
Overall terminal proficiency of conventional and programed students	58
Straight copy proficiency	59
Year-1 vs. year-2 proficiency	
Early proficiency following different amounts of practice	63
Test procedures	63
Results	64
Need for teacher supervision of disadvantaged students	69
Mid-year programed vs. end-of-year conventional performance	70
Discussion of results	72

Page

Relationships among various kinds of performances 74
Vocabulary and typing performance scores 74
Straight copy and production typing scores 77
Production speed and errors 79
Intertask relationships 80
Judgments of the programed instruction by teachers and chairmen . . 82

Summary of findings, conclusions, and recommendations 87

Findings, conclusions, recommendations 89
Straight copy proficiency 89
Production typing proficiency 90
Role of the teacher in programed instruction 92
Teacher judgments of student attitudes and program features . . 93
Supervised vs. unsupervised work at programed materials 94
Intelligence and typing proficiency 95
Inter- and intratask relationships 95

References 97

Appendix contents 99

Supplementary table 100
Instructions for program use 101
Teacher questionnaire 103
Criterion (June) test instructions 106
Criterion (June) test materials 107
January test materials 112
December test materials 118
Error scoring manual 124

List of Tables and Figures

(Figure nos. preceded by F)

No.		Page
F 1	Sample programed frames	7
1	Experimental design--conventional versus programed instruction	14
2	Teachers' judgments of attitudes and abilities of programed students	19
3	Teachers' estimates of later-life use of typing skills by programed students	20
4	Number of usable subjects under conventional and programed instruction	21
F 2	Sample supplementary materials	28
5	Frequency of student typing tasks during the spring semester	30
6	Vocabulary scores	43
7	Criterion test statistics of year-1 programed students taught by the same or different teachers	46
8	Criterion test statistics of year-2 programed students taught by the same or different teachers	47
9	Range and mean for days absent (spring semester) at selected percentiles	48
10	Criterion test statistics for the P_{75} and P_{25} absentees	49
11	Criterion test statistics of year-1 conventional and programed students	52
12	Criterion test statistics of year-2 conventional and programed students	53
13	Criterion test means and significance tests for year-1 and year-2 conventional and programed students	54
14	Production speeds (wpm) of year-1 and year-2 conventional and programed students	57
15	Differences between year-1 and year-2 speed means	60
16	Differences between year-1 and year-2 error means	60
17	Test statistics of year-2 homework and in-class programed students	65
18	Test statistics of year-1 homework and in-class programed students	66
19	Percentage of homework and in-class attendees who completed each production task	67
20	Means and significance tests for year-1 and year-2 programed students in homework and in-class classes	68
21	Performance means on mid-year programed and end-of-year conventional testing	71

No.		Page
22	Correlations between vocabulary and production typing scores	75
23	Correlations between straight copy and production typing scores . .	77
24	Correlations between production speed and errors	79
25	Median intercorrelations among production tasks	80
26	Criterion test means of individual teachers	100

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LJW

Abstract

Among low-ability Ss (students) in first- and second-year typing classes in two vocational high schools, proficiency at vocational typing tasks following conventional instruction (N = 45 Year-1 and 168 Year-2 Ss in the classes of two Year-1 and four Year-2 teachers) was contrasted with proficiency following programed instruction (N = 109 Year-1 and 225 Year-2 Ss in other classes of the same teachers in the same schools). The leading features of the programed instruction were the reverse of conventional ones and consisted of: (a) little practice at ordinary stroking skills, (b) very early introduction of vocational typing tasks, (c) explicit instruction in making decisions about attractive placement of materials on the page--via programed homework, and (d) in-class practice at the typewriter in applying placement decisions to the typing of business letters, tables, and manuscripts embracing a wide range of internal task features and task difficulty (from unarranged, often longhand materials) without teacher guidance. The programed instruction was identical in scope for Year-1 and Year-2 Ss and was conducted for a full school year.

Ss were tested on representative vocational typing tasks, scored for speed, form errors (ones in placement of materials on the page), and for uncorrected typographical errors; straight copy performance was scored for speed and errors. Of 11 terminal vocational task comparisons (conventional vs. programed) across both years, there were 4 significant speed differences, favoring conventional Ss, who were 27% faster (Year 1) and 12½% faster (Year 2) than programed Ss. For the most consequential criterion of proficiency, form errors, all 11 comparisons significantly favored programed Ss, whose total errors were about half those of conventional Ss (38.42 vs. 74.11 for Years 1 and 2 together). Indeed, for parallel test items, mid-year proficiency among programed Ss (for form errors) was greatly superior to end-of-year proficiency among conventional Ss. Further, the level of work quality following one year of programed instruction was greatly superior to that following two years of conventional instruction--for a 1-year programed curriculum exceeding in scope that of 2-year conventional instruction. Nothing of consequence was found for uncorrected typographical errors, and no significant differences were found in terminal straight copy proficiency. Modification of training practices in the direction of the instructional features enumerated above is strongly indicated.

Teachers reported much "live" reteaching of programed placement concepts; but its contribution appears to have been modest in view of the finding of no terminal performance differences between frequently absent and infrequently absent programed Ss. Teachers also estimated student attitudes toward the program to be substantially negative and the program not well suited to low-ability trainees. However, typing proficiency following the programed instruction shows these motivational features to have been transcended by the more important instructional variables enumerated above.

EFFECTS OF PROGRAMED VS. CONVENTIONAL INSTRUCTION ON PROFICIENCY AT OFFICE-TYPING TASKS

The general problem to which the present investigation was addressed is the undersupply of typists sufficiently skilled at vocational typing tasks. As given in government reports (e.g., Wright, 1964), employers' complaints of shortages of, and insufficient skills among, typists have been chronic. The numbers and proportions of office workers who operate a typewriter (clerks, typists, stenographers, secretaries) have been steadily increasing, and further increases have been predicted (U.S. Bureau of Labor Statistics, 1963; New York State Education Department, 1970). In particular, the U.S. Department of Labor's Occupational Outlook Handbook (1966-67 edition) has pointed to a special need during the 1970's for "senior" typists, who "generally perform work requiring . . . independent judgment; they may work from rough drafts . . . which contain technical material, or they may plan and type complicated statistical tables . . . ." Especially compelling is the need to furnish an occupational skill to the disadvantaged urban student, numbers of whom presently complete "clerical" training with little more than ordinary copying skill.

The available research evidence (see "Related Research") suggests that the problems or needs mentioned above arise from deficiencies in conventional instructional materials and practices. Chief among these deficiencies appears to be instruction in the decisions and processes that govern attractive "placement" or arrangement of typed materials on the page, according to established conventions. As a first step in attempting to remedy these deficiencies, instructional materials bearing on the placement features of realistic typing tasks (business letters, tables, and manuscripts) were prepared in "programed" form (West, 1970), in readiness for field trial among high school students enrolled in first-year and second-year typing courses. Following completion of a given subsection of the programed materials, the learner then applies to the actual typing of pertinent tasks the placement concepts and procedures taught by the program. Although the programed materials were intended for use among any (high school and college) trainees, funds for assessing the effects of the materials were available only for field trial among disadvantaged trainees.[1]

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[1]The present investigation was carried out under New York City Board of

Major Purpose. The major purpose of the present investigation was to assess the relative effects of programed versus conventional instruction on proficiency at three major classes of vocational typing tasks (business letters, tables, manuscripts), among students in 1st-year and 2d-year typing classes. More exactly, as will later be explained, the contrast was between the effects of "live" instruction and the effects of an amalgam of live plus programed instruction, using the same teachers under both instructional conditions. Particular programed materials and particular teachers were involved. No general test of live versus programed instruction was intended; for no such test could have any conceivable scientific validity. Instead, should significant superiority in proficiency follow the instruction involving the programed materials, the general use of the materials in training could contribute to alleviating labor shortages, reducing complaints about insufficient skills among typists, and furnishing a marketable skill to students whose present training has been less than adequate.

Several ancillary purposes are more readily explicable after the procedures of this investigation are described. Accordingly, all purposes are listed in detail following the "Procedures" section (pp. 40-42).

Related Research

The research evidence in support of the deficiencies of conventional instruction and of the mistaken rationale underlying it has been given in detail elsewhere (West, 1969, Chap. 13) and was summarized in the report of the preparation of the programed materials used in the present study (West, 1970); accordingly, it is given briefly, rather than in detail, here.

The primary fallacy in the rationale underlying conventional instruction is the assumption that ordinary stroking or copying skills are a major contributor to proficiency at vocational typing tasks. That assumption is implicit in the amount of attention given to copying skills in typewriting textbooks and in the volume of reported data on speed and errors in ordinary copying tests--in contrast to the virtual absence of data on proficiency at vocational typing tasks. Ordinary stroking or copying skills are measured in "straight copy" tests involving the line-for-line copying of perfectly printed

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Education Proposal No. 1, 1969-70, entitled: "Implementation and Validation of 'Programed' Curricular Materials for Developing Marketable Typing Skills Among Disadvantaged High School Students."

prose, without error correction, and requiring no placement decisions other than reasonably regular right-hand margins and, sometimes, correct word division. In contrast, realistic typing tasks contain components and impose requirements wholly absent in straight copy typing, viz., knowledge of conventions of format, decision-making about placement of materials on the page (e.g., margins, tabular stops for table columns), heavier use of the typewriter's service mechanisms, proofreading, and error correction.

The unique features of vocational typing tasks should lead one to expect correlations between straight copy and vocational typing skills that are, at best, moderate. The evidence supports that expectation. Specifically: for errors, near-zero correlations have been found between straight copy and vocational typing (both under no-erasing conditions); for speed, moderate correlations have been found among advanced typists who have established mastery over the placement features of vocational tasks (West, 1969, Chap. 13), while somewhat lower ones have been found among novices (McLean, 1971). Thus the conventional assumption that ordinary copying skills contribute appreciably to skill at vocational typing tasks is seriously in error.

Another type of evidence supporting the low relevance of copying to vocational typing skills is the enormous differences in proficiency scores between the two types of tasks. Speed at vocational typing tasks is a small fraction of ordinary copying speed; stroking errors are also appreciably fewer in vocational tasks--under no-erasing conditions (West, 1969, Chap. 13). Apparently, the typist's "set" or perception of the requirements of the two kinds of tasks differs; accordingly, so do his stroking habits.

Muhich's (1967) study, summarized by West (1969, Chap. 13), is the only one directly addressed to estimating the relative roles of stroking skill and of decision-making about placement of materials on the page in total proficiency at realistic typing tasks. She found decision-making to play a larger role than stroking skill, increasingly so, as amount of training increased. That evidence, together with the evidence mentioned earlier, strongly suggests that the heart of proficiency at realistic typing tasks is decision-making about arrangement of materials on the page.

The evidence, however, seems not to be well known among practitioners, and the contents of typewriting textbooks are not in good accord with that evidence. For one thing, instruction in vocational tasks tends to be deferred until relatively late stages of training. For another thing, although

typewriting textbooks contain ample materials to be typed, such materials are typically accompanied by explicit placement instructions, even at relatively late stages of training. It is difficult to imagine any employer instructing his typist to "type this 137-word letter" or to "leave 8 spaces between columns in this table"; yet guidance at that level pervades the typewriting textbooks. The textbooks contain placement "rules," sometimes in list form, but no explicit practice at the sequential decisions represented by the briefly stated rules. To judge from the levels of proficiency at vocational typing tasks following conventional instruction, the supporting or additional instruction furnished by teachers has not been notably successful in remedying textbook omissions and, thereby, in producing marketable vocational typing skills among students.

The evidence points strongly to the preeminence of decision making about arrangement or placement of materials on the page in accounting for skill at vocational typing tasks. The discrepancy between the implications of that evidence and conventional instructional materials and practices led to the preparation of instructional materials directly addressed to the "mental" decisions governing the placement features of three major classes of vocational typing tasks (West, 1970), as described next.

Programed Materials. The sequential, step-by-step character of the pertinent decision processes lends itself especially well to the step-by-step sequencing of instruction that characterizes "programed" instruction. Accordingly, the instructional materials were prepared in programed form and consisted of 541 linear "frames" organized into 14 sections, as follows:

Section	Topic	No. of Frames
1	Centering at the typewriter	19
2	Horizontal centering of single lines	46
3	Vertical centering	34
4	Vertical centering of simple tables	37
5	Tables without column headings (backspace method)	40
6	Tables with column headings (backspace method)	26
7	Tables without column headings (arithmetic method)	22
8	Tables with column headings (arithmetic method)	31
9	Advanced table typing	105
10	Vertical margins for business letters	34

Section	Topic	No. of Frames
11	Horizontal margins for business letters	22
12	Advanced business letters	40
13	Estimation of copy length and centering of estimated materials	45
14	Manuscript and report typing	40
		541

The scope of the program is evident from its table of contents, above. The first three sections deal with elementary matters that are prerequisite to the vocational tasks specified in Sections 4-14. Simple centering (Sections 1-3) tends to be adequately treated in conventional instruction; programed materials were prepared on that topic merely to provide an easy introduction to programed instruction for students who had not earlier experienced instructional materials in programed form. The more consequential "decision-making" sections (4-14) constitute the heart of the program and were deliberately organized to provide maximum flexibility of use in keeping with variations in training syllabi, objectives, and duration. Except that "advanced" sections (9, 12) require earlier study of the corresponding simpler sections (5-6 and/or 7-8, 10-11), the sections of the program are essentially independent and may be used in a variety of orders. As shown by the program's contents, table planning may be taught by either of two methods or by both methods, as the teacher may desire. The teacher may elect to assign either of two methods of dateline placement in business letters (Section 10): (a) "moving"--dateline location varies with letter length and distance between date and inside address is fixed; (b) "fixed"--dateline constant and distance between date and inside address varies with length of letter. In all program sections, there is provision for both pica and elite type; in applicable instances the student selects a route through the program corresponding to his size of type. The particular placement procedures taught in the program are <u>not</u> tied to any particular typewriting textbook; they represent a selection by the author, according to his judgment, of optimal procedures--sometimes ones not represented in any typewriting textbook. Finally, and not least in importance, the placement processes taught in the program aim at to-the-line and to-the-space exactness in placement--not approximations. The contention underlying that deliberate tactic is

that it is no more difficult to be just right as approximately right; besides, the labor market requirement for "senior" typists connotes a need for high-quality, precision work.

To illustrate the student's use of the program and its place in instruction, six sample frames from the section on "Vertical Placement of Business Letters" ("moving" date line) are shown on pages 7-8.[2] The first ten frames in that section are not shown; frames 11-15 are a sequence; the illustration then jumps to the final "test" frame in that section (No. 34). As illustrated, the learner reads the frame, fills in the blanks (multiple choice items are given in parentheses below the blank), then checks his responses against the model answers given at the left of the following frame. Occasionally, explanations of answers are given in square brackets following the answer. It is <u>not</u> required that a typewriter be available during work at the program. Instead, the program deals entirely with the "mental" processes or steps in determining placement of materials on the page, accompanied by specification of the physical operations required for implementing the placement decisions at the typewriter. Following completion of a portion of the program, the learner then uses the typewriter to apply the placement processes taught in the program to (a) the many miniature tasks included in the program and/or to (b) pertinent typewriting-textbook or locally prepared business letters, tables, and manuscripts. To that end, each of the fourteen sections is further divided into subsections, each of which is judged to provide a single work assignment of practicable duration (10-30 minutes) and meaningful scope.

The scope of the program manifestly exceeds a single semester's work, and its flexible organization permits distributing its subsections across two or three or four semesters, as may be desired. In the present investigation, as described in the "Procedures" section, the entire program was to be "covered" within the two semesters of first-year typing classes and, minus several of the elementary sections, in the two semesters of the separate second-year typing classes, as well. While the scope of the entire program extends well beyond what is characteristically taught in first-year typing classes (e.g., tables with braced column headings), it is contended, for one thing, that the one-year courses that predominate (70 percent of all typing instruc-

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[2]Six sample frames from a section on table planning are on pages 9-10.

NOTE: The 6 frames on pages 7 and 8 are from a section on "Vertical Placement of Business Letters"

10-11

There is a simple rule that tells you how many lines from the top edge to type the date. The location of the date depends on the number of _____ in the _____ of the letter. Here's the rule.

RULE: For a letter of up to 60 words, put the date on line 22. For each additional 20 words or fraction of 20 words, raise the date 1 line.

If words = 60 or less, date line = 22. For 61 to 80 words, the date goes up 1 line to line 21. For 81-100 words, go up another line to line ____; for 101-120 words, place the date on line ____, and so on.

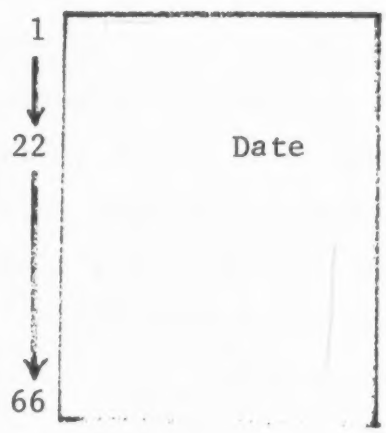
words

body (or message)

20

19

10-12



For a letter of 60 words or less in the message, the distance from the top of the page to the date is ____ lines. The date is _____ 1 line for each
(raised/lowered)
additional ____ words or fraction of ____ words.

22

raised

20

20

10-13

For a letter of longer than 60 words, we want to know how many lines above line 22 to type the date. We want to know how many lines to _____ line 22.
(add to/subtract from)

subtract from

10-14

Assume a letter whose message contains 96 words. To locate its date line, count on your fingers. Count by 20's, starting at 60, until you pass 96. Start with a closed fist and straighten a finger for each 20, like this: "60" . . . "80" (1 finger) . . . "100" (2 fingers). Subtract the number of straightened fingers from the line number on which a letter of up to 60 words is placed; that is, subtract from ____. For the 96-word letter, the date would be on line ____ - 2 = ____.

22

22 (- 2) = 20

10-15

Count on your fingers as you read this frame.

Assume a letter of 138 words. Count: "60" . . . "80" (1 finger) . . . "100" (2 fingers) . . . "120" (3 fingers) . . . "140" (4 fingers). Place the date for that 138-word letter on line 22 - 4 = line ____. For a letter of 103 words you would straighten ____ fingers, and its date would be on line ____.

[Note: 18 additional practice frames follow.]

18

3

19 [22 - 3]

10-34

Now a little TEST.

1. For a letter of up to ____ words, place the date on line ____.
2. In a letter of 116 words, the date should be placed on line ____.

Answers to frame 10-34

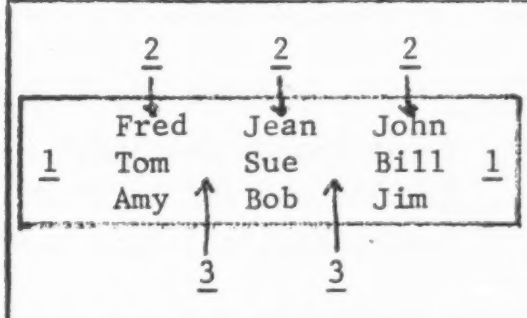
1. 60

   22

2. 19 [22 - 3]

NOTE. The 6 frames on pages 9 and 10 are from a section on "Tables without Column Headings (Arithmetic Method)."

7-2



Horizontally, the body of a table has three elements or parts. As numbered at the left, they are: 1 side margins (left and right), 2 typed matter, and 3 IC (intercolumn) space--the blank space between columns.

If the planning of a table is correct, then: side margins + typed matter + IC (intercolumn) space should equal total spaces across the page.

On 8½" x 11" paper or stationery, in pica type there are ____ spaces across the page; in elite type, ____ spaces. If some elite table uses 50 spaces for the typed matter + ICs, there will be ____ spaces left for the _____ _____.

7-3

85
102
52 [102 - 50]
side margins
(or left and right margins)

To plan a table means to locate the LM (left margin) and the starting point for each column. To do that, you must first determine the number of spaces needed for the typed matter. So: identify the longest item in each column, count its spaces, and add across the columns. Consider:

California	Sacramento	15,707,204
North Dakota	Bismarck	632,446
Ohio	Columbus	9,706,397

The longest item in column 1 is _____; it has ____ spaces. In column 2, the longest item has ____ spaces; and in column 3, ____ spaces. The total is ____ spaces.

7-4

North Dakota
12
10
12
32

To plan tables by arithmetic, you use a horizontal line to represent each column, and you show the number of spaces in each column and between columns, like this:

20 6 10 6 10

The sketch shows that typed matter = 20 + 10 + 10 = ____
ICs (intercolumns) = 2 x 6 = ____
Total = ____

In elite type, the space remaining for side margins would be 102 - ____ = ____.

2503

40
12
52

(102 -) 52 = 50

7-5

The preceding frame shows that:

- Total spaces available across the page
  Spaces used for typed matter and ICs (intercolumns)

= Spaces available for side margins

Since there are two side margins, just divide the marginal space by ____ to determine the point on the carriage scale at which to set the _____ margin. Example: 40 spaces of typed matter + three 5-space ICs total ____ spaces. In pica type, the space remaining for the two side margins = ____ spaces, and the LM (left margin) would be set at ____.

[Note: four additional practice frames follow.]

2

left

55 [40 + 15]

30 [85 - 55]

15 [½ of 30]

7-10

Use scrap paper for the arithmetic and fill in the blanks. When an odd number of spaces remains for side margins, put the "larger half" in the _____ margin.
(left/right)

		Column Spaces	In Each IC	Left Margin Pica	Left Margin Elite
Example		8-12-6-20	5	12	21
	a.	18-23	9	____	____
	b.	6-9-13-7-10-4	3	____	____
	c.	7-19-12	7	____	____
	d.	18-8-11-4	6	____	____

left

Note. The diagonal or fraction bar (/) is also a division sign. 12/2 means 12 ÷ 2.

Ex [85-(46+15)]/2=12 pica
[102-(46+15)]/2=21 elite

a [85-(41+9)]/2 =18 pica
[102-(41+9)]/2=26 elite

b [85-(49+15)]/2 =11 pica
[102-(49+15)]/2=19 elite

c [85-(38+14)]/2 =17 pica
[102-(38+14)]/2=25 elite

d [85-(41+18)]/2 =13 pica
[102-(41+18)]/2=22 elite

7-11

With arithmetic planning, it is easy to check your work before typing. Once you have figured out LM and RM, just sum across (margins + typed matter + ICs). If you do not get a total of ____ (pica) or ____ (elite), you know you have made an arithmetic error and can recheck. Fill in the

	LM					RM	Total
Pica	19	16	9	23		18 =	____
Elite	25	7	7	17	7	12 24 =	____

There is a mistake in the _____ example. The margins should be ____ (left) and ____ (right).
(pica/elite)

[This frame makes a convenient stopping point.]

tion in this country, according to Wright, 1964) mandate inclusion, in such courses, of all the major typewriting tasks required for marketable skills. For another thing, the low relevance of ordinary copying skills to proficiency at realistic typing tasks, in the light of the demands of the decision-making features of such tasks, argues for the introduction of such tasks earlier in training than has been typical. Hopefully, the introduction of such tasks early in first-year training and the particular focus on the consequential decision processes of such tasks permit covering a wider range of tasks and task difficulty than would otherwise be possible within first-year training.

Insofar as "programed instruction" is, by definition, self-instruction, work on it should in theory be done by the student outside of class (e.g., as homework). So used, the program takes over the teaching of placement processes that otherwise characteristically requires much of the teacher's time, thereby providing much more class time for actual typewriting. Whether the program can indeed be used in ideal "homework" fashion or, instead, must be worked on in class under the teacher's supervision, depends mainly on the appropriateness of the program's content to given learners and in part on the attitudes of given students toward school in general and toward homework in particular, as well as on the skill of teachers in accommodating their "live" instruction to the programing of portions of the instruction. Although students work at their own individual rates on programed materials, the dividing of the present program into many short subsections permits the assignment of a given subsection to all students in a class (as homework), in consequence allowing actual typewriting practice in class the next day on a common body of materials for actual typing. The mode of use of the program in the present investigation, with regard to in-class versus at-home work on the program and other issues, is described in the "Procedures" section (pp. 22-35).

It may be repeated that the dominating considerations accounting for preparation of the program were (a) the inferred inadequacies of conventional materials and practices relating to the "placement" features of the major vocational typing tasks and (b) the nice correspondence between the step-by-step sequencing of "programed" instruction with the step-by-step, sequential nature of the decision processes that govern placement of typed materials on the page. The explicit research findings supporting the first of

the above-mentioned two considerations and the processes of program preparation are described in an earlier report (West, 1970) containing the full program.

Procedures

Treated in turn are: (a) experimental design, (b) teachers, (c) subjects, (d) instructional procedures, (e) criterion (and interim) measures, and (f) modes of data analysis. Finally, the purposes of the present investigation are listed in more detail.

Experimental Design

The two contrasted instructional methods or treatments or conditions are: C (conventional) and P (programed) instruction. The proficiency scores of C students were drawn from an earlier study (McLean, 1971) devoted to the development of indices of difficulty for vocational typing tasks. To hold constant teaching skill and the kinds of students undergoing C and P instruction, in several of the high schools involved in the earlier McLean investigation arrangements were made for several of the same teachers to participate, two years later, in the trial of the programed materials, using classes at the same typing grade levels as those of the earlier conventional instruction and, of course, the same criterion measures. It was assumed that within a two-year period any school would tend to have comparable students. As a modest check on that assumption, a brief measure of general ability, administered to the C students by McLean in his investigation, was also administered by the present investigator to the P students [see "Criterion (and Interim) Measures," pp. 35-40].

Initially, for the trial of the programed materials, arrangements were made for the participation of three of the schools that had been involved in the earlier McLean study and of certain of the same teachers in those schools. With each teacher assigned a pair of typing classes at the same typing grade level as in the McLean study,[3] there were originally six teachers of first-year classes and six teachers of second-year classes: in School A, four Year-1 and four Year-2 teachers; in School B, two Year-2 teachers; and in School C, two Year-1 teachers. However, because of schoolwide disruption in School C, leading to closing of the school on a substan-

[3] In School B it was possible to assign three typing classes to one of the two teachers.

tial number of days, conduct of the investigation in that school had to be discontinued after the first semester of the school year. Since the outcomes of this study were to be measured upon completion of a full school year, School C was entirely dropped from this study.

Further modification of the original orthogonal design (equal number of teachers and classes at each typing grade level) was necessitated by the inability of School A to meet the original commitment to program intact classes with the same teacher during both semesters of the school year allocated to the programed instruction.[4, 5] In that school, some students in some first-semester (fall) classes remained with the same teacher during the second (spring) semester; other students taught by various fall-term teachers were distributed among the classes of different teachers during the spring term. The present study retained only those P students whose spring-term teachers had been involved in fall-term instruction in P classes.

However--and despite the absence of information on the extent of yearlong stability of teachers of C students (see Footnote 5, below)--the teacher shifts among P students in School A provided an opportunity to test the possible effects on criterion performance of "same vs. different" teachers during the school year. On the thesis that the typing curriculum is markedly cumulative (simple tasks are necessarily embedded in later, more difficult, tasks)--with the programed materials being deliberately cumulative--it might be contended that criterion proficiency is influenced mainly by one's most recent (spring-term) teacher. The hypothesis would then be one of no differences in terminal proficiency among those taught by the same or by different teachers during the school year. On the other hand, differences in teaching skill could outweigh the stabilizing effects of the cumulative nature of the typing curriculum--leading to a hypothesis of differences in terminal proficiency accompanying differences in teachers. These hypotheses

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[4]One substitute teacher lost her position in the spring; others took maternity leaves or were transferred to other assignments.

[5]The C students of the McLean study had been taught, variously, by the same or by two different teachers during the two semesters of the school year preceding their criterion testing. McLean did not inquire into and therefore did not report the numbers of students in each of the two categories. However, the novelty (to teachers) of programed instruction made it desirable to keep students with the same teacher throughout the year.

were tested in the present investigation, as a first step, and the results used to determine whether the eventual comparison of P with C students was to be carried out separately for same-teacher and for different-teacher P students or, alternatively, for all P students taken together.

In School A, in order not to "lose" students despite attrition among teachers between the fall and spring semesters, it was possible to assign to the two retained Year-2 teachers three typing classes in the spring, thus salvaging many students whose fall-term teachers did not continue into spring instruction. Unfortunately, it was not possible to increase from two to three the number of typing classes of the retained Year-1 teachers; it was necessary to discard the many fall-term students in Year-1 whose spring-term teachers had not participated in the earlier McLean research--teachers for whom there were no scores for C students. In School B there was neither attrition among teachers nor shifts of students from one teacher to the other. In that school, each teacher had three spring-term classes.

In summary, the programed instruction involved the performance of students in four Year-1 classes of two teachers and in 12 Year-2 classes of four teachers. The experimental design (for C vs. P instruction) is summarized in Table 1, showing the number of spring-term typing classes of the various teachers under the C(onventional) instruction of the earlier McLean study and under the P(rogramed) instruction of the same teachers in the same schools two years later.

Table 1

Experimental Design--Conventional vs. Programed Instruction

(Number of Spring Typing Classes)

School and Teacher	Year 1		Year 2	
	Conv.	Prog.	Conv.	Prog.
School A				
Teacher A	1	2		
B	2	2		
C			2	3
D			2	3
School B				
Teacher E			2	3
F			3	3
Total	3	4	9	12

As displayed in Table 1, the data for the major purpose of the present investigation were provided by Year-1 students in 3 conventional and 4 programed classes and by Year-2 students in 9 conventional and 12 programed classes, with the same spring-term teachers for both types of instruction.

The original proviso of a pair of programed classes for each teacher was intended to furnish the largest possible number of students in the light of reasonable scheduling of teachers. However, that proviso permitted the test of an additional hypothesis that arose from the views of the participating teachers and department chairmen prior to initiation of the programed instruction, based on the type of students in the particpating schools. The two participating schools are vocational high schools with substantial proportions of so-called disadvantaged students, of presumed below-average ability and, conceivably, of less than "strong" motivations toward school. The "programed" instructional materials make demands on reading (and, on some topics, arithmetic) skills. Teachers and chairmen contended that students would have difficulty in learning from written materials, that they would not work conscientiously at the materials unless under the direct supervision of their teacher, and that there would be resentment of homework for an "unprepared" (i.e., no homework) subject like typewriting. Although the attempt was made during preparation of the programed materials to gear its reading difficulty to low-ability students (see West, 1970), to assess the validity of the assumptions about these students, one of the two (or three) P classes of each teacher was randomly assigned to in-class work at the programed materials; the other(s), to "home" work at the program. The investigator pointed out to teachers and chairmen that the self-paced character of programed instruction would make in-class work on the program unmanageable and, moreover, that little class time would be left for actual typing were it to be largely preempted by work at the program. Within a few weeks of the mid-October initiation of at-home versus in-class work at the programed sections, reports of the teachers confirmed the investigator's predictions. However, to provide at least a modest test of the original assumptions it was agreed to continue with the dual work conditions until the Christmas holidays, shifting all classes immediately thereafter (in January) to "home" work at the program. As a basis for testing the hypothesis about the behavior of disadvantaged students with regard to programed materials,

there was, then, a 2-month period at the beginning of first-year and second-year instruction carried out under differential homework and in-class conditions, with results based on scores on a brief test battery administered to students just before the Christmas holidays. For that purpose there was a sufficient number of students in the classes of teachers who continued with P classes in the spring term to permit discarding of classes (in School A) whose teachers did not continue with spring-term programed instruction, leaving 122 homework and 133 in-class Ss in the 13 fall classes of 6 teachers.

Finally, a test battery was administered to all P students at the end of their first (fall) semester of instruction (late January), for several reasons: (1) to provide an estimate of mid-year proficiency, (2) to provide a basis for comparing the results of mid-year P instruction with end-of-year C instruction--in the light of the coverage in first-semester P instruction of topics treated at the end of the school year in C instruction (in Year-1 classes), and (3) to salvage the scores of students who were transferred to spring-term classes of teachers who had not been involved in C instruction.

Teachers

Described, in turn, are: (a) the selection of participating schools and teachers, (b) the extent and nature of the teaching experience of participants, (c) ratings of their teaching skills, and (d) the training and supervision of teachers for the conduct of programed instruction.

Selection. The requirement in a comparison of instructional methods that teachers be held constant mandated the use of teachers in the field trial of the programed materials who had also been involved in the conventional instruction of the earlier McLean investigation (1971). That earlier investigation required the cooperation of schools only to the extent of providing one full school week for massive testing of students, rigorously administered by the investigator and his assistants. Accordingly, a large proportion of each school's staff with typing classes at the desired grade levels agreed to participate, representing, presumably, a range of teaching skills. Solicitation of these schools' participation in the more massive, full-school-year intervention needed for trial of the programed instruction led to acceptance by three high schools, i.e., of a number of teachers in these schools who had been involved in the earlier conventional instruction and whose chairmen committed them to at least two typing classes at the appropriate grade

level during the year of programed field trial. The investigator's impression of the initial attitudes of teachers toward participation was enthusiasm among some, curiosity (about programed instruction) among others, and neutrality among still others.

Teaching Experience. As explained earlier, one school had to be dropped following the first semester of P instruction. Of the ten teachers in the other two schools who began the year of P instruction, one was a substitute teacher teaching out-of-license; the typewriting teaching experience of the others ranged from several to many years. All six (of the original ten) teachers who completed the full year of P instruction were experienced. None of the participants, however, had any earlier experience with programed instruction or more than superficial knowledge of the characteristics of such instruction. They may be characterized as experienced in teaching typewriting, but novices at programed instruction.

Rating of Teaching Skills. Of the six teachers whose commitment to programed instruction for the entire school year was met, one was rated by the department chairman as a "superior" teacher, three were rated as "average," and two were rated as "below average" in teaching skills by their chairmen. The investigator's subjective judgment of these six teachers, upon early visit to their classes, concurred in every instance with that of the department chairmen. In a teacher questionnaire completed by participating teachers at the end of the year of programed instruction (see p. 105, item 15), five of the six teachers rated their own teaching skills as "average"; one "excellent" self-rating was by a teacher who was considered "average" by the department chairman and the investigator. It appears from these various ratings that participating teachers represented a range of teaching skills perhaps not unlike that of teachers in general.

Training and Supervision of Teachers. Neither funding nor the schedules of teachers permitted in-depth training for the novelties of programed instruction that would ideally have been desirable. Instead, the investigator conducted a 3-hour Saturday morning session with participants prior to the beginning of P instruction and visited the classes of each teacher at least once early in the fall semester--as did department chairmen later in the year. In addition, by arrangement with chairmen the investigator conducted instruction in each of several classes on one occasion, with teaching as-

signments on that day shuffled to permit all participants to observe the investigator's instruction in at least one class. A second 3-hour Saturday session was held with participants at mid-year, just before the beginning of spring-term instruction. Throughout the school year--beginning with a 9-page single-spaced teachers' manual dealing with the management and scheduling of instruction--teachers were sent by mailed memo and letter a steady stream of detailed advice and instructions, as well as ample supplies of practice and test materials for use in class immediately upon completion of each of the 48 subsections into which the program was divided. These were materials of a kind unfortunately not frequently found in published typewriting textbooks (viz., unarranged materials requiring the typist to make all the placement decisions). The investigator was also in periodic telephone contact with teachers and chairmen.

Details on the extent to which teacher behaviors were in accord with ideal specifications are given in the "Procedures" subsection entitled "Teacher Behaviors" (pp. 31-35).

Subjects

The students or subjects (Ss) were high school trainees normally enrolled in first-year and second-year typing classes in two vocational high schools serving a largely disadvantaged student body. Assignment of Ss to classes followed the school's ordinary programming procedures and led, presumably, to Ss being a representative sample of all typing students in the school. Some Year-1 classes (in School A) included stenographic majors, typically somewhat more able than the "clerical" majors of other Year-1 classes in that school scheduled for a 2-year typing program. All Year-2 classes in both schools consisted of clerical majors.

Ss in all classes were, on the average, of below-average mental ability, as inferred from their scores on a brief 20-word vocabulary test that is highly correlated with a full-scale adult intelligence test.[6] The mental-age equivalents of their vocabulary scores were 1-3 years below the chronological ages of Ss. Additional, but impressionistic, evidence on student abilities is provided by teachers' questionnaire responses (Item 6, Appendix, p. 103) at the end of the year of programed instruction. These are dis-

[6] A description of the vocabulary test and the scores of P and C students are given on pages 43-45.

played in Table 2, relating to attitudes toward homework in typewriting and toward school in general, as well as judgments of reading and arithmetic abilities. Interpretive details are given in the table footnotes.

Table 2

Teachers' Judgments of Attitudes and Abilities of Programed Students[a]

Student Characteristic[b]	Year-1 Teachers		Year-2 Teachers				Mean Judgment[c]
	A	B	C	D	E	F	
Attitudes							
6a. Negative toward typing homework	D	NS	SA	A	SA	SA	2.00
6e. Negative toward school in general	SD	D	D	D	D	D	4.17
Skills							
6b. Reading skills too low to learn from reading	D	D	D	SA	SA	SA	2.50
6d. Weak in arithmetic	A	A	A	SA	A	NS	2.00

[a]SD, D, NS, A, SA stand, respectively, for strongly disagree, disagree, not sure, agree, strongly agree.

[b]The abbreviated designations represent the similarly numbered questionnaire items, which are given in full under Item 6 in the questionnaire reproduced on pp. 103-105.

[c]Weights of 5 through 1 were assigned to the judgments from SD through SA: the lower the mean, the greater the agreement with the statement.

In the judgment of their teachers, as displayed in Table 2, the programed Ss were estimated to have negative attitudes toward homework in typewriting, but not toward school in general. Arithmetic skills were judged to be weak; whereas, with regard to reading skills too low to learn from reading, teachers' views centered between "agree" and "not sure." Also evident, except for attitudes toward school, is the diversity of teacher judgments about the student characteristics listed in Table 2. In any event, these teacher judgments are congruent with Ss' vocabulary scores in characterizing Ss as ones of low ability.

A final characterization of programed Ss, bearing on their motivations toward learning to type, is provided by teachers' end-of-year estimates of the proportions of students in their classes for whom, in future years, typing skills would be of "primary use," "secondary use," or of "little or no use" (see Item 14, p. 105). Teachers were not asked to specify the bases for their percentage allocations, and no comparable data were available for the conventional Ss of the McLean investigation. Findings are displayed in Table 3.

Table 3

Teachers' Estimates of Later-Life Use
Of Typing Skills by Programed Students

(In percentages)

Extent of Use	Year-1 Teachers		Year-2 Teachers				Mean[a]
	A	B	C	D	E	F	
Primary	10	80	75	0	70	70	51
Secondary	80	18	15	50	25	25	35
Little or none	10	2	10	50	5	5	14

[a]Rounded

The classes of Teacher D were described as consisting almost exclusively of bookkeeping majors; however, the investigator has no information that could explain the puzzling discrepancies between the judgments of Teachers A and B (in School A). For whatever the impressionistic data of Table 3 may be worth, only about half the programed Ss were judged to have the primary use for typing skills in later life that one would expect to be associated with high motivation toward learning to type.

Sample Size. In the initial 25 P classes in 3 high schools there were 638 Ss on register. Loss of School C after the fall term (for the reasons given earlier) reduced the number (N) of Ss in the two remaining schools to 542. Attrition among School-A teachers at mid-year, necessitating the dropping of Ss whose spring-term teachers had not participated in the conventional instruction of the earlier McLean study, led to further reduction in the number of usable programed Ss. Gross truancy plus absenteeism during the

terminal testing at the end of the school year reduced the number of usable Ss still further.[7]

The number of usable Ss from the earlier conventional classes of the McLean investigation was determined by the nature of the test battery administered to those students, as explained in the subsection on "Criterion (and Interim) Measures" (pp. 35-40).

Retaining only those conventional Ss for whom appropriate test scores were available and only those programed Ss with pertinent test scores who had a full year of P instruction under teachers involved in that instruction for the full school year, the number of usable Ss is shown in Table 4.

Table 4

Number of Usable Subjects

Under Conventional and Programed Instruction

Instruction	Year 1	Year 2	Total
Conventional	45	168	213
Programed	109	225	334
Total	154	393	547

The data of Table 4 apply to the terminal testing at the end of the school year across the various items in the test battery. Since not all Ss completed all items in the test battery, Ns for particular test items are below those shown in Table 4. Per teacher for individual test items the range was from as few as 2 conventional Ss to as many as 64 programed Ss. Details are given in the "Results" section (pp. 42-87). For the ancillary purposes of this investigation (effects of in-class vs. at-home work on the program, effects of same vs. different teachers during the programed year) and for interim testing of P students during the school year, Ns are given in the "Results" section, since these varied widely with various objectives and testing occasions. The data of Table 4 apply to the primary objective

[7] In School A, schoolwide absenteeism during the school year of programed instruction was 8 percent above the figure for the school year (two years earlier) of the conventional instruction--suggestive of a nontrivial decrement in student attitudes toward school. In School B, schoolwide attendance was high and stable throughout the period involved. The general impression of School-A teachers was that students' attitudes toward school had noticeably declined during the period of the past few years.

of this investigation.

The earlier McLean study that provided the scores of conventional Ss did not collect attendance data on students and used all persons for whom at least one test score was available--regardless of whatever may have been the attendance history of Ss during the school year preceding the testing. Accordingly, in all testing of programed Ss, both terminal and interim, no persons were discarded for reasons of excessive absence.

Instructional Procedures

The pertinent instructional procedures for the most part apply to the programed instruction; only general information on the procedures of conventional instruction two years earlier was available, based on the remarks of participating teachers upon first examining the programed materials and upon their questionnaire responses at the end of the year (Appendix, pp. 103-105). The various procedural aspects concern: (a) differences between conventional and programed typing curricula, materials, and methods; (b) scope of programed materials assigned to P classes; (c) mode of student use of the program during the initial 2-month period of contrasted at-home vs. in-class work on the program, as well as during the at-home work by all Ss thereafter; (d) supplementary practice and test materials for programed Ss; and (e) desired and actual teacher behaviors during programed instruction. Each of these aspects is described, in turn.

Conventional vs. Programed Conditions. A number of features grossly characterize the distinctions between the two types of instruction, as conducted by the same teachers. For one thing, the P materials extend to tasks at a level of difficulty beyond that included in C instruction (e.g., tables with braced column headings, footnoted manuscripts, close estimation of words or lines in a piece of materials). For another, in P instruction, especially in first-year classes, topics were introduced much earlier than in C instruction. Third, C instruction generally specified some one procedure for carrying out a particular kind of typing task; whereas P instruction deliberately included alternative procedures (e.g., both backspace and arithmetic methods of planning tables, both fixed and moving date lines in business letters). One consequence was to place second-year programed Ss in an interference situation. That is, some programed topics had been included in the first-year C instruction of these Ss, involving placement processes differing in varying degrees from those taught in the program; thus Year-2 Ss were faced with the

difficulties of replacing earlier-learned responses with different ones. Fourth, C instruction presumably used large amounts of "guidance,"[8] extending into relatively late stages of instruction; whereas P instruction early required the learner to make his own decisions about placement of materials on the page. Fifth, a larger proportion of C instruction than of P instruction, especially in first-year classes, was probably devoted to ordinary copying skills that have no bearing on the placement aspects of realistic typing tasks.[9] Sixth and most centrally, C instruction was entirely teacher-conducted, wholly reliant on oral explication of placement processes, applied for the most part to typing textbook materials plus locally prepared materials presumably supplementing the textbook. P instruction, on the other hand, was intended to be largely program-mediated. The teacher's role was to be confined to checking on the extent of student learning from the program, to providing practice at the typewriter following completion of each subsection of the program and feedback (knowledge of results) to Ss about their typed products, to furnishing only such oral instructional support as student difficulties with the program might dictate, and to maintaining student motivation. No doubt, differences between C and P instruction in addition to the six given above existed; however, those listed are judged to be the major ones.

Scope of Programed and Conventional Typing Curricula. The scope of the programed materials (see pp. 4-5) extends beyond what had been included in conventional instruction. In fact, although it was originally hoped that

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[8]"Guidance" refers to showing or telling the learner, in advance of his response, what response he is to make or, more broadly, to providing information needed for a response before the response is made. The contrasted "confirmation" tactic consists of requiring a response without prior assistance or information and then of providing a model against which the learner can assess the correctness of his response. The experimental evidence (Bugelski, 1956; Stolurow, 1959) uniformly shows that guidance is valuable if given in small doses entirely confined to the earliest stages of learning, but that it is less effective than confirmation and even harmful if given in large amounts or past the earliest stages of learning.

[9]The two first-year teachers reported (Questionnaire Item 7, Appendix p. 104) 1 and 10 percent of second-semester P instruction devoted to ordinary copying skills--those estimates being of unknown reliability. Typing textbooks and the modest clerical-typing curriculum of the school involved suggest that at least 25-30 percent of the C instruction of these teachers in the second semester of first-year classes bore on ordinary copying skills.

the entire program could be included in both first-year and second-year programed classes, the judgments of teachers led to agreement to drop several subsections dealing with advanced table typing (braced headings, unequal intercolumn spacing, blocking columns under a table title, table footnotes). Accordingly, criterion testing did not include items involving the features discarded from the instruction. Responses to Item 1 of the Teacher Questionnaire (p. 103) revealed that, among the programed topics that were to be included, one first-year teacher (Teacher A) was not able to include Section 14 on manuscript and report typing. For that teacher, the two of the six criterion test items that consisted of manuscripts represented performances based on Ss' best judgment, in the absence of pertinent formal instruction.

Among the programed topics that were included, responses to Teacher Questionnaire Item 11 (p. 104) identified as new ones, not included in their conventional instruction of two years earlier: side-bound manuscripts, footnotes, fixed date lines in business letters, estimation of copy length, backspace methods of centering tables horizontally. One first-year teacher (Teacher B) also excluded from earlier conventional instruction business letters with inserts or listings and the centering of materials in relation to the length of the writing line rather than in relation to the width of the paper. The last-mentioned feature was probably also excluded by the other teachers (it is a rather fussy feature), who failed to mention it in their questionnaires, undoubtedly through forgetfulness or oversight.

The actual scheduling of sections of the program varied within and between the first- and second-year teachers. Second-year teachers routinely omitted program sections 1-2, dealing with simple horizontal and vertical centering. Some teachers (in both first- and second-year classes) elected to begin with simple business letters (Sections 10-11); others, with simple tables (Sections 5-6 or 7-8). The order in which the various program sections were treated varied according to the judgment of the individual teacher, and the organization of the program permitted a number of different orders; e.g.: simple letters/tables without column headings/advanced letters or tables without column headings/simple letters/tables with column headings or tables without then with column headings/simple letters/advanced letters, and so on. In some instances, arithmetic and backspace methods of centering tables horizontally were taught consecutively; in other instances, simple business letters intervened between one table centering method and the other.

The only constraint imposed by the investigator was completion of specified sections of the program to permit specified testing at various times during the year of instruction; for example: simple business letters and tables without column headings (for Year-1 classes), but with column headings (for Year-2 classes), by mid-year. The remaining portions of the program (with the agreed upon exceptions noted earlier) were to be completed by the end of the school year (early June), just prior to criterion testing, following whatever time schedule the teacher desired. In some but not all instances, teachers deliberately elected to use the same order of sections and time schedule as one or another of their colleagues.

Procedures for Student Work at the Program. The mode of use of "programed instruction" is essentially standard and is represented in the instructions to Ss (Appendix pp. 101-102) distributed to students on the first day of programed work (mid-October) and discussed by the teacher, step by step, on that day and on each of the next few days. During the first two months of programed instruction (until mid-December), one of each teacher's classes worked on the program in class, under the teacher's supervision; the other class(es) of each teacher worked on the program at home. Thereafter, starting in January after the Christmas holidays, all classes worked on the program at home.

Because of the novelty of programed instruction to Ss, the generally low reading skills of Ss and their presumed resistance to reading (in contrast to listening to oral teacher instruction), and possible student resentment of "homework" for typewriting, teachers were asked to attend particularly to motivational factors and to monitor, as best as possible, adherence of students to the "rules" for work at the program (especially, no cheating--no looking at model answers in advance). In fact, students were asked to record on the first page of each program section the number of wrong answers they made. In addition, to provide empirical data on the amounts of time typically required for completing each subsection of the program, Ss were asked to record on the first page of each section the to-the-minute starting and stopping times for their work at each subsection of the program. It was the strong impression of teachers, however, that there was much "cheating," much copying of model answers in the frame blanks, and that work time entries were unreliable, often "invented" by students after the fact. Therefore, work-time data were not processed and are not reported here.

As a modest and essentially impressionistic check on the extent of student copying of model answers, all program sections were collected by teachers periodically, turned over to the investigator at the end of the school year, and examined by him. Specifically, a full set of all program sections for each of five students selected at random from each class was scanned for the frequency and nature of front-page record entries and for the frequency of wrong answers lightly lined out and accompanied by the correct answer--in accord with instructions. It was found that some students routinely recorded work times and error rates; others, only sometimes. For some students, lined-out wrong answers regularly appeared; for others, not. Very many instances of scribbled arithmetic applicable to certain placement decisions were found, suggesting that many students were making an honest attempt to respond to frame blanks before looking at the model answer. At the same time, the impressions of teachers cannot be gainsaid. It is very probable that substantial copying of answers occurred, especially for the more difficult sections of the program. Of course, looking at model answers in advance is a guidance procedure and, as such, powerful during early learning stages. For first-year Ss, the entire program is early learning; for second-year Ss the novel program topics also constitute early learning. Whether Ss who looked at model answers in advance of filling in program blanks indeed considered frame content in relation to their responses is another question --one on which no information could reliably by collected.

The 14 sections of the program were further divided into 48 subsections, each of meaningful scope and concluding with one or more unguided, unprompted test frames ("Now a little TEST"). For both in-class and at-home work on the program, the teacher assigned to Ss one or more subsections. Thus, while each S worked at each subsection at his own rate, movement from one subsection assignment to the next was on a group basis.

In summary, it must be judged that, in general, adherence of Ss to the specified procedures for their work at the program was mixed. Some seem responsibly to have responded before examining model answers; others, often not.

Supplementary Materials for Programed Classes. Supplementary materials were of two kinds: those designed to check on the extent of learning of the placement concepts taught in the programed materials and materials for actual typing. Materials of the first kind were like the "TEST" frames that concluded each of the 48 subsections of the program, but were unaccompanied by model an-

swers. Copies were to be distributed to students in class immediately upon their completion of the pertinent programed subsection, and model answers were to be supplied by teachers after students had responded to the test items. Varying with the volume of student errors on these unprompted, unguided test items, teachers were to conduct clarifying oral instruction on the concepts reflected in the test items before having Ss proceed to actual typing of letters, tables, or manuscripts from unarranged longhand copy, unaccompanied by detailed placement instructions and requiring application of the placement concepts to the typing. A sample of such supplementary materials (applicable to table typing--and planning by arithmetic) is shown on page 28; one relating to manuscripts is shown on page 29 (top half). In these exhibits, LM and RM stand for left margin and right margin, IC is intercolumn (the number of typewriter spaces between table columns, shown circled), and CH stands for column heading. To permit quick checking of Ss' placement decisions, blanks are provided for Ss to record those decisions. The investigator sent to teachers, accompanying these supplementary materials for Ss, model answers to all test items and model typing.

The materials for actual typing incorporated into the supplementary materials were provided precisely because few typewriting textbook materials were judged to be sufficiently realistic. They are too often accompanied by explicit placement instructions, and they tend to be in perfect print rather than in the longhand that characterizes much of real-life copy for typists. The supplementary materials for actual typing provided to teachers by the investigator, however, were intended to be illustrative rather than sufficient. Teachers were therefore asked to prepare additional materials, taken from their typing textbook, but converted into longhand and unaccompanied by explicit placement instructions--in order to provide sufficient "application" practice on each kind of typing task. A sample of such materials is shown on the lower half of page 29.

Teachers were asked to turn over to the investigator, in advance of intended class use, a copy of each piece of supplementary practice materials prepared by them, modeled on those prepared by the investigator. About one hundred such items were received by the investigator during the course of the year of programed instruction (from ten fall-term teachers and six spring-term teachers). Extent of actual use of these materials in class was estimated by the six spring-term teachers at the end of the year (see

Figure 2. Sample Supplementary Materials

After 8-24

Fill in the blanks in the questions that follow the table below. IC space is circled between columns.

Stock No.		Item		Retail Price
14215		Chemistry Set		$12.60
3986	(5)	Doll	(5)	4.38
7310		Model Airplane		7.95

1. If the CH of column 1 begins at 29 on the carriage scale, the LM for that column would be set at _____.
2. The tab stop for column 2 is at 43; the CH for that column begins at _____.
3. In column 3, begin the CH at _____ and set a tab stop at _____.
4. In row 1 of the table, after tabulating to column 3, what should you do?

Instructions. Write a complete plan just below each of the tables below. Show side margins, tab stops, CH starting points, and a right-end check. IC is circled between columns.

(5) Pennsylvania Presidential Election Returns, 1964

(By County)

County		Johnson (D)		Goldwater (R)
Delaware		147,189		111,189
Erie	(8)	72,444	(8)	39,393
Fayette		45,155		16,127

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(6) AMERICAN ASSOCIATIONS AND SOCIETIES

(Organization, Membership, Director, Dues)

Organization		Membership		Director		Annual Dues
Appalachian Mountain Club		11,000		Francis Belcher		$ 5
Camping Association	(3)	7,100	(3)	Ernest F. Schmidt	(3)	10
Financial Executives Institute		6,300		Paul Haase		50
American Gas Association		8,000		Vaughan O'Brien		15

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7. Type table (6), above, centered horizontally and vertically on a full sheet, using proper vertical spacing within the table. The table title should be on line _____.

Your name _____ Typing Class Section _____

After 14-40 (continued)

2. Type the materials below as the last page (page 8) of a side-bound report.

As footnote 1, type a reference to a book entitled "Training for Typists," by J. R. Lee, published in 1960 by the Markham Press, in Detroit.

As footnote 2, type a reference to an article by Samuel L. Fay entitled "Machine Transcription." The article was published on pages 23-28 of the April 1969 issue (Volume 21) of "Business Monthly."

Before typing, fill in the blanks below:

a. LM is at _____; RM is at _____.

b. The page no. is typed on line _____.

c. The ms. starts on line no. _____.

d. The divider line is on line no. _____.

Effect of Dictation Machines on Job Requirements → Center this heading

The growing use of dictation machines is bound to affect the work done by typists. ¶ While some people believe that any good typist can ~~easily~~ switch with ease to machine transcription, ¶ others feel that a trained person can do a ~~does the~~ better job.[2] ¶ Turning out a mailable piece of work on the first try requires several things ~~qualities~~: understanding the meaning of the copy, selecting margins that result in attractive placement of the material on the page, and, of course, typing accurately ~~and~~ and quickly.

close up to 1 space

After Section 9F (Frames 66-80)

Instructions. Below is a portion of a business letter that includes a table. On any available full sheet, type the materials below. The letter has about 130 words. Determine the margins according to the length of the letter and block the table at the letter margins. Determine IC space accordingly.

Please make the following reservations for our salesmen for the coming year.

Name	Date	Rate	Length of Reservation
Jack Jones	March 5	$12	Three days
Bill Williams	April 8	15	Two days
Ron Weiss	May 10	11	Four days

Please confirm the above reservations. Thank you.

Questionnaire Item 8, p. 104), covering only the spring term. These estimates are summarized in Table 5 (programed classes only).

Table 5

Frequency of Student Typing Tasks During the Spring Semester

Type of Task	Two First-Year Teachers		Four Second-Year Teachers	
	Range	Mean	Range	Mean
Ordinary business letters from longhand copy, not accompanied by a word count (ones in which the student had to make his own estimate of length)	3-10	6½	5-9	6¾
Business letters containing a table	3-4	3½	4-5	4¾
Tables containing at least 1 column heading of more than 1 line	7-8	7½	4-5	4¾
Tables in which intercolumn space was up to the student	4-5	4½	3-6	4¾
Manuscripts containing at least 1 footnote	0-2	1	3-5	4½
Connected longhand matter for which the student had to estimate length as a basis for selecting margins leading to a typed product centered both vertically and horizontally	4-6	5	4-10	7½
Total per teacher		28		33

As total opportunities for Ss to type full-scale vocational tasks during an entire semester, 28 and 33 are not impressive frequencies. However, not all pertinent tasks are listed in the stub of Table 5. Omitted are tables with no 2-line column headings or ones in which intercolumn space was specified in advance, business letters with a word count, and manuscripts without footnotes. Except for business letters accompanied by a word count (presumably from the typing textbook), the others were represented in the supplementary materials prepared by the investigator and by teachers, but are not listed in Table 5. Even so, the amount of actual typing of pertinent tasks was not voluminous and perhaps below that required for good mastery over the various types of tasks. Not negligible proportions of class time during the

spring semester were no doubt devoted to oral explanation and discussion by teachers, as a backup to the programed instruction. Time was also devoted to ordinary copying skills of the sort measured by straight copy tests: in Year-1 classes, 10 and 1 percent; in Year-2 classes (despite the investigator's urgings to the contrary), 10, 30, 25, and 25 percent (Item 7, p. 104). Some of the teachers were apparently unable to rid themselves of the fiction that ordinary stroking skills contribute appreciably to proficiency at vocational typing tasks (see p. 3 for the pertinent research findings). No doubt, the Year-2 teachers were concerned with preparing Ss for the straight copy typing that prevails in Civil Service and much other employment testing of typists and were unpersuaded by the investigator's assurances that a few straight copy timings on each of a few days during each of the last two or three weeks of training would be sufficient preparation for employment testing of simple copying skills.

The reliability of the estimates of teachers in response to end-of-year questionnaire items is uncertain and undeterminable. It should also be mentioned that the two School-B teachers, unfortunately, responded to the questionnaire as a joint enterprise and gave identical responses to all but one item. However, they explained that they shared the task of lesson planning and scheduling and used a common set of lesson plans throughout the year. Some School-A teachers also shared materials and used a common teaching schedule, but no uniform identity was found among their questionnaire responses--as was found among School-B teachers even for "opinion" items.

Teacher Behaviors. Little detailed information about the instructional practices of participating teachers in their conventional classes could be made available. The little that has already been reported was based on questionnaire responses and inferences from the typing textbooks employed in conventional instruction. Much of what was specified by the investigator for programed instruction has also been described earlier (e.g., pp. 23, 26-31). Accordingly, the present subsection deals with the extent of teacher compliance with the investigator's specifications. These specifications were based on best estimates, and it was anticipated that they would to some extent require modification as student behavior with regard to the programed instruction might dictate. One such modification has already been mentioned: the discarding of certain advanced typing tasks as beyond what could be cov-

ered with these low-ability Ss in the time available. Other discrepancies between actual teacher behaviors during programed instruction and theoretically ideal ones (i.e., ones that might reasonably accompany a program well suited to the target audience) are described next, admittedly based on essentially anecdotal and impressionistic information, on questionnaire responses of undeterminable reliability, and on one or two classroom observations of each teacher by the investigator and by department chairmen.

Aside from the mechanics of scheduling program assignments and monitoring program distribution and collection, the principal teachers' roles were designated by the investigator as:

1. Checking on the extent of student learning from the program by following each completed subsection of the program with the unguided, unprompted, essentially test-like supplementary materials prepared by the investigator (e.g., pp. 28, 29), plus comparable materials prepared by the teacher or taken from the textbook.

2. Provision of immediate feedback (right answers) for student responses to the supplementary materials, preferably following Socratic questioning of Ss aimed at eliciting right answers from them. The teacher was to behave like the program, often by referring Ss to the pertinent programed frames and working through them step by step with the class, preferably using fresh illustrative copy materials.

3. Provision of sufficient additional materials for actual typing that required application of the placement concepts taught in the program.

4. Furnishing of immediate knowledge of results for student typing--for example, by glancing at the typed products as Ss held them high, facing the teacher, for brief visual inspection.[10]

5. Periodic formal testing and detailed teacher scoring of test papers.

Among the various teacher responsibilities, the key one arises from the fact that the programed materials deal only with concepts, not actual typewriter operation. Accordingly, the central teacher function is that of supplying a sufficient body of materials for actual typing, on the heels of completing any programed subsection, plus prompt feedback for student efforts.

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[10] That and other modes of furnishing Ss with knowledge of results are described in the investigator's "Acquisition of Typewriting Skills" (1969), a copy of which was given to each participating teacher, with the request that designated chapters be read, principally those on "production" typewriting.

Teachers were to give only such "live" instruction on the concepts treated in the program as appeared, from Ss responses to the supplementary materials, to have been poorly learned from the program--and, even then, in the Socratic manner given in Point 2 (p. 32). They were not routinely to teach "live" the concepts about placement of materials on the page that it was the function of the program to teach.

The foregoing caveat seems to have been widely violated, judging from the comments of teachers to the investigator throughout the instructional year and from their responses to Item 13 in the end-of-year questionnaire (p. 105). Teachers claimed that Ss had substantial difficulty in applying the programed concepts to actual typing and that there was no recourse but to reteach "live" the pertinent program subsection that had been worked on by students as homework during the preceding day(s). A number of the participating teachers in fact expressed to the investigator their difficulties in restraining their habitual instructional behavior with low-ability trainees: point by point oral explanation, explication, illustration. Teachers are accustomed to "teaching" and unaccustomed to their modified role when much of instruction is preempted by another agent--in this instance, the programed materials. Thus, their live teaching probably represented a mixture of inability to restrain themselves from their habitual behavior, a tendency to extrapolate the difficulties of some students to all students and to assume that all needed the assistance of live teaching, plus undoubted particular instances of programed concepts difficult for all students. Whatever the sources of their live teaching behavior, their end-of-year questionnaire estimates of the proportion of student proficiency attributable to the program and to their live teaching ranged, for the six teachers, from 10 percent attributable to the program and 90 percent to live teaching to 35 percent to the program and 65 percent to live teaching. Across teachers, the mean or average was: Program 25%, Live Teaching 75%.

The presumed extent of live teaching would, on the face of it, call into question the propriety of characterizing the present investigation as one that tests the effects of the programed instruction, as its role has been formally defined in relation to the defined role of the teacher. Accordingly, a check on the reliability of teachers' estimates of the relative roles of the program and of their live teaching efforts was carried out. The student who is frequently absent from school cannot benefit from the teacher's instruction because he is not there to receive it. He should, therefore, be

expected to perform less well than the student who is infrequently absent. Absence frequencies during the spring semester had been reported to the investigator for all students on register in each of the 16 classes of the 6 teachers; the completed program sections of all Ss had also been turned over to the investigator at the end of the school year. The investigator rank ordered Ss according to frequency of absence and located, in each of the 16 rank-ordered lists, the Ss at the 75th and 25th percentiles for absences[11] (e.g., the 8th and 24th persons in a class of 31 Ss). In instances of several Ss at the P_{75} or P_{25} absence frequency, the one whose surname was first alphabetically was selected. Criterion (final exam) scores of the two groups of Ss on one of each of the three types of tasks (ordinary business letter, simple table, ms. with footnotes) were subjected to t tests for differences in means. In the four instances (of the total of 32 Ss) in which the desired test item had not been typed by the S first selected, the S with the same absence frequency who was next alphabetically was substituted. The file of completed program sections was then checked to determine whether each of the 32 Ss had completed the pertinent sections (Nos. 6 or 8, 10 and 11, 14).

Obtained t's not statistically significant (at the .05 level) would suggest that gross differences in absenteeism had no significant differential effects on proficiency and, by inference, that the programed materials, not the live teaching, had carried the burden of instruction--despite the impressions of teachers. The high-absent S who performs as well as the low-absent S must have learned from the programed materials. The findings on the issue discussed here are given in the "Results and Discussion" section (pp. 48-50).

Another important teacher responsibility--the main one, in fact--was to provide generous amounts of practice at actual typing tasks requiring application of the placement concepts taught in the program. Details on six selected types of tasks were displayed in Table 5 (p. 30). Across those six tasks, the total for the six teachers ranged between 23 and 35, averaging 31, or about 5 per task--a rather modest number in the light of the number of trials at each type of task that one might judge to be necessary in order to establish genuine proficiency. One wishes that teachers had felt less compelled to provide oral instruction before typing--less guidance and more

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[11] In a semester containing 72-75 actual school days, the mean number of absences at the 75th percentile was 5.56 days; at the 25th percentile, 18.19 days, for a difference of about 2½ weeks of instruction in a 15-week semester prior to the week of final testing.

confirmation, more discussion of results after typing by Ss (see Footnote 8, p. 23). In that way, more actual typing could have been accomplished. The inevitable effect of much guidance before typing is to reinforce the long-established expectation of low-ability Ss that teachers will "talk" the instruction at them, thereby reducing their attentiveness to the programed homework.

A final instructional feature of high consequence is the frequency of detailed feedback for student efforts--the frequency of formal testing and detailed test scoring by teachers. No prescriptions in this regard were specified by the investigator other than urging teachers to test as often as possible. Inquiry into the number of such occasions (Questionnaire Item 9, p. 104) showed a range from 5 to 20 times during the spring semester (20, 14, 5, 10, 14, and 14 for Teachers A-F, respectively), for an average of 13. With such tests commonly consisting of a single item, and occasionally two items, detailed feedback seems rather modest in frequency in the light of the more than a dozen subclasses within the three major classes of tasks (business letters, tables, manuscripts) treated in the program.

Criterion (and Interim) Measures

The criterion tasks were those incorporated into the final testing of C and P students during the final month (June) of the year's instruction. Interim measures, applicable only to P instruction, consisted of business letter and table testing (a) just before the Christmas holidays, to assess the relative effects of at-home versus in-class work at the program and (b) at midyear (mid-January)--for the purposes given in the second paragraph of page 16. Straight copy testing (a 3- or 5-minute timing on ordinary prose materials) was also done on each testing occasion--to provide information about relationships between straight copy proficiency and proficiency at vocational typing tasks and about the relative effects on straight copy proficiency of much time spent at copying skills (C instruction) versus less time at such skills (P instruction). The latter issue also applies to the mid-December straight copy testing of at-home versus in-class programed Ss, the latter group having done less actual typing in class during the preceding two months. Criterion (June) testing also included a 20-word vocabulary test used to estimate the comparability in intellectual capacities of C and P Ss. The various test materials are displayed in the appendix, except for

the vocabulary test (to preserve the security of the test and because it is copyrighted) and the straight copy materials: (a) Criterion (June final exam) production test items (pp. 107-112), (b) January production test items (pp. 112-117), and (c) December production test items (pp. 118-123).

Criterion Test Items. The testing of C students was on a 64-item test battery (24 letters, 24 tables, and 16 manuscripts), assembled into various sets of 8 items (3 letters, 3 tables, and 2 manuscripts) that it was judged could be completed by the student in one continuous week of testing (McLean, 1971). Additional C scores were obtained from a 9-item test battery (3 letters, 3 tables, 3 manuscripts) drawn from the original 64 tasks used by McLean for reliability and cross-validation purposes in his investigation. Among the original pool of 64 test tasks, 6 were chosen for final testing of P students, ones representing the three major classes of vocational typing tasks treated in the programed instruction (see Appendix pp. 107-112). Straight copy materials were also identical for C and P Ss, as was the vocabulary test.

Test Administration Conditions. For both C and P criterion testing, the production test items were assembled into booklets in a variety of orders, distributed to students serially (to minimize the frequency with which any S, at a given moment, would be working at the same task as his neighbor). A 1-page body of test instructions (p. 106) was distributed to all Ss at the outset. Test administration conditions, except as noted in Footnote 12 (p. 37), were the same for P students as for McLean's C students. Among the various test conditions, the main ones were the instructions to Ss to bring each completed task to the examiner before beginning the next task in the test booklet and to type the tasks in the order of their appearance in the test booklet. Tasks that were partially completed at the end of any test day were collected by the examiner and returned to Ss the next day for completion. Supplies were unlimited and Ss were permitted as many attempts at a task as they wished before bringing their final version to the examiner. Ss were urged, however, to use good judgment; i.e., in view of the objective of completing 6 production tasks in the 4 consecutive days of testing allotted to those tasks, tasks containing trivial errors should not be retyped.

All production tasks were from "unarranged," longhand copy, accompanied only by the general instruction to type each task attractively arranged on the page in accordance with established procedures. Products were to be proofread, and errors were to be corrected (by eraser or Ko-Rec-Type, at the

option of the student). Test booklets were of course collected after each testing session and redistributed the next day.

One feature of test administration distinguished criterion from interim testing. In interim testing there was no carryover of partially completed tasks into the next day--mainly because the modesty of interim testing in the light of the available testing time made it possible for many students to complete the assigned tasks within the class period. The distinction is nontrivial because, in criterion testing, the examiners observed marked disinclination by Ss to complete the next day a task partially typed the preceding day. Instead, there was much discarding of partially typed tasks and beginning anew. Because production speed was measured by the interval (time to the nearest quarter minute) since completing the preceding task--including the time spent on the abortive, partially typed version that the S discarded--criterion test completion times were inflated in relation to interim-testing completion times on comparable test items. Indeed, programed Ss were observed to be notably more reluctant than conventional Ss to complete the next day tasks partially typed the preceding day.[12] The result was to inflate the completion times (i.e., depress speeds) of P students in rela-

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[12]The present investigator assisted McLean by serving as an examiner on one day in six classes in one high school, following the administration procedures specified by McLean. Partially completed tasks were returned to examinees for insertion into the typewriter at the appropriate point on the page, in readiness for resumption of typing at the signal of the examiner. Ss who did not have an incomplete task to finish were given fresh paper. At that point the signal to begin typing was given. Nearly no instances of Ss coming to the examiner's desk for fresh paper within a minute of the starting signal were observed. Unfortunately, the present investigator was less rigid in applying the foregoing procedures to his testing of P students. The McLean study involved several thousand students, so that occasional failures to complete the entire test booklet were of little consequence. In testing of P students two years later, the present investigator was keenly impressed (and oppressed) by anticipated absenteeism on one or more days of the single week available for testing and was eager to maximize the number of completed test booklets by the end of the week. Accordingly, with the teacher's assistance, partially typed tasks were returned to the pertinent Ss while others took fresh paper (all accomplished within about two minutes); the starting signal was then given, without waiting for reinsertion of incomplete work, properly lined up for resumption of typing. The consequence was many Ss immediate discarding of incomplete work, beginning anew on fresh paper, and being "charged" for the time spent on the preceding day's incomplete task. The investigator was grievously at fault in permitting himself the described variation in test administration procedures; for the production speeds of P Ss were thereby depressed in relation to those of C Ss.

tion to those of C students. Also, implicit in the behavior of Ss with regard to partially completed tasks is the failure of teachers to instruct students on realigning paper in the typewriter and to provide sufficient practice at that act. It is a common enough activity of employed typists, but not one which the programed materials could properly treat because they were concerned with conceptual, not manipulative, features.

All testing was conducted by the investigator and one thoroughly trained assistant who had worked with him throughout the year on various aspects of the present investigation. Teachers were not involved in the testing, except for recording attendance and helping to distribute materials, and had no advance access to the test copy. The criterion-test week began with the vocabulary test and then a 3-minute straight copy timing, followed by the 6-item production-task booklet. Commonly, but with exceptions, the production-task booklet was begun on the second day of the test week, test orientation having been accomplished toward the end of the first day, after the vocabulary and straight copy testing.

Test Scoring. The 20-item vocabulary test was scored for number correct. The 3-minute straight copy timing--on prose at the syllabic intensity of 1.53 and stroke intensity of 6.0 that are the true averages for the vocabulary of written business communication (West, 1968)[13]--was scored for number of errors and for gross strokes, converted, for reporting purposes, to gross wpm (words per minute). The 6 production-task items also had a stroke intensity of 6.0 and were scored for speed (completion time to the nearest quarter minute) and for two classes of errors: uncorrected typographical errors (misstrokes) and "form" errors--those that have to do with placement or arrangement of materials on the page in accordance with established conventions.

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[13]Syllabic intensity is mean number of speech syllables per dictionary word (total syllables divided by total words). Stroke intensity is mean number of typewriter strokes per dictionary word, including spacing and punctuation (total typewriter strokes divided by total dictionary words). Both indices are essentially measures of vocabulary frequency and have been found to correlate significantly with straight copy speed, but not with errors, in many studies (summarized by West, 1969, Chap. 22). The traditional assumption has been that a syllabic intensity of 1.40 and a stroke intensity of 5.0 represent "average" difficulty, and practice and test materials have for years been constructed on that assumption. The true mean values are, however, 1.54 and 6.0--the 1.53 copy of the present investigation differs insignificantly from 1.54--and the consequences of the traditional underestimation of average difficulty has been to overestimate the proficiency of students and to underprepare them for the vocabulary of real-life typing.

A team of experienced typewriting teachers, ones not involved in the present investigation, was hired to score papers. These scorers were briefed on scoring procedures in a training session conducted by the investigator and given a scoring manual (pp. 124-129). Upon completion of first-round scoring of all papers by the scorers, all papers were reexamined by one highly trained scorer (not a member of the original team) to insure consistent application of the scoring rules and to correct any errors in the original scoring. Finally, a random sample of about five percent of the scored papers was spot-checked by the investigator, who found no more than about a dozen instances of incorrect scoring (mostly overlooked typographical errors).

As is evident from the error-scoring manual (pp. 124-129) the standards of acceptability were extremely high, usually consisting of to-the-line and to-the-space exactness in placement of materials on the page and classifying as an error almost any deviation from perfection. Such standards are rather more rigorous than those commonly used by teachers, so that the error frequencies of Ss are above those that would have resulted had the same papers been scored according to ordinary teachers' standards. The objective of maximum discrimination among Ss, however, mandated the use of the rigorous error standards employed here.

Speed-scoring procedures have already been partially described (p. 37). In more detail: the record of total typing time in minutes each test day for each class was given to the scorer of the papers for that class, permitting computation of time (to the nearest quarter-minute) spent at a task partially typed on that day. For example, on a test day consisting of 32 minutes of typing, if one task was completed in 23½ minutes and another task, begun on that day, was completed after 7 minutes of work on the next day, total time for that task was 32 - 23½ + 7 minutes = 15½ minutes. Since completion time for any task on a given test day was cumulative, for two tasks completed the same day, time on Task 2 was Task-2 time minus Task-1 time [e.g., Task 2 completed after 26¼ minutes, Task 1 after 14 minutes, results in a Task-2 time of 26¼ - 14 = 12¼ minutes]. Absenteeism during the test week was differentially coded on the daily class record, so that no S was charged for work time during his absence. The daily class test record (on which entries were made as Ss brought completed work to the

examiner) was also differentially color coded to show the day on which any given task in the test booklet was completed. In consequence, the reliability of speed scoring is probably near-perfect.

December and January interim testing used the procedures described above, except that there was no carryover of partially typed tasks into a second test day.

Data Analyses

Test scores, plus background and identifying data on Ss, were punched on tabulating cards and subjected to a variety of statistical analyses, both descriptive and analytical. Descriptive statistics (means, standard deviations, product-moment correlation coefficients) were computed, as applicable to the various purposes of this investigation. Statistical inferences were based, on occasion, on *t* tests, but for the most part on analyses of variance: 2-way ANOVA's with 1 interaction term, as given by Bancroft (1968, pp. 20-30).[14] The various analyses required by the various purposes are specified, as applicable, in the "Results and Discussion" section of this report.

Summary of Purposes

The various objectives or purposes of the present investigation, as detailed below, bear on the performance of disadvantaged high school students in first-year and second-year typing classes, treated separately. The general questions to which the present investigation was designed to contribute information are listed at the left below; the purposes or measures associated with each general question are given alongside, at the right. Below, "production" typing refers to the realistic job tasks of business letters, tables, and manuscripts; whereas "straight copy" or ordinary stroking skills are those commonly measured in employment tests and given much attention in conventional typewriting instruction.

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[14] Step 1 of a 3-step procedure tests for the presence of any effects (between C and P treatments, among teachers, teacher-method interaction) at the .25 level. If a significant *F* results, the method of fitting constants (a least squares method) is applied to test for interaction (at the .25 level). If that *F* is significant, the main effects are also tested by that least squares method (at .05). If, on the other hand, the interaction *F* is not significant, the method of weighted squares of means (Yates, 1934) is used to test for main effects (at .05). The various procedures conservatively guard against a Type I error--against rejection of null hypotheses when they are true. Accordingly, those significant differences that are found may be confidently accepted as "real" ones.

Question	Associated Purpose or Measure
1. In contrast to "live," conventional instruction (characterized by much attention to ordinary copying skills and deferred teaching of production skills, accompanied by much guidance into late stages of training), what are the effects on production typing proficiency of programed instruction devoted to the decision-making or placement aspects of production typing tasks, introduced early in training and shortly requiring the learner to make placement decisions without guidance?	1. Relative effects of C (conventional) versus P (programed) instruction on proficiency in typing business letters, tables, and manuscripts.
2. Do ordinary copying skills of the kind measured in straight copy employment tests suffer when the bulk of the training is devoted to production typing rather than to ordinary stroking skills?	2. Relative effects on straight copy proficiency of much time (C instruction) versus less time (P instruction) devoted to ordinary copying skills.
3. (For disadvantaged students) is it necessary for programed (i.e., self-instructional) materials to be worked on in class, under the teacher's supervision, or can such materials be studied as homework?	3. Relative effects on early production proficiency among P students of at-home versus in-class work at the program.
4. Does early proficiency suffer when less rather than more class time is available for actual typing?	4. Relative effects on early (a) production and (b) straight copy proficiency among P students of in-class versus at-home work at the program, i.e., of little versus more actual practice at the typewriter.
5. Are these programed materials a more influential determinant of learning outcomes than teachers are? Put differently: Are the results of the P instruction due largely to the program or largely to live teaching efforts in support of the program?	5a. Relative effects on typing proficiency of the same versus different teachers during the year of programed instruction. 5b. Typing proficiency of frequently absent versus infrequently absent P students.
6. Does early attention to production tasks lead to early proficiency at such tasks approximating the later proficiency of students for whom production training is deferred?	6a. Extent of differences between January test scores of P students and June test scores of C students. 6b. Extent of differences between first-year P students and second-year C students.

Question	Associated Purpose or Measure
7. Should applicants for advanced typing training be screened on the basis of intelligence? Does explicit instruction in the decision making aspects of production typing tasks affect the role of intelligence in production typing skill?	7. Correlation coefficients for vocabulary and typing scores, as between P and C students.
8. Is the conventional substantial attention given to ordinary copying skills (on the supposition that such skills contribute appreciably to production proficiency) sound instructional practice?	8. Correlations between straight copy and production test scores, for C and P students separately and together.
9. Is each kind of production task unique, requiring separate teaching? or is there sufficient overlap among tasks to justify the expectation of transfer from one type of task to the next, thereby requiring less training time for later than for earlier types of production tasks?	9. Intercorrelations among production task scores.

Results and Discussion

The findings of this investigation relate to the various questions and purposes listed immediately above. As bases for the data on the principal objective (Question 1), findings are first presented (a) characterizing the intellectual capacities of Ss and the comparability of C and P students in that respect and (b) estimating the effects on the terminal proficiency of P students of teacher behaviors (Question 5). Then, (c) the effects of C and P instruction on terminal straight copy and production proficiency are given (Questions 1 and 2). Treated in turn thereafter are: (d) effects on early proficiency of less rather than more actual typing practice (Question 4), (e) effects on the early proficiency of disadvantaged Ss of supervised (in-class) versus unsupervised (at-home) programed work (Question 3), (f) effects of earlier introduction and accelerated presentation of production typing tasks (Question 6), (g) intelligence as a potential partial basis for screening applicants for advanced typing training (Question 7), (h) Contribution of ordinary stroking skills to production proficiency (Question 8), and (i) extent of the overlap in work processes applicable to various production typing tasks (Question 9). Finally, the impressions of teachers and chairmen about the program, via questionnaire and letter, are reported.

The propriety of contrasting the effects of differential instruction on student performance hangs, among other things, on the initial comparability of the students subjected to the differential instruction. In addition, the possible role of differences in teaching skill and of live teaching in support of an instructional mode that was to have been self-instructional (viz., the P instruction) must be considered (a) to determine whether terminal performance data should be analyzed for all Ss or separately for those who did and did not remain with the same teacher throughout the year and (b) to characterize accurately the instructional modes labeled here as "conventional" and "programed." The findings on these preliminary issues are presented next.

Vocabulary Scores

Use of Ss at the same grade levels in the same schools and the essentially random assignment of Ss to classes should be expected to lead to comparable Ss in the C and P classes. As a modest check on that expectation, Form 2 of the 20-word (5-option, multiple choice) vocabulary test from the CAVD scale developed by Thorndike and others (see Buros, 1965) was administered to C and P Ss on the first terminal test day--as an index of general intelligence. For two of the five forms of the vocabulary test, Miner (1961) reported correlations (corrected for attenuation) with the WAIS (Wechsler Adult Intelligence Scale) of .84 and .86. Vocabulary test means and standard deviations for C and P Ss at each of the typing grade levels are displayed in Table 6.

Table 6

Vocabulary Test Means and Standard Deviations
(By treatment and year)

Treatment	Year 1			Year 2		
	N	Mean	SD	N	Mean	SD
Conventional	42	8.19	3.10	148	7.37	2.29
Programed	107	8.02	2.03	220	7.66	2.39
All Ss	149	8.07	2.36	368	7.55	2.35

The obtained F's in analysis of variance for each of the two years individually were .1453 and 1.32, neither of which is significant at the .05 level. Thus the C and P Ss may be taken not to differ in vocabulary scores--to be samples from the same population of intelligence. The Year-1 mean

is significantly higher than the Year-2 mean (for all Ss): $t = 2.305$, for which $p < .05$. However, that difference appears to reside in differences between the Year-2 classes of Schools A and B (means of 8.42 and 6.69 respectively, resulting in an obtained t of 7.566, for which $p < .01$). Judging from the surnames of Ss, School B had substantially more Spanish speaking students of Puerto Rican extraction, whose experience with English was presumably less than that of the more frequently native-born Ss of School A. Within School A, the Year-1 and Year-2 means (8.07 and 8.42) do not differ significantly ($t = 1.353$, for which $p > .05$).

As a basis for characterizing the intelligence of Ss in relation to norms, for all Ss in both years the vocabulary mean was 7.70 (SD = 2.37). The test items are scaled according to difficulty, so that failure at Item 9 is likely to mean failure at Items 10-20, except for correct guesses. Taking 8 as the typical score of the present Ss, the average S knew that concur means agree but did not know that downcast means sad. An unpublished compilation of normative data on the vocabulary test[15] provides yardsticks against which to assess the intelligence of the present Ss. For example (Miner, 1957): (a) for 74 persons who had completed 9-12 years of school the mean was 10.68, (b) for 110 persons aged 14-17 years the mean was 9.71. Although mental ages above 12 have uncertain meaning, in relation to the means of the present Ss (Year 1 = 8.07, Year 2 = 7.55, All Ss = 7.70), data furnished by Thorndike (1942)[16] assigned mental-age equivalents (in years and months) of 13-8 and 13-10 to a vocabulary score of 8 and mental ages of 12-0 and 13-0 to a score of 7. About half the present Year-1 Ss were 9th graders (age 15), the remainder 10th graders; Year-2 Ss were 10th and 11th graders (ages 16 and 17).

From the various data given above it is apparent that the present Ss were of below-average intelligence; i.e., their mean scores were below those of norm groups of comparable chronological age and schooling, and the mental-age equivalents of their vocabulary scores were 1-3 years below the chronological ages characteristic of their school grade levels.

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[15] From the Institute of Psychological Research at Teachers College, Columbia University (1957), entitled "Vocabulary Test-GT, Directions and Norms."

[16] Based on two forms of the Otis Self-Administering Intelligence Examination administered to 538 pupils in grades 7-9 and 456 pupils in grades 10-11.

In summary, the Ss in the C and P classes did not differ significantly in intelligence (i.e., vocabulary) and were clearly of below-average general mental ability.

Role of Teacher Behaviors in Programed Instruction

As explained earlier (pp. 13-14) some P Ss in School A remained with the same teacher throughout the school year; others changed from one P teacher to another for the second semester of the year. (All Ss in School B remained with the same teacher throughout the year.) The School-A shifts raise the question of whether data analyses need to be carried out separately for Ss who did and did not remain with the same teacher throughout the year; and the underlying issue is one of whether the programed materials played a role in determining outcomes sufficient to overcome whatever differences in teaching skill and teaching procedures may have been applied to Ss taught by different teachers during the year.

A parallel and more compelling issue--in the light of the reports by P teachers of much live instruction in support of the programed materials (see pp. 33-34)--concerns the contribution to outcomes of the live teaching activities of P teachers and, thereby, the question of whether those outcomes may be attributed more to the programed materials than to the live teaching support or vice versa.

The findings on each of the foregoing two issues are given next: the first, via analyses of terminal test scores of same-teacher versus different-teacher Ss; the second, via data analyses of terminal test scores of frequently absent and infrequently absent programed Ss, as specified earlier (pp. 33-34).

Same vs. Different Teachers. Analyses of variance (as given on page 40) were applied to the June (final) test scores of same-teacher vs. different-teacher Ss in P classes. The criterion measures, as listed in the stubs of Tables 7 and 8 (pp. 46 and 47), consisted of the vocabulary test scores, the number of production test items completed during the test week (out of a possible maximum of six), the SC (straight copy) speed (gross wpm) and number of errors (in a 3-minute timing), and the speed (completion time to the nearest quarter-minute) and number of "form" errors (those in arrangement or placement of materials on the page) and number of uncorrected typographical errors (typos) on each of six production test items. Tables 7 and 8

display descriptive statistics in the center and the results of F tests at the right. "Treatment" refers to the same-different dichotomy; "Teacher," to variations among teachers regardless of treatment. "Interaction" means that, for some teachers, Ss who remained with them throughout the year were superior to those who changed teachers, whereas for other teachers the converse prevailed.

Table 7

Criterion Test Statistics of Year-1 Programed Students
Taught by the Same or Different Teachers

Variable[a]	Same Teacher			Diff. Teacher			Probability of Obtained F[b]		
	N	Mean	SD	N	Mean	SD	Treatment	Teacher	Interaction
Vocabulary	53	8.17	2.04	54	7.89	2.02	NS	NS	NS
No. of Tasks	53	4.81	1.36	56	5.18	1.19	NS	<.005	NS
SC speed	53	28.20	6.61	53	30.39	9.11	NS	NS	<.10
SC errors		5.26	3.25	53	7.09	4.75	NS	NS	<.25
Letter 2									
Speed	36	111.58	38.21	49	106.37	35.47	NS	NS	NS
Typos		3.42	3.57		5.27	4.11	NS	NS	NS
Form		3.89	5.24		4.06	2.37	NS	NS	NS
Letter 17									
Speed	46	51.26	24.53	50	49.26	27.40	NS	NS	<.10
Typos		1.93	2.86		2.28	2.02	NS	NS	NS
Form		1.63	1.61		1.66	1.55	NS	NS	NS
Letter 23									
Speed	48	82.77	37.44	48	66.02	27.84	NS	<.05	NS
Typos		3.17	[illegible]57		4.23	3.56	NS	NS	<.01
Form		1.92	[illegible].06		2.17	1.86	NS	NS	NS
Table 4									
Speed	41	96.95	34.30	46	95.91	34.89	NS	NS	NS
Typos		3.07	2.98		3.39	2.99	NS	NS	NS
Form		2.85	2.71		4.43	2.26	NS	<.005	<.25
Manuscript 1									
Speed	41	82.66	27.17	47	83.66	34.40	<.025	<.005	NS
Typos		4.00	2.97		5.94	4.85	NS	NS	NS
Form		5.73	2.61		7.47	2.49	NS	<.005	NS
Manuscript 15									
Speed	43	51.09	24.40	48	45.79	26.31	NS	NS	NS
Typos		1.65	2.28		2.00	2.04	NS	NS	NS
Form		1.67	1.04		1.79	1.30	NS	NS	NS

[a]The six production tasks (Letter 2 through Manuscript 15) are on pp. 107-112.

[b]NS means not significant (at the .25 level for interaction, at .05 for treatment and teacher).

Table 8

Criterion Test Statistics of Year-2 Programed Students
Taught by the Same or Different Teachers*

Variable	Same Teacher			Diff. Teacher			Probability of Obtained F		
	N	Mean	SD	N	Mean	SD	Treatment	Teacher	Interaction
Vocabulary	68	8.72	2.20	45	8.22	2.28	NS	NS	NS
No. of Tasks	68	4.69	1.60	46	5.00	1.40	NS	NS	<.005
SC Speed	65	38.56	7.31	42	36.69	8.90	NS	NS	NS
SC Errors		7.20	4.37		8.07	5.09	NS	NS	NS
Letter 2									
Speed	48	77.23	26.17	35	81.71	24.91	NS	NS	<.25
Typos		4.50	3.41		2.60	2.58	<.01	NS	NS
Form		3.44	1.91		4.00	2.39	NS	NS	<.10
Letter 17									
Speed	55	34.55	13.36	39	45.46	20.42	<.005	NS	NS
Typos		2.31	2.61		1.79	1.78	NS	NS	NS
Form		2.00	1.82		1.54	1.48	NS	NS	NS
Letter 23									
Speed	58	52.88	19.94	41	52.22	15.44	NS	NS	NS
Typos		3.88	3.17		2.61	2.52	<.05	NS	NS
Form		1.53	1.60		1.73	1.61	NS	NS	NS
Table 4									
Speed	51	72.86	29.91	38	77.18	29.62	NS	<.005	NS
Typos		3.57	3.23		2.29	2.34	<.05	NS	NS
Form		4.61	2.84		4.61	3.23	NS	NS	NS
Manuscript 1									
Speed	58	71.20	34.58	37	70.70	29.55	NS	NS	<.25
Typos		5.84	3.90		4.43	3.91	NS	<.025	NS
Form		4.84	1.91		5.16	2.56	NS	<.005	NS
Manuscript 15									
Speed	50	33.68	11.41	38	34.26	14.89	NS	NS	NS
Typos		1.68	1.72		1.36	1.68	NS	NS	NS
Form		2.06	1.48		2.08	1.17	NS	<.05	NS

*The footnotes of Table 7 also apply here.

Tables 7 and 8 show comparable general ability (i.e., vocabulary scores) among programed Ss taught by the same or different teachers. Of the remaining 21 variables in the stub of each table (42 variables for both years), for 5 (fewer than one-eighth of them) there were significant treatment effects. Of those 5, 3 relate to uncorrected typographical errors on which the programed instruction had no bearing whatever, while none was for "form" errors, which are the central focus of the P instruction. Nine instances of

significant differences among teachers, independent of the same-different dichotomy, were about as often in one direction as the other (as between Teachers A and B in Year 1 and Teachers C and D in Year 2). Of the 42 typing performance variables in Tables 7 and 8, there were nine signficant interaction effects, two of which were at probability levels of .05 or less. Taken together, in the light of the issue to which the data of these tables apply (viz., treatment effects), it may be concluded that the role of the programed materials in relation to the terminal proficiency of Ss transcended, in the great majority of instances, the possible effects of instructional variations accompanying a change of teachers during the year and, in turn, that analyses of terminal performance differences between P and C students may be carried out for all Ss in those two groups, without regard to a change of teacher, i.e., with the "teacher" component of these analyses referring to the spring-semester teacher.

Live Teaching Support for the Programed Instruction. As described earlier (pp. 33-34), if the live teaching support for the P instruction was as consequential as teachers estimated it to be, then the performance of the frequently absent student should be expected to suffer. On the other hand, if the programed materials played the more substantial role in instruction, there should be little to choose between the terminal performance scores of frequently absent and infrequently absent Ss. Following the procedures described on page 34, absence data for the 16 classes of the 6 teachers during the spring semester are shown in Table 9.

Table 9

Range and Mean for Days Absent (Spring Semester) At Selected Percentiles

P	Range	Mean
All Ss	0-59	
At P_{75}	2-10	5.56
At P_{50}	7-26	11.94
At P_{25}	11-34	18.19

In a semester containing 72-75 school days prior to final testing the median number of absences was about 12 days (i.e., P_{50} = 11.94 days). The

present contrast is one for a difference of 12.63 days of absence (18.19 minus 5.56) or about 2½ weeks in a 14-15 week semester. The criterion test statistics and the results of t tests for vocabulary, a business letter (see p. 112), a table (p. 109), and a manuscript with footnote (p. 110) are shown in Table 10.

Table 10

Criterion Test Statistics for the P_{75} and P_{25} Absentees

Variable	Mean			SD		t (Means)	p
	P_{75}	P_{25}	Diff.[a]	P_{75}	P_{25}		
Vocabulary	8.06	7.81	- .25	1.56	2.16	.363	NS
Letter 23							
Speed	48.06	54.94	6.88	14.94	18.14	1.134	NS
Typos	3.25	5.31	2.06	2.38	3.96	1.725	NS
Form	1.62	2.31	.69	1.36	1.57	1.276	NS
Table 4							
Speed	82.92	62.56	-20.38	32.81	21.46	6.367	< .01*
Typos	2.44	4.69	2.25	1.90	3.40	.722	NS
Form	4.25	5.75	1.50	2.82	2.61	1.512	NS
Manuscript 1							
Speed	73.19	65.25	- 7.94	47.35	32.47	.536	NS
Typos	5.69	7.38	1.69	3.58	4.03	1.214	NS
Form	5.12	6.50	1.38	2.57	2.83	1.393	NS

[a] P_{25} minus P_{75}

*The difference between means is statistically significant at the .01 level. For all t tests, df = 30 (i.e., 16 + 16 - 2).

As shown in the first data row of Table 10, the two groups of absentees do not differ significantly in general ability (i.e., vocabulary). For 7 (of 9) production test criterion measures (speed, number of uncorrected typographical errors, number of errors in form or arrangement on each of the three types of production tasks), the differences favor the less frequent (P_{75}) absentee--higher speeds (i.e., shorter completion times) and fewer errors. In all but one instance, however, the differences are small enough in relation to the variability in scores to be attributable to sampling fluctuation rather than to the differences in extent of absenteeism. Indeed, the one significant difference (Table 4 speed) favors the more frequent (P_{25}) absentees.

In drawing inferences from the data of Table 10, several questions arise. For one, is a 2½-week difference in absences enough of a difference to make a difference? For example, if there is redundancy in instruction (several days of practice being devoted to a particular kind of typing task) and if absence tends to be scattered a day at a time rather than concentrated in blocks of several days, perhaps attendance on some but not all of the days given to a particular task is sufficient. No data on the distribution of absences are available. However, teachers reported that in order to meet the investigator's prescriptions for program coverage by the end of the semester they had to proceed at a breathless rate through the program subsections, leaving little time for redundant or repetitious practice at a given kind of task. Instead, redundancy was built into the programed materials and is intrinsic to a given class of typing task; for example, the processes applicable to the design of a simple table also apply to more complex tables. The foregoing discussion notwithstanding, more extreme differences in absenteeism could of course have been contrasted (e.g., P_{80} vs. P_{20} or P_{90} vs. P_{10}). The former possibility would change less frequent absence from 5.56 days to 5.00 days and more frequent absence from 18.19 to 20.31 days--the difference changing from 12.63 days to 15.31 days, or from 2½ to 3 weeks. In view of the varieties of typing tasks covered, those changes (from the P_{75} and P_{25} values to the P_{80} and P_{20} values) hardly seem sufficient to be sensitive to whatever redundancy may have been present in teachers' oral instruction. The more extreme alternative (P_{90} vs. P_{10}) is not a practicable ones because the P_{10} absentee ranged up to 49 days (10 weeks) of absence, averaging 29.19 days or nearly 6 weeks in a 14-15 week semester. Those were often persons frequently or entirely absent during the test week, so that test scores, required for the comparison with P_{90} absentees, were often nonexistent. All things considered, the P_{75} vs. P_{25} contrast reported here seems a reasonable choice.

A second alternative hypothesis is represented by the possibility that the more frequent absentee tends to be the one who learned from study of the program and who deliberately absented himself from class on the day or days immediately following completion of a programed subsection to save himself the boredom (to him) of unnecessary teacher explanations. That hypothesis seems to the investigator to be, on the face of it, rather far-fetched--especially since it is not common practice for teachers to inform Ss in advance of in-

structional plans for subsequent day(s).

A third possibility is that Ss might have absented themselves on days primarily devoted to ordinary stroking skills rather than to production typing activities associated with the programed materials. That supposition may be dismissed out of hand: partly because teachers reported that the prescribed coverage of programed topics required virtually daily production typing during the spring semester, partly because ordinary stroking skills are commonly attended to via 5-10 minutes of "warmup" at the beginning of each class period rather than via all or most of a class period devoted to such skills, and partly because Ss' complaints of insufficient practice at ordinary copying skills ("Where you don't have to think"), as reported by teachers, would hardly lead Ss to absent themselves from ordinary copying practice--were it to be assumed, doubtfully, that some lessons were mostly devoted to such practice and that Ss were so informed in advance.

The various alternative hypotheses discussed above do not seem to be persuasive ones. Although it is not possible to allocate percentages to the relative roles of the program and of live teaching in accounting for the terminal performance of programed Ss, the data of Table 10 make apparent that teachers' oral explications of programed "placement" concepts were decidedly less consequential than teachers had estimated (75 percent). Indeed, the programed materials may well have been as consequential as, or even more important than, live explication of programed placement concepts.

Terminal Performance--C vs. P Instruction

The findings on the terminal performance of programed Ss taught by the same or by different teachers during the year (pp. 45-48) permit dealing with all programed Ss as one group; and the general absence of statistically significant differences in terminal performance between frequently and infrequently absent programed Ss (Table 10) permits characterizing the P instruction as one in which the supporting live instruction did not play the dominating role--despite the estimates of teachers. Accordingly, the terminal test statistics for the programed and conventional Ss--relating to Questions 1 and 2 (p. 41)--are displayed in Tables 11 and 12, for Year-1 and Year-2 Ss. Descriptive statistics are given in the center section of these tables, and the analysis of variance results (F tests) are shown at the right. "Treatment" refers to P vs. C instruction; "Teacher," to variations among teachers regardless of treatment. "Interaction" means that

for some teachers P Ss were superior to C Ss, whereas for other teachers the converse prevailed. The "treatment" effects are of course the ones of interest, and significant treatment effects (i.e., ones whose probabilities are less than .05) are indicative of real differences in the outcomes of P and C instruction, over and above "teacher" and "interaction" effects.

Table 11

Criterion Test Statistics of Year-1 Conventional and Programed Students

Variable[a]	Conventional			Programed			Probability of Obtained F[b]		
	N	Mean	SD	N	Mean	SD	Treat.	Tchr.	Interact.
Vocabulary	42	8.19	3.10	107	8.03	2.03	NS	NS	NS
SC speed	44	29.98	9.91	106	29.29	8.00	NS	NS	<.01
SC errors		7.18	4.84		6.18	4.15	NS	NS	<.10
No. of Tasks	45	5.04	1.83	109	5.00	1.28	NS	<.001	NS
Letter 2									
Speed	15	70.40	25.58	85	108.58	36.52	<.025	NS	NS
Typos		6.80	5.63		4.48	3.98	NS	NS	NS
Form		10.67	5.19		3.99	3.82	<.001	NS	NS
Letter 17									
Speed	21	44.67	24.94	96	50.22	5.95	NS	NS	NS
Typos		3.29	2.65		2.11	2.45	NS	NS	NS
Form		4.52	1.44		1.65	1.57	<.001	NS	NS
Table 4									
Speed	17	55.65	27.77	87	96.40	34.42	<.001	<.025	<.05
Typos		2.65	2.89		3.24	2.97	NS	NS	NS
Form		11.65	3.87		3.69	2.59	<.001	<.005	NS
Manuscript 1									
Speed	23	76.57	32.46	88	83.19	31.07	NS	<.05	NS
Typos		5.96	3.51		5.03	4.18	NS	NS	NS
Form		10.78	3.53		6.66	2.68	<.001	<.001	<.25
Manuscript 15									
Speed	22	34.95	17.09	91	48.30	25.43	NS	<.025	NS
Typos		1.27	1.12		1.84	2.15	NS	NS	NS
Form		3.27	1.08		1.74	1.18	<.001	NS	NS

[a]The production test tasks are shown on Appendix pages 107-112.

[b]NS means nonsignificant (at .25 for interaction, at .05 for treatment and teacher).

Five, rather than six, production tasks are listed in Table 11 because for the sixth task (Letter 23) there were no scores for conventional Ss; that is, no conventional Ss taught by one or another of the teachers also involved in

the P instruction had completed Letter 23 during the Year-1 testing in the earlier investigation (McLean, 1971) that provided the scores of C students. For Year-2 Ss, however, Letter-23 scores were available (Table 12).[17]

Table 12

Criterion Test Statistics of Year-2 Conventional and Programed Students*

Variable	Conventional			Programed			Probability of Obtained F		
	N	Mean	SD	N	Mean	SD	Treat.	Tchr.	Interact.
Vocabulary	148	7.37	2.29	220	7.66	2.39	NS	<.001	NS
SC Speed	147	36.09	7.50	216	36.73	7.42	NS	<.005	NS
SC Errors		8.20	4.59		8.05	5.48	NS	NS	NS
No. of Tasks	168	5.84	1.94	224	5.15	1.34	<.001	<.025	<.01
Letter 2									
Speed	56	69.23	19.19	181	84.90	26.56	<.025	NS	NS
Typos		3.98	3.82		3.96	3.46	NS	NS	NS
Form		7.79	2.90		3.97	2.30	<.001	NS	NS
Letter 17									
Speed	72	37.00	12.97	195	42.07	17.82	NS	NS	NS
Typos		2.71	2.53		1.98	2.11	NS	NS	NS
Form		4.24	1.97		2.22	1.84	<.001	NS	NS
Letter 23									
Speed	22	53.82	17.76	112	56.86	18.68	NS	<.025	<.025
Typos		3.86	2.49		3.46	2.96	NS	NS	NS
Form		3.86	2.34		1.96	1.59	<.001	<.01	<.25
Table 4									
Speed	61	64.98	24.19	188	76.87	29.28	<.05	NS	NS
Typos		2.43	2.61		2.90	2.77	NS	NS	NS
Form		8.03	3.34		4.86	2.91	<.001	<.01	<.10
Manuscript 1									
Speed	68	61.10	26.12	200	70.58	27.20	NS	NS	NS
Typos		4.32	3.45		5.38	3.83	<.05	NS	NS
Form		10.07	3.20		5.10	2.28	<.001	<.005	<.25
Manuscript 15									
Speed	73	36.68	14.32	188	37.72	17.17	NS	<.05	<.025
Typos		1.34	1.45		1.56	1.72	NS	NS	NS
Form		3.10	1.70		2.09	1.36	<.001	<.025	<.25

*The footnotes of Table 11 also apply here.

[17] Letter 23 was completed by Year-2 C students in the classes of Teachers D and F only. The Ns for the other five production tasks (in Tables 11 and 12) include C students taught by all six teachers (A-F), as do all scores of P students in Tables 11 and 12.

The criterion test means of C and P Ss for each of the six teachers individually are shown in Table 26 (page 100). In order to provide a visually clearer basis for discussion of the findings across teachers, selected data from Tables 11 and 12 are displayed in another form in Table 13. Of the three criterion measures, uncorrected typographical errors have no bearing on the instructional focus on placement concepts; accordingly, no significant differences between P and C Ss were anticipated. That expectation is in excellent accord with the findings: of the 11 production tasks listed in Tables 11 and 12, in only one instance (Manuscript 1, Year 2) was there a significant difference in number of "typos." Accordingly, Table 13 omits the data on "typos."

Table 13

Criterion Test Means and Significance Tests for Year-1 and Year-2 Conventional and Programed Students

Variable	Year 1				Year 2			
	Mean			Treat. $p < .05$	Mean			Treat. $p < .05$
	C	P	C - P		C	P	C - P	
Vocabulary	8.19	8.03	.16	no	7.37	7.66	- .29	no
SC Speed[a]	29.88	29.29	.69	no	36.09	36.73	- .64	no
SC Errors	7.18	6.18	1.00	no	8.20	8.05	.15	no
No. of Tasks	5.04	5.00	.04	no	5.84	5.15	.69	yes
Speed[b]								
Letter 2	70.40	105.58	- 38.18	yes	69.23	84.90	-15.67	yes
Letter 17	44.67	50.22	- 5.55	no	37.00	42.07	- 5.07	no
Letter 23	---	---	---	---	53.82	56.86	- 3.04	no
Table 4	55.65	96.40	- 40.75	yes	64.98	76.87	-11.89	yes
Ms. 1	76,57	83.19	- 6.62	no	61.10	70.58	- 9.48	no
Ms. 15	34.95	48.30	- 13.35	no	36.68	37.72	- 1.04	no
Total	282.24	386.69	-104.45		322.81	369.00	-46.19	
Form Errors								
Letter 2	6.80	4.48	2.32	yes	7.79	3.97	3.92	yes
Letter 17	4.52	1.65	2.87	yes	4.24	2.22	2.02	yes
Letter 23	--	--	--	---	3.86	1.96	1.90	yes
Table 4	11.65	3.69	7.96	yes	8.03	4.86	3.17	yes
Ms. 1	10.78	6.66	4.12	yes	10.07	5.10	4.97	yes
Ms. 15	3.27	1.74	1.53	yes	3.10	2.09	1.01	yes
Total	37.02	18.22	18.80		37.09	20.20	16.89	

[a]Gross words per minute

[b]Completion time to the nearest quarter minute

Table 13 provides a bird's eye view of the findings on the chief issues of this investigation: effects of the differential instruction on terminal proficiency at (a) production typing tasks (Question 1, page 41) and at (b) straight copy typing (Question 2, p. 41). It may first be noted (Table 13) that there were no significant differences in vocabulary scores; the P and C students were comparable in general intellectual ability. Accordingly, differences in typing performance may be attributed to the differential instruction.

Production Typing Speed. As shown in Table 13 ("No. of Tasks"), Year-2 C Ss completed during the week of testing significantly more tasks than did P Ss--an outcome that parallels the faster completion times for C Ss shown in the "Speed" section of Table 13. In that connection it is pertinent to mention that P Ss worked from a 6-task booklet, whereas C Ss worked either from an 8-task booklet used in McLean's original testing or from a 9-task booklet administered to different Ss to estimate test reliability. It is conceivable, although not determinable or testable, that advance awareness of the scope of the work (6 vs. 8 vs. 9 tasks to be completed) affects work rates--that typists pace their work at a rate they estimate will accomplish it in the time available, an instance of Parkinson's Law. If so, part of the difference of .69 in number of production tasks completed by Year-2 C and P Ss might reflect differences in number of tasks in the test booklet.

That speculation aside, more direct evidence is furnished by the "Speed" data of Table 13. As shown, C Ss in Year 1 were significantly faster than P Ss in two out of five instances; in Year 2, in two out of six instances. Summing across tasks and converting quarter minutes to whole minutes, Year-1 C Ss completed five tasks in 70.5 minutes; P Ss, in 96.7 minutes, for a difference that approximates 26 minutes. Put another way, C Ss completed five tasks in 73 percent of the time required by P Ss (282.24/386.69). Smaller differences, but in the same direction, were found for Year-2 Ss, covering six (not five) tasks: 80.7 vs. 92.25 minutes for C and P Ss respectively, for a difference of 11.55 minutes; Year-2 C Ss completed the work in seven-eighths the time required by Year-2 P Ss (322.81/369.00 = 87.5 percent).

The statistically significant speed differences, it may be noted, pertain to planning the layout of tables (Table 4 and Letter 2, which contains a table--see Appendix pp. 109 and 107). For the simpler letters and the two manuscripts, the speed differences were of a size that could arise by

chance more than five percent of the time in samples of the present size.

The five (or six) production subtests of Table 13 are based on different Ns--the identical group of Ss was not involved in each subtest. Even so, and despite the absence of statistically significant speed differences in three out of five (Year 1) and four out of six (Year 2) instances, the accumulated means show substantial speed differences in favor of conventional Ss. In the light of the greatly fewer form errors by programed Ss and in view of the dominating focus in the programed materials on placement concepts reflected by a product typed in correct form, "taking the time to do things right" by "thinking before you type" would seem the most likely explanation for the longer task completion times of programed Ss. It had originally been conjectured (by the investigator) that unremitting attention in the programed materials to placement features might lead to higher speeds than those of conventional Ss, who, in their presumed lesser mastery over placement features, would need more time to make placement decisions before beginning to type. However, that conjecture is not borne out by the results, perhaps because of insufficient practice among programed Ss at applying placement decisions to actual typing in the classroom (too much teacher talk--not enough student typing). Footnote 12 (p. 37) is also applicable.

Before turning to error findings, the speed data are presented, in Table 14, in gross words per minute, a form familiar to typewriting teachers. "Length" is number of 5-stroke words, including the conventional 1-stroke allowance for each operation of a service mechanism (space bar, tabular key, carriage return, backspacer) and covering the entire task (e.g., from date through initials or enclosure in a business letter). Words per minute (wpm) is computed as number of words divided by completion time in minutes.

As shown in Table 14 (page 57), production speeds ranged from a low of 3.11 wpm on a table among first-year typists to a high of 11.15 wpm on a simple letter by second-year typists. Those speeds may be contrasted with their straight copy speeds of about 30 and about 37 wpm (Tables 11 and 12), varying from about one-tenth to about three-tenths of straight copy speed (10.6 percent and 30.9 percent, to be exact). Error correction no doubt accounts for some of the loss in speed. Most of it, as handsomely demonstrated by Muhich (1967) and corroborated here, is attributable to the

time-consuming placement decisions of production typing and to the different set (i.e., perception) adopted toward production tasks, leading to the use of slower keystroking rates than those of straight copy typing. Findings such as these are typical and demonstrate not only the fallacy of the conventional assumption that ordinary copying skills are important contributors to production proficiency, but the foolishness and irrelevance of production typing standards applicable to prearranged tasks, requiring no placement decisions by the typist. The production speeds of Table 14 are for typists of below-average general ability, but they are only a few words per minute (about 5-10) below the production speeds found among more able students whose straight copy speeds were substantially above those of the present Ss (see West, 1969, Chap. 13 for a summary of the earlier research).

Table 14

Production Speeds (wpm) of Year-1 and Year-2 Conventional and Programed Ss

Subtest	Length (in words)	Description	Words per Minute			
			Year 1		Year 2	
			C	P	C	P
Letter 2	150	Letter with table	8.52	5.53	8.67	7.07
Letter 17	75	Letter with listing	6.72	5.97	8.11	7.13
Letter 23	150	Simple letter	--	--	11.15	10.55
Table 4	75	4-column table	5.39	3.11	4.62	3.90
Ms. 1*	150	Ms. with footnote and corrections	7.84	7.21	9.82	8.50
Ms. 15*	75	Simple ms.	8.58	6.21	8.18	7.95
All Tasks	675		7.44	5.43	8.36	7.32

*Manuscript 1 uses fixed margins that do not have to be estimated; ms. 15 requires estimation of length of copy to determine appropriate vertical and horizontal margins--probably accounting for the somewhat lower speeds on what would appear, superficially, to be the simpler task. Or, on ms. 15, a bad guess at margins was made at the first trial, and the task was retyped.

Also apparent in Table 14 are differences in inter- and intratask difficulty. A 75-word table was typed at about two-fifths the speed of a simple letter that had twice as many words; a letter containing a table was typed at about 70 percent of the speed of a simple letter of the same length. Phenomena such as these demonstrate that it is internal task features, not

mere word length, that determine task difficulty.

Form Errors in Production Typing. As shown in Tables 11 and 12 (pp. 52-53), differences in number of form errors were found to be highly significant ($p < .001$) for each production task in each year. Table 13 (p. 54) shows the differences to be very large and uniformly in the direction of fewer errors by P Ss. Specifically, in Year 1, form errors for P Ss were 49.2 percent of those for C Ss (18.22/37.02); in Year 2, form errors by P Ss were 54.5 percent of those for C Ss (20.20/37.09). Although the error differences are very large, the absolute number of errors made by P Ss shows that their performance does not tend to meet business standards of acceptability. An average (Years 1 and 2 together) of about 3½ form errors per task among P Ss and of about 6¾ form errors per task among C Ss constitutes "unmailable" work. Neither the conventional nor the programed instruction equipped students to carry out realistic vocational typing tasks at acceptable levels of quality. Programed instruction, however, brought about substantial improvement in quality of work, and it is conceivable that improvements in the programed materials and in the associated instructional activities of teachers could lead to marketable levels of quality or accuracy for vocational typing tasks.

Finally, it may be noted (Table 13) that the chief difficulties reside in the layout of tables and in the correct placement of manuscript footnotes (Table 4, Letter 2 containing a table, Manuscript 1); for those three tasks the number of form errors is notably higher than for the other tasks. For Manuscript 1, however, the Year-1 form errors among P Ss (6.66, in Table 11) were inflated by the students of Teacher A, who excluded manuscript typing from the instruction: for Year-1 Teachers A and B, mean number of form errors on Manuscript 1 among their P Ss were 8.33 and 4.65 respectively.

Overall Terminal Production Proficiency of C and P Students. For Years 1 and 2, of 11 production task comparisons, there were four significant differences in speed, favoring C Ss; whereas significant differences in form errors were found in all 11 instances, all favoring P Ss. The effects of P instruction were to reduce form errors to about half the number made by conventional Ss, at the price of a reduction in speed of 27 percent among Year-1 Ss and of about 12½ percent among Year-2 Ss. Since, with occasional exceptions, form errors tend to be uncorrectible and to require complete retyping of the task, it is apparent that the very large superiority of P Ss in the quality of their work swamps the loss in speed. Overall, significant superiority in pro-

duction proficiency is evident for progamed over conventional instruction among the low-ability vocational high school students of this investigation.

Straight Copy Proficiency. As shown in Table 13, differences in straight copy speed between C and P Ss in Years 1 and 2 were trivially small (less than 1 wpm) and not statistically significant. Small differences in errors in favor of fewer errors by P Ss were also not statistically significant. In view of the substantially larger amount and proportion of training time devoted to ordinary copying skills in conventional instruction, as compared to programed instruction, it is apparent that ordinary copying proficiency does not suffer when the bulk of the training is given to production typing rather than to direct speed and accuracy practice aimed at copying skills. In view of the typical negative acceleration of the performance curve for ordinary stroking skills, one might speculate that for those whose copying skills are as modest as those of the present Ss any kind of typing leads to gains. Whatever the explanation may be for the equivalent copying skills of the present Ss, despite gross differences in amount of practice at such skills, the present findings demonstrate the fallacy in the conventional focus on copying skills and in the typically late introduction of production typing tasks and point to the desirability of early introduction of production typing tasks and dominating attention to such tasks thereafter. Correlational data (pp. 77-78) are congruent with the foregoing recommendation; production proficiency is only trivially related to and, by inference, dependent upon copying proficiency.

Year-1 vs. Year-2 Proficiency. Of tangential interest (i.e., not among the direct objectives or purposes of the present investigation) is the question of gains accruing from a second year of training. These are displayed in Table 15 (speed) and Table 16 (errors). It should be noted that different Ss are involved in the two training years; the gains or changes are not for the same persons in a second year of training. It may be recalled, however, that in School A, at least, Year-1 and Year-2 vocabulary scores did not differ significantly (p. 44). Also, a substantial proportion of all Ss were in School A.[18] Tables 15 and 16 apply to both schools, A and B.

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[18] School A included all the Year-1 Ss and, in Year 2, 70 of the 148 (47.3%) conventional Ss and 113 of the 220 programed Ss (51.4%)--or nearly half (49.7%) of all Year-2 Ss.

Table 15

Differences Between Year-1 and Year-2 Speed Means (wpm)

Variable	Conventional			Programed		
	Year 2	Year 1	Diff.[a]	Year 2	Year 1	Diff.[a]
Straight copy	36.09	29.98	6.11	36.73	29.29	7.44
Letter 2	8.67	8.52	.15	7.07	5.53	1.54
Letter 17	8.11	6.72	1.39	7.13	5.97	1.16
Table 4	4.62	5.39	- .77	3.90	3.11	.79
Manuscript 1	9.82	7.84	1.98	8.50	7.21	1.29
Manuscript 15	8.18	8.58	- .40	7.95	6.21	1.74
All production tasks	7.81	7.44	.37	6.73	5.43	1.30
% gain			5.0			23.9

[a]Year 2 minus Year 1

Discussion of the findings on gains from a second year of training follows the display of error data in Table 16.

Table 16

Differences Between Year-1 and Year-2 Error Means

(Straight copy errors and production form errors)

Variable	Conventional			Programed		
	Year 1	Year 2	Diff.[a]	Year 1	Year 2	Diff.[a]
Straight copy	7.18	8.20	-1.02	6.18	8.05	-1.87
Letter 2	6.80	7.79	- .99	4.48	3.97	.51
Letter 17	4.52	4.24	.28	1.65	2.22	- .57
Table 4	11.65	8.03	3.62	3.69	4.86	-1.17
Manuscript 1	10.78	10.07	.71	6.66	5.10	1.56
Manuscript 15	3.27	3.10	.17	1.74	2.09	- .35
All production tasks	37.02	33.23	3.79	18.22	18.24	- .02
% reduction[b]			-10.2			+ .1

[a]Year 1 minus Year 2

[b]3.79/37.02 = 10.2%, and .02/18.22 = .1%.

As shown in Tables 15 and 16, a second year of training led to gains in straight copy speed of 6-7 wpm and an increase in 3 minutes of 1-2 errors. The Year-1 and Year-2 Ss were, however, virtually equivalent in

relative accuracy (i.e., words per error): 13.44 wpe (Year 2) and 13.31 wpe (Year 1), for the C and P trainees taken together.

Concerning production speed, conventional instruction led to a 5 percent gain (less than .4 wpm); programed instruction, to a 24 percent gain (1.30 wpm). However, the lower Year-1 speeds of the programed Ss left more room for gains. The error data are more striking. Superficially, it would appear from the data of Table 16 that conventional instruction led to some improvement in quality of work in a second year of training (10 percent); whereas programed instruction led to a slight (and no doubt nonsignficant) decrement in work quality among second-year trainees (.1 percent). Since different trainees are involved in the two years, the consequential inference from the data of Table 16 is that programed instruction led to a level of work quality in production tasks among first-year typists as good as that found among second-year trainees. Although the Year-2 Ss in School B had significantly lower vocabulary scores, inspection of the teacher means (in Table 26, Appendix page 100) reveals little to choose between the Ss in the two schools. Such significant "teacher" effects as were found (Table 12) pertain to quite small differences in means as between School A and School B teachers (i.e., Teachers C and D versus Teachers E and F).[19] Thus the findings for programed Ss in Tables 15 and 16 are little affected by differences between School A and School B trainees. With correct placement (as measured by form errors) the most important criterion of performance, it is clear from Table 16 that programed instruction among first-year trainees led to a level of work quality greatly superior to that achieved after two years of conventional instruction; form errors among first-year programed Ss were 54.8 percent (18.22/33.23) of those made by second-year conventional Ss: for every 20 form errors made by Year-2 conventional Ss, Year-1 programed Ss made 11 form errors (in the five tasks common to all Ss).

The foregoing data provide the most striking and compelling inferences of this entire investigation: (1) Early and unremitting attention to the placement features of production tasks in first-year training (here, via programed instruction) permits confining typing instruction to one year if the outcomes

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[19]The significant "teacher" effects of Table 12 are for Letter 23, Table 4, and Manuscripts 1 and 15. For these four tasks mean form errors in School A (Teachers C and D) totalled 19.65; in School B (Teachers E and F), 20.40.

of two years of conventional instruction are considered acceptable. Of course, those outcomes are not acceptable: an average of 6-7 form errors per production task is not "mailable" work. Accordingly, (2) Following first-year focus on production typing (e.g., via these programed materials) by a second year of training with the same focus should be expected to lead (a) to terminal performance vastly superior to that ensuing from two years of conventional instruction and (b) to absolute levels of work quality that are mailable or marketable. The less than satisfying absolute levels of work quality (and work speed), even among the programed trainees of this investigation, are probably attributable, in large part, to such factors as: inexperience of teachers in accommodating their live instruction to the programed materials, the cramming into one year of a curricular scope characteristic of two years of instruction, and the reservations of teachers about the scope of coverage insisted on by the investigator. Given appropriate modification of supporting live instruction and less tight a scheduling of topics (e.g., the six criterion tasks of the present investigation spread over 2½-3, rather than 2, semesters), marketable and even high skill might reasonably be expected after a full two years (4 semesters) of instruction among trainees like those of the present investigation. Among more able students, for the relatively simple criterion tasks of the present investigation one year of training focussed on production typing should easily lead to adequate (i.e., marketable) skill, while additional training could lead to "senior" typing skills--at more complex tasks included in the programed materials but excluded from the curriculum of the disadvantaged trainees of the present investigation.

On the original issue of gains from a second year of training--but subject to the imprecision resulting from different trainees in the two years of instruction--a second year of conventional instruction led to nominal gains in production speed (5 percent); of programed instruction, to larger speed gains (24 percent). Production quality after a second year of conventional instruction was somewhat improved (10 percent), and the modesty of the improvement probably reflects the typical deferring of much of production typing to the second year. Among programed Ss there is nothing to choose between the production quality of Year-1 and Year-2 trainees; i.e., the latter group's first year of conventional instruction contributed nothing to the production quality that followed programed instruction in Year 2.

The findings on the major purposes of the present investigation (Questions 1 and 2, p. 41) have been given in the preceding subsection (pp. 51-62). Findings on the secondary purposes, as itemized on the lower half of page 42, follow, in turn.

Early Proficiency Following Different Amounts of Practice

As described earlier (pp. 15-16), for the first two months of programed instruction (mid-October to mid-December), one P class of each teacher worked on the program in class, under teacher supervision; the other P class(es) of each teacher worked on the program at home, each homework assignment covering a specified subsection of the program. The P teachers instantly reported that program work in class preempted virtually the entire class period, leaving little and sometimes no time on the same day for actual typing of production tasks based on the program. In contrast, the "homework" classes, following some discussion of programed placement concepts at the beginning of the class period following completion of the homework assignment, had substantially more time for actual typing practice at production tasks based on the programed placement concepts. As reported by teachers, the scheduling of program subsections for the IC (in-class) and HW (homework) Ss was kept approximately parallel by deferring the assignment of a new subsection to HW Ss until IC Ss were able to complete some actual typing based on the earlier subsection (often, not until the day after IC work on a subsection had been completed).

Test Procedures. The effects of the large differences in actual typing practice were examined via mid-December testing on straight copy (five minutes, using the same copy as in the 3-minute, June criterion testing) and on production tasks based on completed program subsections: simple business letters and simple tables, as follows: a 75-word simple business letter (see p. 118), a 150-word simple business letter (p. 119), a 37½-word, 3-column table with minor heading and column headings (p. 122), a 75-word, 4-column table with minor heading and column headings (p. 123), and parallel 37½- and 75-word tables, but without column headings (pp. 120 and 121). In each of the 16 classes of 6 teachers (those who continued with P instruction in the spring semester), the testing was conducted on one day by allocating different production tasks to different classes, as follows: the two business letters to the Year-1 classes of Teacher A, the two tables

without column headings to the Year-1 classes of Teacher B, the two letters to the Year-2 classes of Teacher C in School A, the two tables with column headings to the Year-2 classes of Teacher D in School A, and the two tables without column headings to the Year-2 classes of Teachers E and F in School B. In that fashion the two business letters were typed by some Year-1 Ss and some Year-2 Ss; the tables without column headings by some Ss in both years, and the tables with column headings by Year-2 Ss only. Because Year-1 teachers could not be persuaded to teach erasing or other mode of correcting misstrokes by mid-December of first-semester instruction, all testing was conducted under no-erasing conditions and, for that reason, the work was scored for speed (completion time to the nearest quarter minute) and for form errors, but not for uncorrected typographical errors. In anticipation of some Ss being unable to complete two production tasks (and a 5-minute timing) in one class period, for alternate Ss in each class the two production tasks were done in short-long and long-short order (i.e., the 37½ and then the 75-word table, and vice versa; the 75- and then the 150-word letter, and vice versa). As a result, Ns for each completed production task were more equal than they would otherwise have been--since many Ss were unable to complete the second task.

The performance scores were subjected to analysis of variance, as given in Footnote 14 (p. 40). However, since (with one exception[20]) only one teacher was involved in any given pair of production test items, analysis of variance is "one way" (for the HW and IC Ss of that teacher), and $F = t^2$. Accordingly, for production task comparisons, t's are reported, with their associated probabilities. For straight copy performance and "No. of Tasks" completed (out of a maximum of two), F's are reported, because analysis is "two way," providing measures of "Teacher" and "Interaction" effects.

Results. For the first two months of programed instruction--during which one class of each P teacher worked on the program in class, while the other class(es) of that teacher worked at home--the results of mid-December testing are shown in Table 17 (Year 2) and Table 18 (Year 1).

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[20]The exception is for Teachers E and F in School B, all of whose classes typed the same pair of production tasks (tables without column headings). However, to keep the analyses uniform for all production task comparisons, the HW classes for the two teachers were combined into one group, and the IC classes into another. t tests were carried out for the resulting two groups.

Table 17

Test Statistics of Year-2 Homework and In-Class Programed Students

Variable[a]	Homework			In-Class			Probability of Obtained F[b]		
	N	Mean	SD	N	Mean	SD	Treat.	Tchr.	Interact.
SC Speed[c]	75	33.82	7.47	98	33.43	6.64	NS	NS	NS
SC Errors		12.39	11.49		14.64	13.61	NS	<.025	NS
No. of Tasks	80	1.46	.50	101	1.46	.50	NS	<.05	<.25
								t	p[b]
Short Letter									
Speed	19	21.84	7.03	22	18.63	4.04		1.821	<.05
Form		2.95	1.43		2.14	1.42		5.736	<.001
Long Letter									
Speed	19	37.79	10.57	21	36.29	5.93		.559	NS
Form		2.95	1.43		2.43	1.57		.476	NS
Short Table, w/CHs									
Speed	12	51.00	13.25	8	42.75	10.38		1.480	NS
Form		3.50	2.02		3.50	3.25		.000	NS
Long Table, w/CHs									
Speed	7	66.29	7.93	9	65.22	12.29		.199	NS
Form		3.57	2.76		4.00	2.60		.852	NS
Short Table, w/o CHs									
Speed	30	36.70	13.28	47	37.34	10.90		.306	NS
Form		2.83	1.71		3.53	2.08		1.518	NS
Long Table, w/o CHs									
Speed	29	52.41	10.55	40	54.10	12.58		.265	NS
Form		4.38	2.14		4.50	2.24		.011	NS

[a]The production test tasks are shown in Appendix pages 118-123. For the tables, w/CHs means "with column headings" and w/o CHs means "without column headings."

[b]NS means nonsignificant (at .25 for interaction, at .05 for teacher and treatment in the F tests and at .05 in the t tests).

[c]Straight copy speed is in gross words per minute, production speed in quarter minutes of completion time.

Discussion of the data on typing performance after different amounts of actual typing practice follows presentation of the findings for Year-1 Ss in Table 18 (p. 66).

Table 18

Test Statistics of Year-1 Homework and In-Class Programed Students[a]

Variable	Homework			In-Class			Probability of Obtained F		
	N	Mean	SD	N	Mean	SD	Treat.	Tchr.	Interact.
SC Speed	41	21.24	5.63	31	22.96	6.46	NS	NS	NS
SC Errors		5.78	4.13		8.26	6.44	<.05	NS	<.25
No. of Tasks	42	1.57	.50	32	1.31	.47	NS	<.001	<.001
							t	p	
Short Letter									
Speed	24	27.79	7.29	9	31.44	13.54	1.003	NS	
Form		2.08	1.32		3.33	3.08	1.658	NS	
Long Letter									
Speed	25	46.16	11.76	8	38.38	7.69	1.821	<.05	
Form		2.08	1.66		2.63	1.30	.848	NS	
Short Table w/o CHs									
Speed	10	50.90	13.07	11	37.27	7.52	2.851	<.02	
Form		2.10	1.97		3.27	2.15	1.265	NS	
Long Table w/o CHs									
Speed	7	63.71	8.48	14	63.86	14.12	.026	NS	
Form		2.57	1.18		2.50	1.24	.125	NS	

[a]The footnotes of Table 17 also apply here.

In Tables 17 and 18 the larger N for "No. of (Production) Tasks" completed than for the straight copy timing reflects latecomers who missed the SC timing administered at the beginning of the period, but who arrived in time to complete at least one of the two production tasks.

With respect to task difficulty, although details are not shown here, a much larger percentage of Ss (in each year) were able to complete two business letters than were able to finish two tables, as one would expect. In fact, only 8 (of 32) Year-1 Ss were able to complete two tables in the one class period devoted to testing.

The Ns of Tables 17 and 18 are for those who completed the specified task, and the probabilities of significant differences in performance as between HW and IC Ss are based on those Ns. Also pertinent to the issue is the percentage of attendees who completed specified tasks, shown in Table 19.

Table 19

Percentage of Homework and In-Class Attendees Who Completed Each Production Task

Variable	Year 1		Year 2	
	HW	IC	HW	IC
Letter				
Short	92.3	64.3	86.4	95.7
Long	96.2	57.1	86.4	91.3
Average	94.2	60.7	86.4	93.5
Table w/o CHs				
Short	62.5	68.8	81.1	75.8
Long	43.8	87.5	78.4	64.5
Average	53.1	78.1	79.7	70.2
Table w/CHs				
Short	--	--	66.7	57.1
Long	--	--	38.9	64.3
Average			52.8	60.7

Occasional substantial differences in volume of completed output are evident in Table 19: e.g., in Year-1, more letters completed by HW Ss, but more tables completed by IC Ss; in Year-2, the reverse situation obtains. It must be remembered, however, that each of the three kinds of tasks listed in the stub of Table 19 is associated, within each year, with a different teacher. The testing design does not permit measures of treatment-teacher interaction, so that the effects of different teaching behavior on the data of Table 19 are not determinable.

As a basis for drawing inferences about the effects on performance of in-class vs. at-home work on the programed materials during the first two months of programed instruction, the data of Tables 17 and 18 are summarized in another form in Table 20 (p. 68).

One kind of variation resulting from in-class vs. at-home work at the program has already been mentioned: more actual typing practice by HW than by IC Ss. That variation might be expected to affect ordinary stroking skills, especially among Year-1 Ss whose skills were nominal (21-23 wpm). As shown in the upper section of Table 20, stroking speed was unaffected; whereas, among Year-1 Ss, significantly fewer errors were made by the HW Ss. However, the characteristically low reliability of error measures in straight copy samples as short as five minutes suggests that little importance be given to the finding just mentioned.

Table 20

Means and Significance Tests for Year-1 and Year-2 Programed Students In Homework and In-Class Classes

Variable	Year 1				Year 2			
	IC	HW	IC - HW	Treat. $p < .05$	IC	HW	IC - HW	Treat. $p < .05$
SC Speed	22.96	21.24	1.72	no	33.43	33.82	- .39	no
SC Errors	8.26	5.78	2.48	yes	14.64	12.39	2.25	no
No. of Tasks	1.31	1.57	- .26	no	1.33	1.34	- .01	no
Speed								
Short Letter	31.44	27.79	3.65	no	18.63	21.84	- 3.21	yes
Long Letter	38.38	46.16	- 7.78	yes	36.29	37.79	- 1.50	no
Short Table w/o CHs	37.27	50.90	-13.63	yes	37.34	36.70	.64	no
Long Table w/o CHs	63.86	63.71	.15	no	54.10	52.41	1.69	no
Short Table w/CHs					42.75	51.00	- 8.25	no
Long Table w/CHs					65.22	66.29	- 1.07	no
Total	170.95	188.56	-17.61		254.33	266.03	-11.70	
Form Errors								
Short Letter	3.33	2.08	1.25	no	2.14	2.95	- .81	yes
Long Letter	2.63	2.08	.55	no	2.43	2.95	- .52	no
Short Table w/o CHs	3.27	2.10	1.17	no	3.53	2.83	.70	no
Long Table w/o CHs	2.50	2.57	- .07	no	4.50	4.38	.12	no
Short Table w/CHs					3.50	3.50	.00	no
Long Table w/CHs					4.00	3.57	.43	no
Total	11.73	8.83	2.90		20.10	20.18	- .08	

Regarding differences between means for production tasks (IC - HW columns in Table 20), negative signs mean higher speeds (faster completion times) and fewer form errors by in-class Ss; positive differences favor HW Ss. The concomitants of the differential treatments (HW vs. IC) pull in opposite directions. More actual typing practice by HW Ss might lead to superior performance by them. On the other hand, Ss who worked on the program in class had the assistance of teachers, who furnished help in responding to

programed frames to students who requested such help. The net effect of these two concomitants--although based on data from different Ss taught by different teachers for each of the three major classes of production tasks--is evident in Table 20. Of twenty comparisons, there were four differences that are statistically significant, all favoring in-class Ss (three for speed, one for form errors). Summing across tasks and converting completion time to whole minutes, in Year 1, in-class Ss completed their tasks in 4.4 fewer minutes than did homework Ss; in Year-2, the difference was 2.9 minutes in favor of in-class Ss. In Year 1, in-class Ss were about 10 percent faster than homework Ss; in Year 2, about 5 percent faster. Concerning form errors, which measure the dominating objectives of the programed instruction and, indeed, of vocational typing training, there was nothing to choose between the second-year HW and IC students; whereas in Year 1, the HW Ss made three-fourths the number of errors made by the IC Ss. In summary, there was a general tendency toward higher speeds among in-class Ss in both years and toward fewer errors by first-year homework Ss. The few statistically significant differences and the varying direction of differences (sometimes favoring IC Ss, at other times favoring HW Ss) suggest that the benefits of more actual typing practice among HW Ss were more or less offset by the assistance with the programed materials given IC Ss by their teachers.

Need for Teacher Supervision of Disadvantaged Students

The foregoing findings (on HW vs. IC performance) show to be groundless the fears of teachers that disadvantaged vocational high school students of below-average general ability could not (or would not) learn from programed self-instruction unless under the direct supervision of teachers. This is not to gainsay the benefits of teacher support for programed instruction when the student is in class, but merely to make apparent that in the present instance unsupervised work at the program was about as effective as directly supervised work. Accordingly, there seems no reason to preempt class time, among disadvantaged students, for monitoring self-instruction. The self-pacing of responses that is one of the defining characteristics of programed instruction makes in-class treatment of it in "group" fashion at best unwieldy and at worst impossible. Fortunately--at least in the present instance--group management over programed instruction was not found to be necessary. Even for disadvantaged students, programed instruction should be conducted as it is designed to be--independent of the teacher.

Mid-Year Programed vs. End-of-Year Conventional Performance

For the reasons given in the second paragraph of page 16, programed Ss were tested at mid-year (late January). During the three weeks of instruction that intervened between the Christmas holidays and the mid-year testing, all work on the program was done as homework (in-class work at the program was discontinued). In anticipation of late-January testing, teachers were asked to provide Ss with adequate practice at proofreading and correcting errors (by eraser or Ko-Rec-Type, at the option of the student) and had been informed that the testing would consist of business letters and tables (without column headings for Year-1 Ss, with column headings for Year-2 Ss).

The six test tasks are shown on Appendix pages 112-117 and are characterized in Footnote a of Table 21 (p. 71). The testing was conducted during one class period on one day, using four tasks in each class (the two letters and two tables in Year-1 classes, the two letters and the other two tables in Year-2 classes), each S being asked to complete two tasks (one letter and one table), plus a 3-minute straight copy timing, given first, using the same copy as in the June criterion testing. In order to maximize the chances of approximately equal Ns per task, the four production tasks were distributed to Ss in successive seats serially (about one-fourth of each class for each of the four tasks). Upon completing the first task each S was then given the test copy for the other-length other task; i.e., for fourths of the class the two tasks were: short letter/long table, long letter/short table, short table/long letter, long table/short letter. Of course, many Ss (especially in Year 1) were unable to complete the second task.

The purposes for which the January testing was conducted require comparison of results with those of end-of-year (June) testing of conventional Ss on the same tasks and, in consequence, the reporting of data only for those teachers whose conventional Ss had completed one or more of the same tasks during the earlier McLean study that furnished the scores of conventional Ss. The foregoing requirement was met for Year-1 Teacher B and two other Year-1 teachers who did not continue with P instruction in the spring semester, and for Year-2 Teachers D and F. Unfortunately--and not known at the time of selecting the mid-year test tasks--there were no conventional scores for Year-1 Ss on the long letter (Letter 23). Results are shown in Table 21 (p. 71).

Table 21

Performance Means on Mid-Year Programed and End-of-Year Conventional Testing

Variable[a]	Year 1					Year 2				
	N[b]		Mean			N[b]		Mean		
	C	P	C	P	C - P	C	P	C	P	C - P
SC Speed[c]	42	76	34.51	25.80	8.71	29	41	34.52	32.99	1.53
SC Errors			6.50	6.50	0.00			8.49	7.48	1.01
Speed[d]										
Letter 8	11	36	50.27	45.92	4.35	18	32	38.50	33.47	5.03
Letter 23						18	32	53.82	47.76	6.06
Table 2	7	27	53.43	47.11	6.32					
Table 20	9	31	74.56	65.10	9.46					
Table 12						17	30	41.00	45.85	-4.85
Table 22						14	30	65.00	71.05	-6.05
Total			178.26	158.13	20.13			198.32	198.13	.19
Form Errors										
Letter 8			7.64	1.44	6.20			2.67	2.21	.46
Letter 23								3.86	2.20	1.66
Table 2			3.43	2.67	.76					
Table 20			2.78	2.81	- .03					
Table 12								5.64	4.00	1.64
Table 22								5.80	5.41	.39
Total			13.85	6.92	6.93			17.97	13.82	4.15
Typos										
Letter 8			1.64	2.28	- .64			1.94	2.51	- .57
Letter 23								3.86	5.34	-1.48
Table 2			1.00	1.19	- .19					
Table 20			2.11	2.48	- .37					
Table 12								.57	2.87	-2.30
Table 22								3.50	4.27	- .77
Total			4.75	5.95	-1.20			9.87	14.99	-5.12

[a]Tables 2 and 20 are without column headings; Tables 12 and 22 are with column headings (37½ words in Tables 2 and 12; 75 words in Tables 20 and 22). Letter 8 has 75 words; Letter 23 has 150 words. (See Appendix pp. 112-117.)

[b]The Ns are based on the classes of three Year-1 and two Year-2 teachers. Those shown in the "Speed" section also apply to Form Errors and Typos.

[c]Gross words per minute.

[d]Quarter minutes of completion time.

The data of Table 21 are purely descriptive and were not subjected to statistical tests for significant differences between C and P Ss--for a number of reasons. Mainly, there was one consequential difference in test adminis-

tration conditions that could conceivably have affected production speed; viz., carryover of incomplete tasks to the next day in June testing but not in January testing. The possible effect of that difference is to increase (by an undeterminable, but possibly small, amount) the production completion times (i.e., depress the speeds) of conventional June examinees in relation to those of January programed Ss. That aside, the principal purpose of January testing of programed Ss was to estimate the extent to which early and deliberate focus on the concepts and processes governing the form or arrangement of production tasks (in the programed instruction) could lead to results in a half-year approximating those following a full year of conventional instruction, in which production typing is deferred until later in training, accompanied by much "guidance." Purely descriptive data are felt to serve that purpose adequately.

Discussion of Results. Although ordinary copying skills, as measured by the 3-minute straight copy timing, are not the issue here, the findings given above the dashed line in Table 21 may be mentioned in passing. As is virtually ordained by the negative acceleration of the acquisition curve for stroking speed, Year-1 Ss made a substantial gain in speed (8.71 wpm) in their second semester of training: first-semester speeds are so modest that any kind of typing contributes to gains in speed. On the other hand, but equally expectable, a fourth semester of training adds little (1.53 wpm) to third-semester achievement. Concerning stroking errors, although first- and second-semester Year-1 Ss made the same absolute number of errors in three minutes (6.50), a full year of training led to greater relative accuracy (15.93 versus 11.91 words per error). Among third- and fourth-semester Year-2 Ss (i.e., P and C Ss in Year 2), the former were more accurate--absolutely and relatively (7.48 vs. 8.49 errors, 13.23 wpe versus 12.20 wpe). The surprising near identity of second- and fourth-semester stroking speeds (34.51 and 34.52 wpm of C Ss in Years 1 and 2) is accounted for by the 13 Ss of one of the Year-1 teachers (who did not continue with P instruction in the spring), who averaged 39.18 wpm. The 29 Ss of the other two Year-1 teachers in C classes averaged 32.4 wpm.

Turning to the major data on production performance (below the dashed line in Table 21), positive differences between means (in the "C-P" columns) favor programed Ss, negative differences favor conventional Ss. First-semester programed Ss were faster at all three tasks than second-semester

conventional Ss, the difference (of 20.13 quarter minutes) equalling about five minutes. That difference seems greatly larger than the time that would be required for the correcting of the additional 1.20 uncorrected typographical errors made by the P Ss. In Year-2, third-semester programed Ss were faster at business letters, but slower at tables, than fourth-semester conventional Ss. Very likely, the programed S, whose training has focussed on correct placement, took the time to plan table layout more carefully; business letters, on the other hand, make fewer and simpler conceptual demands. Across all four Year-2 tasks there seems little to choose between the speeds of P and C Ss (a difference of .19 quarter minutes equals about 3 seconds). However, P Ss had an excess of 5.12 uncorrected typographical errors; correcting them would probably have added 1-2½ minutes to completion time, varying with eraser versus Ko-Rec-Type use. Accordingly, fourth-semester conventional Ss should probably be considered to be slightly faster at production tasks than third-semester programed Ss.

The foregoing speed findings are, on the one hand, somewhat uncertain because of the difference in test administration conditions mentioned earlier and, on the other, of less consequence in relation to the more important criterion of quality of work (form errors). Here, the clear superiority of the programed instruction is evident. First-semester programed Ss made half as many form errors (49.96%) as were made by second-semester conventional Ss. Third-semester programed Ss made about three-fourths the errors (76.91%) made by fourth-semester conventional Ss.

In contrast to some of the more complex tasks employed in June criterion testing (see Table 14, p. 57), some of which were lightly treated, if at all, in conventional instruction, the January test tasks were simple ones routinely included in one-year and two-year conventional training programs. The data of Table 21 strongly suggest that, with respect to the dominating criterion of quality of production typing (absence of errors not correctible by eraser--form errors, that is), early, continual, and intensive focus on placement concepts and processes can, for the simple letters and tables used here, lead to substantially superior performance in substantially less time--in contrast to the deferred production typing and excessive guidance characteristic of conventional instruction. Here, the novel medium was programed instruction. But the important point is early and deliberate focus on placement concepts and processes, whatever the medium of instruction may be.

Relationships Among Various Kinds of Performances

The relationships of interest, for the conventional and programed Ss separately and together, are these:

1. Between vocabulary and typing performance scores (straight copy and production tasks)

2. Between straight copy and production typing scores

3. Between speed and errors in production tasks

4. Among the three classes of production tasks (business letters, tables, manuscripts) for speed, form errors, and uncorrected typographical errors

The data on the four classes of relationships enumerated above are given, in turn, below, as are the instructional questions that underlie, and the inferences to be drawn from, the data. Correlation coefficients were computed by level (Year 1 and Year 2) within treatment (conventional and programed). However, with occasional exceptions, there were few nontrivial differences between Year-1 and Year-2 correlations. Accordingly, the tabled findings are given across years, and the few instances of nontrivial "level" differences are mentioned in the accompanying discussion. All the scores are those of end-of-year (June) criterion testing, consisting of: a 3-minute straight copy timing, a 20-word vocabulary test, three business letters for P Ss but two business letters for C Ss, one table, and two manuscripts. Ns per task per level varied widely; therefore, the mean correlation coefficients (r's) given in the tables that follow, computed by z transformation, were weighted by N. Since the larger Ns were for P Ss in both years and among Year-2 Ss in both treatments, the overall r's for "both" treatments are more heavily influenced by P than by C Ss and by Year-2 than by Year-1 Ss.

Vocabulary and Typing Performance Scores. One issue here is that of the extent to which typing proficiency is associated with intelligence (as inferred from vocabulary scores). Might intelligence scores be a partial basis for screening candidates for advanced typing training? In contrast to earlier findings on heterogeneous students, do those for disadvantaged students support the desirability of different training techniques for such students? A second issue stems from investigations (e.g., Stolurow, 1964) that showed programed instruction to lead to "essentially zero" correlations between IQ scores and achievement measures. Are the correlations obtained here lower for P than for C Ss? If so, then the present programed materials may be judged more efficient than is conventional instruction.

In agreement with a very large volume of earlier research (summarized in West, 1969, p. 522) showing trivial relationships between intelligence and ordinary copying skills as measured in straight copy tests, for N = 504, r's of .115 and -.050 were found between vocabulary scores and straight copy speed and between vocabulary scores and straight copy errors in the present investigation. Copying skills are largely independent of intelligence. Between vocabulary scores and number of production tasks completed during the test week, r = -.094 (N = 514). Production task data are shown in Table 22.

Table 22

Correlations between Vocabulary and Production Typing Scores
(Decimals omitted)

Variable	Range						Mean r			Mean N		
	C		P		Both							
	From	To	From	To	From	To	C	P	Both	C	P	Both
Speed												
3 Letters	-35	17	-20	04	-35	17	-08	-12	-11	35	138	91
1 Table	-22	05	-12	05	-22	05	-16	-07	-09	32	133	85
2 Mss.	-25	16	-18	06	-25	16	-08	-04	-05	85	138	90
Form Errors												
3 Letters	-38	-02	-14	02	-38	02	-13	-04	-05	35	138	91
1 Table	-18	01	-01	02	-18	02	-03	01	01	32	133	85
2 Mss.	-47	05	-13	05	-47	05	-15	-09	-10	85	138	90
Typos												
3 Letters	-62	14	-18	11	-62	14	-32	-07	-12	35	138	91
1 Table	-19	-09	-08	-01	-19	-01	-17	-06	-08	32	133	85
2 Mss.	-47	05	-13	-05	-47	05	-18	-08	-10	85	138	90
All Tasks												
Speed	-35	17	-20	06	-35	17	-10	-08	-09	38	137	90
Form Err.	-38	01	-19	02	-38	02	-12	-05	-06	38	137	90
Typos	-62	05	-18	11	-62	11	-24	-07	-10	38	137	90

Production speed was measured by completion time; accordingly, the negative r's with speed mean that as vocabulary scores increased, completion time decreased (i.e., production speed increased). For errors (form and typos),

negative signs show increases in vocabulary going with decreases in errors. Although the mean r's are in the anticipated direction, none of them is large enough (in relation to the mean Ns) to differ significantly from zero, using p = .05. Earlier studies of heterogeneous trainees (e.g., Cook and Appel, 1941) reported correlations between IQ and production typing scores of up to .81. For the present disadvantaged Ss, however, there was substantial restriction of range in the vocabulary scores (low of 2, high of 15, with about 95 percent of all scores between 3 and 13). Another explanatory factor arises from the established generalization that in complex tasks individual differences increase with practice (Anastasi, 1934). The below-average abilities of the present trainees probably led to relatively limited amounts of practice (i.e., number of different typing tasks completed during the training). Thus, production typing scores were also probably restricted in range. The present low correlations no doubt reflect, in part, substantial restriction of range in both variables (vocabulary and production skill). Even so, there is no present evidence that intelligence is useful in screening disadvantaged trainees for vocational typing courses. Firmer data require, at a minimum, sufficient practice to widen the range of production typing scores.

Concerning the typical finding of at least moderate correlations between aptitude and achievement following conventional instruction, it has been held that such relationships reflect instructional inefficiency--the inability in mass instruction for the "live" teacher to take into account in his teaching the various pertinent individual differences among students. With more adequately individualized (e.g., "programed") instruction, studies such as those of Stolurow (1964) found "essentially zero" correlations. Inspection of the mean r's for the C and P Ss in Table 22 shows the shift to be, in 11 of 12 instances, in the predicated direction: the mean r's for P Ss are, with one exception, below those for C Ss. The various Ns that underlie the mean r's preclude testing whether the differences are statistically significant; the near-uniform direction of these differences is, however, apparent. In the present context of individualized instruction reducing relationships between aptitude and achievement, it seems probable that the learning sequences of the present programed typing materials were more "efficient" than those of conventional, live instruction. Efficiency, here, is in relation to aptitude correlations, not to the achievement of marketable typing skills.

Straight Copy and Production Typing Scores. As described earlier, conventional instruction, especially of disadvantaged students, tends to give substantial attention to ordinary copying skills. Among heterogeneous students, the assumption would appear to be that such skills contribute appreciably to proficiency at realistic vocational typing tasks; among students of below-average ability it is perhaps assumed, as well, that their capacities preclude mastery over the more consequential typing tasks. A summary of the earlier evidence on relationships between straight copy and production typing proficiency among heterogeneous high school and college students (West, 1969, p. 330) showed moderate correlations for speed and low correlations for errors (under no-erasing conditions). The present findings on this issue are displayed in Table 23.

Table 23

Correlations between Straight Copy and Production Typing Scores
(Decimals omitted)

Variable	Range						Mean r			Mean N		
	C		P		Both							
	From	To	From	To	From	To	C	P	Both	C	P	Both
SC Speed with												
Letter Speed	-63	-21	-31	05	-63	05	-36[a]	-23[c]	-25[b]	35	136	90
Table Speed	-09	02	-17	-03	-17	02	-06	-13	-11	37	132	84
Ms. Speed	-47	-23	-31	-15	-47	-15	-35[a]	-24[c]	-26[a]	42	137	65
All Tasks	-63	02	-31	-15	-63	02	-31	-22[c]	-23[a]	38	136	89
SC Errors with												
Letter Speed	-12	05	-24	26	-24	26	-04	05	04	35	136	90
Table speed	08	19	-06	01	-06	19	11	-12	03	37	136	90
Ms. Speed	-25	21	-12	15	-25	21	09	02	-01	42	137	65
All Tasks	-25	21	-24	26	-25	26	-04	03	02	38	136	89

[a]Significantly different from zero at the .05 level.

[b]Significantly different from zero at the .02 level.

[c]Significantly different from zero at the .01 level.

Again: with SC (straight copy) speed measured in words per minute but production speed in completion time, negative speed correlations in Table 23

mean that as wpm increases, production completion time decreases (i.e., production speed increases). The mean r's for speed-with-speed in Table 23 show rather more transfer of SC stroking habits to letter and manuscript typing than to table typing--a finding that is quite to be expected from the continuous prose character of letters and manuscripts, but not of tables. The more the production task content consists of the continuous prose of straight copy typing, the more will straight copy skills contribute to production speeds. Even for such tasks, however, the obtained r's are low--well below those found among highly trained high school and college typists of heterogeneous ability. Also, although the nature of the data precludes statistical tests for significance of differences between the mean r's of C and P Ss, it may be noted for letters and manuscripts (the two tasks to which the issue applies) that the r's are lower for P than for C Ss. For the conventional trainee, given little explicit instruction in making placement decisions, his production speed depends more heavily on ordinary stroking speed than does that of the trainee given explicit placement instruction and practice in making placement decisions. Put another way: as the thinking through of the placement decisions enters more prominently into production typing, the role of ordinary stroking speed is reduced.

Correlations of SC errors with production errors are not reported because they have no logical relationship. Misstrokes are wholly independent of the kinds of mental processes that apply to form errors, and there can be no interest in whether misstrokes under no-erasing (SC) conditions are associated with uncorrected misstrokes (typos) under the erasing conditions of production typing. In Table 23, correlations between SC errors and production speed are shown because, if the stroking habits of SC typing are also used in production typing and if production misstrokes are to be corrected, then the more production misstrokes the longer the production completion time. As shown in Table 23, the obtained r's are trivially small--a finding that suggests that the stroking habits bearing on accuracy in SC typing are not the ones used in production typing and that the conventional extreme focus on stroking accuracy in straight copy typing (during training and in employment tests) is seriously mistaken. That inference is more directly supported by error correlations under no-erasing conditions for both tasks and by the characteristically low reliability of measures of SC errors. The present data merely add tangential support to the earlier direct evidence,

as summarized by West (1969, pp. 330, 296).

Production Speed and Errors. Does the faster production typist tend to do work of higher quality? For straight copy typing, data on thousands of typists in dozens of studies (summarized in West, 1969, p. 238) show the two criteria to be virtually uncorrelated, i.e., about as often very low negative as very low positive. For the present Ss, the r for straight copy speed and errors was .08 for both C and P Ss, little different from the r of .14 found among typists covering the full range of copying skills from 9 through 108 wpm (West, 1969, p. 238). For the realistic vocational typing tasks of "production" typing, four earlier studies (see West, 1969, p. 398) reported speed-error r's ranging between .08 and .52. The findings for the present Ss are displayed in Table 24.

Table 24

Correlations between Production Speed and Errors
(Decimals omitted)

Variable	Range						Mean r*			Mean N		
	C		P		Both							
	From	To	From	To	From	To	C	P	Both	C	P	Both
3 Letters												
Form	-11	20	-23	19	-23	20	03	06	05	37	140	93
Typos	-30	22	-09	48	-30	48	-08	17	14	37	140	93
1 Table												
Form	-04	07	07	10	-04	10	-08	09	05	39	136	88
Typos	-46	-05	-29	-05	-46	-05	-19	-13	-14	39	136	88
2 Mss.												
Form	-14	12	01	08	-14	12	00	06	04	46	141	94
Typos	-15	13	-33	13	-33	13	-05	01	00	46	141	94
All Tasks												
Form	-14	20	-23	19	-23	20	00	06	05	41	140	92
Typos	-46	22	-33	48	-46	48	-08	07	04	41	140	92

*None of the mean r's is significantly different from zero.

With few exceptions, the mean r's of Table 24 are near zero, and none differs significantly from zero. Speed at production tasks is essentially independent of that aspect of work quality bearing on attractive arrangement of materials on the page (form errors). "Typos" are not number of misstrokes, but number of uncorrected misstrokes. However, purely probabilistically, the more misstrokes, the more of them that can be overlooked. Also, a typist could be faster because he does not take the time to correct misstrokes, or slower because he does correct mistakes. The near-zero r's for "typos," as for form errors, show no tendency in either direction. Speed and quality seem essentially independent--at least among the present low-ability Ss.

Intertask Relationships. If there is overlap in the processes applicable to typing the various vocational tasks, transfer of skills from one kind of task to another should be expected; and if the commonalities in task processes are accurately identified and there is deliberate "teaching for transfer," training time can be economized. The pertinent data are shown in Table 25.

Table 25

Median Intercorrelations Among Production Tasks[a]

(L = Letter, T = Table, Ms = Manuscript; Decimals omitted)

Task	C			P			Both		
	Ls	T	Mss	Ls	T	Mss	Ls	T	Mss
Speed									
Letters	22	27	40*	23*	16	20*	23*	17	22*
Table			22			16			17
Manuscripts			26			08			10
Form Errors									
Letters	51*	62*	38	44*	47*	46*	44*	49*	45*
Table			45*			42*			43*
Manuscripts			-11			45*			38*
Typos									
Letters	59*	36	34	46*	31*	27*	46*	32*	28*
Table			31			40*			39*
Manuscripts			10			34*			31*

[a]From left to right across the rows, the mean Ns are--Letters row: 20, 24, 24, 124, 120, 126, 98, 82, 85; Table row: 25, 122, 74; Manuscripts row: 16, 124, 72.

*Differs significantly from zero (i.e., $p < .05$ to $< .01$).

In Table 25, some of the r's among conventional trainees are higher than the corresponding r's for the programed trainees, but fall short of differing significantly from zero only because of the smaller Ns on which they are based (see Footnote a). That aside, the correlation coefficients of Table 25 confirm what is more or less to be expected. The tasks whose content consists substantially of continuous prose and whose placement decisions are largely confined to the determining of margins (viz., letters and manuscripts) show greater agreement with each other than either of the two do with tables. Tables, uniquely, add internal decisions about the location of tabular stops for columns and the centering of column headings, as well as the alignment of digits in columns. The two manuscripts show relatively less agreement with each other than one might, superficially, expect. However, one of the two manuscripts contained features not present in the other one: editorial corrections and footnoting. Clearly, the more the overlap in task features (and, therefore, in placement processes), the higher the intertask correlations. In general, the extent of overlap in the six criterion tasks (3 business letters, 1 table, 2 manuscripts)--for the present Ss--may be characterized as low to moderate and tending to be higher for placement processes (form errors) than for speed of work. The tendency to proofread and to correct misstrokes (i.e., "typos") was more in evidence for letters than for the other two tasks.

Differences between the r's for P and C trainees--although not susceptible to statistical tests of signficance--bear on the deliberate attempt in the programed materials to teach for transfer, resulting in a substantially smaller range of form-error r's among the P trainees (from .42 to .47) than among C trainees (from -.11 to .62). Clearly, the programed materials led to levels of agreement among scores substantially less variable than those found among conventional trainees. The programed instruction seems to have accomplished its objective of transfer of applicable placement processes among tasks. Conventional instruction, it may be inferred, tends more often to treat each kind of task as unique; commonalities among placement processes are not routinely and deliberately pointed out to trainees.

Finally, there were a few instances of nontrivial differences between Year-1 and Year-2 r's--about as often in one direction as the other among both P and C trainees. The more general data of Table 25 and the inferences drawn from that data are unaffected.

Judgments of the Programed Instruction by Teachers and Chairmen

The subjective impressions of teachers about various aspects of the programed instruction were solicited via questionnaire at the end of the year. The chairman of the Secretarial Studies Department in each of the two participating vocational high schools was also asked to comment, by letter to the investigator, on any aspect of the instruction, using the teacher's questionnaire as an approximate indicator of the issues of interest. Their comments tended to be in general accord with the questionnaire responses of teachers. Some of the questionnaire findings were given in the "Procedures" section of this report. Other findings are given here, and the questionnaire is reproduced on pages 103-105.

The present findings apply to eight teachers: the six involved in the full-year instruction, plus two other teachers in School A (one Year-1 and one Year-2 teacher) who replaced the fall-term teachers who left or were reassigned. The two replacements were involved only in spring-term programed instruction of Ss whose earlier fall-term programed instruction had been in classes of the teachers who left at the end of that semester. However, the one-semester experience with programed instruction of the two new teachers is felt to have furnished as adequate a basis for judgment as did the full-year experience of the other six teachers. The test papers of Ss in the four classes of the two new teachers were not scored, however, because those teachers had not been involved in the earlier McLean investigation that furnished the scores of conventional Ss; i.e., for those teachers there were no C scores against which P scores could be assessed. The two teachers were not so informed, however; they and their classes were treated throughout precisely as were the other six teachers and their classes, including full June criterion testing.

Questionnaire Item 3 (p. 103) asked for estimates of the percentage of students with various attitudes toward the program (unfavorable, neutral, favorable). Among the eight teachers, estimates of unfavorable attitudes ranged from 10 to 95 percent, averaging 65 percent; neutral attitudes ranged from 5 to 50 percent, averaging 20 percent; favorable attitudes ranged from 0 to 50 percent, averaging 15 percent. Put another way, of every 20 P trainees, 13 were judged to have unfavorable attitudes, 4 to be neutral, and 3 to have favorable attitudes. With values of 1, 2, and 3 assigned to the attitudes (from unfavorable through favorable), the mean was 1.50--halfway be-

tween unfavorable and neutral.

Questionnaire Item 4 (p. 103) asked for estimates of program suitability to students (highly suitable, moderately suitable, unsuitable). Responses approximately paralled those for student attitudes--as might be expected, since attitudes and suitability are correlated phenomena. Specifically, the programed frames were judged to be unsuitable for 10 to 85 percent of Ss, averaging 71 percent; moderately suitable ranged from 10 to 40 percent, averaging 18 percent; and highly suitable applied to 0-60 percent of Ss, averaging 11 percent. With slight rounding of these estimates, the judgment were that of every 20 P trainees the program was unsuitable for 14 of them, moderately suitable for 4, and highly suitable for 2 students. With values of 1, 2, and 3 assigned to the estimates (from unsuitable to highly suitable), the mean value of 1.41 is two-fifths of the way between unsuitable and moderately suitable.

The general tenor of these estimates (about student attitudes and program suitability) is markedly negative and, however subjective, cannot be gainsaid. Even so, some emotionalism and lack of discrimination in the responses of some teachers is evident. It is hardly likely, for example, that no student in a pair of classes had favorable attitudes toward the program; yet, one of the eight teachers (with 50+ students on register in two classes) so estimated. Similarly, two of the eight teachers (100+ Ss on register in four classes) estimated that there were no students for whom the program was highly suitable and only ten for whom the program was moderately suitable. Extremes such as those cited contradict reasonable probabilities and cannot be taken seriously. In view of the perceptions and expectations of six of the eight teachers concerning student abilities and attitudes toward homework (as given in the "Procedures" section), it may be that, to some undeterminable extent, the present estimates represent a self-fulfilling prophecy, revealing teacher attitudes as much as they do student attitudes.

The foregoing conjecture deserves some exploration, admittedly speculative. The disadvantaged Ss of the present investigation are not "readers"; they have been trained throughout their school experience to expect instruction to be largely at the hands of the teacher, gotten "through the ears" and from the blackboard. Insofar as thinking about what one reads is hard work, such students are not overjoyed with instruction that requires thought on their part. In turn, teachers of such students probably reinforce stu-

dent expectations about instruction and, indeed, account in no small part for those expectations. One teacher, in fact, confessed to the investigator personal resentment at the preempting of a consequential portion of that person's normal teaching activities by the programed materials. Inexperience in accomodating their live instruction to the programed portion of it is another factor bearing on teachers' estimates of program suitability and student attitudes, and the rather too full curriculum imposed by the investigator on both Year-1 and Year-2 trainees is also pertinent. Given more teacher experience with programed instruction and deeper training in using such materials, plus modification of teachers' stereotypes about disadvantaged students and concomitant revision of instruction away from interminable "guidance" for relatively trivial tasks and toward "confirmation" techniques applied to more consequential tasks, teacher and student attitudes might well be appreciably improved. The present programed materials were hard work indeed, for both students and teachers. However, the resulting proficiency at the vocational typing tasks of the present investigation, in relation to the outcomes of conventional instruction, show the effects of the programed instruction to have transcended the attitudes reported by teachers.

Teachers were also asked (Questionnaire Item 5, p. 103) to specify the sections of the program that students found most difficult. All eight teachers listed various subsections of Section 9 (Advanced table typing) as most difficult, and five of the eight also mentioned one or another of the earlier sections on simple tables (Sections 5-8). Four of the eight teachers included manuscript typing (Section 14) as among the half dozen most difficult topics. Despite the particular wording of the question, responses refer to the task, not to the programed treatment of it. Table typing is notoriously the most difficult vocational typing task, whatever the medium of instruction; and manuscript typing was new to the curriculum and to these teachers--not included in earlier conventional instruction. That "difficulty" was to some extent confused with "novelty" is evident in the specification by one teacher of backspace methods of typing tables as among the more difficult topics. Backspacing is much simpler than arithmetic methods and is, indeed, the only method of table typing taught in one of the country's leading typewriting textbook, one that studiously excludes the more complex tables for which backspace methods are wholly inadequate. Backspace

methods are simple, and they apply to simple tables--but that method was new to the teacher in question, as it was to all eight teachers, who had previously taught only arithmetic methods of planning the horizontal layout of tables. For students routinely characterized by their teachers as exceptionally weak in arithmetic, the conventional use of arithmetic rather than nonarithmetic methods of table placement illustrates the failure to modify instruction in accord with student characteristics.

In other instances of topics characterized as difficult, the tasks were familiar, but the program's procedures for executing those tasks differed to greater or lesser extent from those familiar to teachers (e.g., placement of business letters).

Teachers were also asked (Questionnaire Item 10, p. 104) what program procedures they felt were superior to the ones they had employed in their earlier conventional instruction. Mentioned, with frequencies in parentheses, were: business letter placement, i.e., procedures for determining vertical and horizontal margins (5), estimation of copy length (4), lavish use of longhand rather than perfectly printed copy for typing (2), manuscript typing (2), and backspace methods of table placement (1).

They were also asked (Question 12, p. 105) about their future intended inclusion of topics and use of placement procedures that were contained in the program (to a considerable extent, to some extent, not much). Of the eight teachers, responses were equally divided between "not much" and "to some extent." It is perhaps amusing to note that three of the four "not much" respondents had specifically listed a number of program procedures they felt were superior to their usual ones (Question 10).

Finally (Question 16, p. 105), teachers were invited to comment freely on any aspect of the programed instruction. Five of the eight teachers accepted the invitation. Excepting the few irrelevant or factually incorrect comments (and including those in the chairmen's letters to the investigator), the pertinent ones were:

1. Too much work in too little time; students felt breathlessly rushed.
2. Our pupils do not work well under pressure; they become jittery.
3. The skills taught were beyond the comprehension of [our] pupils.
4. The program required reading comprehension that pupils did not have.
5. The program is more suitable to brighter or college students--probably a good one for students of average or higher ability.

6. [High school students] do not willingly do homework.

7. Pupils are accustomed to teacher [emphasis mine] explanation, repetition and review.

8. The program's procedures for typing are good for the teacher--to use in teaching verbally. These kids want the teacher to teach; they don't want to read.

9. The need for close concentration [on the programed frames] was just too much for many students.

10. The precision of the program's placement procedures perhaps made pupils conscious of minutiae at the expense of broader concepts.

11. Teaching more than one placement procedure for a given type of task [e.g., backspace and arithmetic table planning methods, moving and fixed datelines in letters, pica and elite type] confuses students. Better to teach such students one and only one way to do things.

12. Any kind of arithmetic [e.g., for table placement, estimation of copy length] is too much for these students.

13. For the many clerical and bookkeeping majors, "interest in typing is at best peripheral."

14. [From one chairman] There was a great deal of teacher resistance to the program; some were never "sold" on it. There were too many topics to be covered, with inadequate time for application. Teacher paper work and clerical chores were also a burden.

15. Pupils were achieving better in judgment areas than former pupils of these teachers had done [because] pupils were forced to use their own judgment and not rely on their teachers.

The foregoing comments are given almost verbatim, and No. 15 strikes to the heart of what instruction aimed at marketable vocational typing skills is all about. Even so, the program is probably not well suited to low-ability trainees. The highly favorable typing performance outcomes of the programed instruction were perhaps accomplished by brute force--by a level of effort that probably cannot be routinely expected short of a revolution in teachers' perceptions of low-ability students and in the modes of teaching such students characteristic of all their schooling. One principal requirement, in the judgment of the investigator, is the replacement of pap with substance, of trivial skills for which there is no market with skill at real-world tasks. Another is gross reduction in the amount of leading

by the hand, coupled with explicit teaching of pertinent concepts and ample practice in applying those concepts without continuous assistance--an assistance that is rarely available in real life once formal training has been completed.

Finally, it is regrettable that an opportunity to test the programed instruction on heterogeneous students, including ones of average and higher general ability, could not be arranged. Conceivably, the program would be found to be well suited to the average student. For such students, bypassing the substantial amount of live instruction devoted to the placement concepts of vocational typing tasks (by home study of materials such as the present ones) could result in important economies in training time and/or in higher proficiency resulting from more time available for practice at the typewriter in applying placement concepts to realistic vocational typing tasks.

Summary of Findings, Conclusions, and Recommendations

As a basis for enumerating the specific findings of the present investigation and the conclusions and recommendations that flow from the findings, the major purposes and characteristics of this investigation are first summarized briefly.

Chiefly at issue are the relative effects on proficiency at vocational typing tasks of conventional versus programed instruction, applied to low-ability first-year and second-year typing trainees in two vocational high schools. The programed instruction was conducted for a full school year in four first-year classes of two teachers and in twelve second-year classes of four teachers. Outcomes were contrasted with those following conventional instruction among students of comparable general ability in the classes of the same teachers in the same schools two years earlier (three first-year and nine second-year classes). For first- and second-year instruction respectively, findings are based on 45 and 168 conventional students and on 109 and 225 programed trainees.

The real variables under investigation are represented by the characteristics of the two contrasted instructional modes. Conventional instruction had the following leading characteristics:

1. Substantial focus on ordinary copying skills of the kind measured in straight copy tests.

2. Relatively late introduction of vocational typing tasks.

3. Restriction of vocational typing tasks to the simplest ones (viz., simple business letters and simple tables).

4. Instruction wholly teacher mediated (oral and blackboard), accompanied by much teacher guidance for student responses into late stages of training.

5. Teaching of one procedure for a given kind of task, by rote and not strongly accompanied by "whys and wherefores."

6. Student practice almost entirely from perfectly printed materials.

In contrast, the programed instruction had the following characteristics:

1. Substantially less practice given to ordinary copying skills.

2. Early (middle of October) introduction of realistic typing tasks.

3. Coverage of a wide range of task difficulty, indentically in first- and second-year classes.

4. Deliberate instruction, via "home" work on linear programed "frames," dealing with the concepts and procedures governing attractive placement or arrangement of typed materials on the page, followed, in class, by practice at the typewriter in applying the placement concepts and procedures to representative tasks (here: business letters, tables, and manuscripts). Practice and test materials following completion of a subsection of the program were wholly "unarranged," unaccompanied by specific placement information, and required the student to make his own decisions about margins, tabular stops, et al., without teacher assistance. The chief roles of the teacher were to monitor the completion of programed subsections by students and to furnish ample practice at the typewriter.

5. Teaching, when applicable, of more than one procedure for typing a given task (e.g., both backspace and arithmetic methods of table planning, both moving and fixed date lines in business letters).

6. Large amounts of student practice from the longhand materials that predominate in real-world typing activities.

In addition, the programed materials incorporated the step-by-step sequencing of events and the individualization of instruction that is nearly impossible to achieve to comparable degree in live (oral) conventional teaching.

Programed students were tested at mid-year on simple business letters and tables. All trainees, both conventional and programed, were tested at the end of the school year on the same tasks: a 20-word vocabulary test used as a measure of general ability, a 3-minute straight copy timing on prose of average difficulty, a 150-word letter that included a 3-column table with

column headings, a 75-word letter including an enumeration, a 150-word simple business letter, a 4-column table with one 2-line and three 1-line column headings, a 150-word manuscript including one footnote and editorial corrections, and a 75-word simple prose manuscript without special features.[21] The six production tasks were scored for speed (completion time), for errors in form or arrangement of materials on the page (form errors), and for uncorrected typographical errors ("typos"). All production test copy was unarranged, and students were required to make their own placement decisions and to correct mistakes (by eraser or Ko-Rec-Type).

Findings, Conclusions, Recommendations

The principal findings are given below, with details presented on the pages of this report given in square brackets. Each finding or group of findings is followed by conclusions and recommendations. The objective of the programed instruction (and, indeed, of vocational typing training) makes "form errors" the principal criterion of proficiency, with speed of work secondary. Neither mode of instruction, conventional or programed, had any direct differential bearing on proofreading and correction of misstrokes; accordingly, uncorrected typographical errors were not expected to be differentially affected by the two contrasted instructional modes.

As a preliminary to the findings on performance, the students in the C (conventional) and P (programed) classes did not differ in general ability (as inferred from vocabulary test scores) and were of below-average general mental ability [pp. 43-45]. Accordingly, the results may be attributed to the instructional modes, uncontaminated by differences in student aptitudes.

Straight Copy Proficiency. Despite substantially less practice at ordinary stroking skills in P (programed) classes, neither in Year 1 nor in Year 2 did P and C students differ significantly in straight copy performance, as measured by gross words per minute and number of errors [pp. 52-53, 59]. In addition, straight copy speed was little correlated (r = -.23) with production speed (completion time); and straight copy accuracy was uncorrelated with production speed (r = .02). [pp. 79-80]

Conclusion 1. The conventional assumption that ordinary copying skills

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[21] It was found, upon readying data for statistical analysis, that there were no scores on record for first-year C students for the 150-word simple business letter. Accordingly, results for Year-1 trainees are based on five rather than six production typing tasks.

make an important contribution to proficiency at vocational typing tasks and the consequent substantial attention to copying skills throughout training are seriously in error. Three inferences seem appropriate: (a) Vocational proficiency depends mostly on decision-making about the placement of materials on the page; (b) The stroking habits of straight copy typing are not identical to those of production typing--probably because of differences in the typist's "set" or perception of the requirements of the two kinds of tasks; and (c) The characteristic negative acceleration of the acquisition curves for copying speed and errors suggests that the levels of copying skills typically found at the earlier stages of training are so modest that any kind of typing practice (e.g., at realistic vocational tasks) contributes to gains in ordinary stroking skills.

Recommendation 1. Drastically reduce the conventional focus on ordinary copying skills of the kind measured in straight copy tests. Such skills contribute little to proficiency at realistic vocational tasks and do not suffer when the bulk of training is devoted to vocational skills.

Production Typing Proficiency. Findings on production proficiency are given, in turn, for first- and second-year trainees, for both years together, and for less programed instruction in contrast to more conventional instruction. [pp. 51-62, 70-73]

a. Among the five Year-1 terminal production tasks, C (conventional) students were significantly faster than P (programed) trainees in two instances (table and letter with table), whereas P students made significantly fewer form errors in each of the five tasks. There were no significant differences in number of "typos." Summing across all five tasks, C students completed them in 73 percent of the time required by P trainees (70.6 vs. 96.7 minutes--7.44 vs. 5.43 words per minute). Form errors by P students were 49.2 percent of the number made by C trainees (18.22 vs. 37.02). [pp. 51-59]

b. Among six Year-2 production tasks, C students were significantly faster than P trainees in two instances (table and letter with table), but made significantly more form errors in each of the six tasks. One of the six differences in "typos" was statistically significant, favoring C students. Summing across tasks, C trainees completed them in 87.5 percent of the time required by P students (80.70 vs. 90.25 minutes--8.36 vs. 7.32 words per minute). Form errors by P students were 55.5 percent of the number made by C trainees (20.20 vs. 37.09). [pp. 51-59]

c. Summarizing across both years, of 11 task comparisons, there were four significant speed differences, favoring C students; whereas P trainees made significantly fewer form errors in all 11 instances (the largest differences being found for the table and for the manuscript containing a footnote). At the cost of a 27 percent reduction in speed among Year-1 trainees and of 12½ percent among Year-2 students, programed instruction reduced placement or form errors by nearly half (38.42 vs. 74.11). [pp. 58-62]

d. First-year programed instruction led to a level of work quality greatly superior to that achieved after two years of conventional instruction: for every 20 form errors made by Year-2 C students, Year-1 P trainees made 11 form errors (on the five tasks common to both years). [pp. 58-62]

e. Contrasting first-year and second-year performance among C and P students, production speed among C students in Year-2 was only .37 wpm above that of first-year students; among programed trainees, the gain was 1.30 wpm. On the other hand, among conventional students form errors in Year 2 were 10.2 percent below those of Year 1; whereas among P students the difference was .1 percent. It is apparent that among Year-2 programed trainees their first year of conventional instruction contributed nothing to the production quality (form errors) that followed programed instruction in their second year. In other words, for quality of work, programed instruction in Year 1 was as effective as Year-2 programed instruction that had been preceded by a year of conventional instruction. [pp. 58-62]

f. Programed students were tested at mid-year (January) under conditions that tended to inflate their speed scores (in relation to end-of-year scores) but that could have no differential effect on errors. Comparison of mid-year P scores with end-of-year C scores (3 tasks in Year 1, 4 tasks in Year 2) had results as follows: In Year 1, P students after one semester of instruction completed 3 tasks in 5 fewer minutes than did C students after a full year of instruction, and they made greatly fewer form errors (P = 6.92, C = 13.85). In Year 2 there were no speed differences between half-year P students and full-year C trainees, whereas P trainees made fewer form errors (P = 13.82, C = 17.97). [pp. 70-73]

Conclusion 2. Early introduction of and continual focus on the concepts and procedures applicable to the placement features of vocational typing tasks (here, via programed instruction), accompanied by practice in applying those procedures to realistic tasks, without teacher assistance, is markedly superior to the conventional practice of deferring vocational

typing tasks until relatively late in training, accompanied by large amounts of teacher (or textbook) assistance in making placement decisions. Indeed, the former tactic--among low-ability students, at any rate--led to nearly 50 percent improvement in work quality in about half as much training time.

Recommendation 2. Vocational typing training should (a) drastically reduce the amount of attention given to ordinary copying skills; (b) introduce vocational tasks very early in instruction (perhaps by mid-October); (c) give students, from the start, explicit instruction in the procedures governing attractive arrangement of typed products, accompanied by ample practice in applying placement procedures to realistic, unarranged materials (preferably in longhand), without teacher guidance. Strenuously to be avoided is interminable teacher assistance in making placement decisions. These recommended tactics more or less reverse those of conventional instruction. Particularly, the "clerical" training programs common among low-ability students result in skills that have little marketable value and should be replaced by ones of genuine vocational value--even if confined to the simpler tasks rather than covering a wide spectrum of task difficulty.

Role of the Teacher in Programed Instruction. Teachers reported that students found the programed materials difficult and that much live explanation and reteaching of the programed placement concepts were required. Indeed, they estimated outcomes to be due more to their support of the program than to the program itself (Program 25%, Live Teaching 75%). However, among nine end-of-year test comparisons, only one significant difference was found between frequently absent (18.19 days) and infrequently absent (5.56 days) students--in a 72-75 day spring semester. [pp. 48-51]

Conclusion 3. Whatever the contributions to outcomes of live teaching support for the programed instruction, they were clearly less than teachers estimated. The frequent absentee who performs as well as the infrequent absentee must have learned from his programed homework.

Recommendation 3. Programed materials progressively move from heavily guided or prompted frames to unguided "test" frames--here, under wholly paper-and-pencil conditions for placement concepts and processes. The appropriate post-program teacher behavior is to supply opportunities for actual typing requiring application of placement procedures--not heavily guided oral re-explication of placement procedures prior to typing. Teachers' tendencies to extrapolate the difficulties of the few to the many is particularly to be

guarded against. (See, also, Recommendation 4, below).

Teacher Judgments of Student Attitudes and Program Features. Concerning the programed instruction used as the particular vehicle for implementing the instructional tactics described in Recommendation 2, above, the subjective judgments or impressions of teachers and department chairmen were solicited via formal questionnaire and informal letter. Findings were [pp. 82-87]:

a. Of every 20 programed trainees, 13 were estimated to have unfavorable attitudes toward the program, 4 were neutral, and 3 were judged to have favorable attitudes. The average judgment was halfway between unfavorable and neutral.

b. Judgments of the suitability of the programed instruction for low-ability trainees paralleled those for student attitudes. Of every 20 P students, the program was judged to be unsuitable for 14, moderately suitable for 4, and highly suitable for 2. The average judgment was two-fifths of the way between unsuitable and moderately suitable.

c. Table typing was judged to be the most difficult task, while the teaching of manuscript typing was novel to teachers.

d. The program's placement procedures were felt to be superior to the ones employed in earlier conventional instruction with respect to: business letter placement, estimation of copy length, lavish use of longhand materials, manuscript typing, and backspace methods of table placement.

e. Unstructured comments heavily stressed the low reading and arithmetic abilities of their disadvantaged students, the over-full curriculum imposed by the investigator, the resistance of disadvantaged students to working under pressure and to homework, and, especially important, the expectation of such students, built in over years of schooling, of oral instruction from the teacher rather than of concentrated attention to written instructional materials that require thought.

f. In general, it was judged that the program would be a highly appropriate one for students of at least average ability.

Conclusion 4. The particular programed materials used here are probably not optimally designed for low-ability students without extensive live teaching support (but see the preceding subsection on "Role of the Teacher . . ."). However, terminal production proficiency following the programed instruction (see above) suggests that the instruction transcended the negative stu-

dent attitudes and was not unmanageably beyond the modest abilities of students. Especially evident, by inference from the findings on proficiency in relation to student attitudes, is the predominance of acquisition variables over motivational ones. "You don't have to love it to learn it."

Recommendation 4. The comments of teachers and direct observation of their teaching by the investigator suggest that more effective use of these (or any) programed instruction among low-ability students requires modification of teacher stereotypes about such students and, among all students of whatever level of general mental ability, explicit training of teachers in accommodating their live instruction to the programing of parts of it. Particularly needed among teachers, especially of low-ability students, is restraining the tendency to behave as if little learning is possible except via the agency of their live instruction. The consequence of redundant oral re-explication of programed instruction is to bore the more able students and to reduce the attentiveness of all students to the programed materials. "Why work on the program if the teacher is going to explain it all anyway?"

A number of ancillary findings, associated with secondary purposes of the investigation, follow.

Supervised vs. Unsupervised Work at Programed Materials. To test the predictions of participants that their low-ability students required direct teacher supervision over their work at the program, for the first two months of programed instruction (mid-October through mid-December), one class of each P teacher worked on the program in class, under the supervision and with the assistance of the teacher; the other class of each P teacher worked on the program as homework. (Thereafter, homework applied to all students.) Among six mid-December production test tasks, for only one task were there significant differences (favoring Year-2 in-class students). Among Year-1 trainees, two of four speed differences significantly favored in-class students, with no form-error differences on any of the four tasks. [pp. 63-69]

Conclusion 5. The initial fear of teachers and chairmen that their low-ability students would not responsibly work on the program at home or learn from it without the teacher's assistance was largely unfounded. Study of programed materials by low-ability students benefits little from teacher supervision and assistance. Besides, programed materials are designed to be self-instructional and are, by definition, self-paced. In-class use of such materials on a group basis is unwieldy and unmanageable because of variations

in work time--as was instantly reported by teachers.

Recommendation 5. Efficient management of programed instruction and preservation of its consequential features mandate the assignment as homework of a specified portion of the program, which all students work on at their own rates. In-class activities following completion of programed homework can then be uniformly and efficiently applied to all students.

Intelligence and Typing Proficiency. Essentially zero relationships were found between general mental ability (as inferred from vocabulary test scores) and straight copy proficiency--in accord with much earlier evidence. Although correlation coefficients were depressed by restriction of range in the scores, for the low-ability students of the present investigation there was only a slight (and nonsignificant) tendency for intelligence to be correlated with production typing proficiency among C and P students. However, in eleven out of twelve instances, relationships were lower for P than for C students--in agreement with earlier findings that the greater individualization of instruction accomplished by programed instruction reduces the dependence of achievement on aptitude. [pp. 74-76]

Conclusion and Recommendation 6. There is no present evidence that intelligence is a useful partial basis for screening low-ability applicants for vocational typing training. However, the reduced dependence of achievement on aptitude following programed instruction is all to the good and argues for the widespread use of well developed programed-learning materials.

Inter- and Intratask Relationships. As mentioned earlier, straight copy proficiency is little related to production proficiency [pp. 77-78]. In addition, production speed was found to be uncorrelated with production form errors (r = .05) or with uncorrected typographical errors (r = .04) [pp. 79-80]. Correlations among production tasks (letters, table, manuscripts) ranged from low to moderate (-.11 to .62), the higher ones being found for tasks that share internal features and therefore placement processes. The range of intertask r's (for form errors) was greatly narrower for P than for C trainees. [pp. 80-81]

Conclusion and Recommendation 7. (See Conclusion and Recommendation 1, pp. 89-90.)

Conclusion and Recommendation 8. The essential independence of production speed and quality suggest that the two aspects of performance be given

separate instructional attention and, depending on the reliability of speed and error measures, be separately scored.

Conclusion and Recommendation 9. To the extent that various production tasks (business letters, tables, manuscripts) share internal features and, in consequence, the procedures applicable to attractive placement on the page, economies in training time and higher proficiency may be expected to result from deliberate "teaching for transfer"--intentional pointing to task communalities and placement processes--in contrast to treating each task as unique. In the sense of greatly more consistent predictability of task performance levels among programed than among conventional students in the present investigation, transfer effects, aimed at by the programed instruction, were better achieved than by conventional instruction.

Bringing the findings of the present investigation to bear on the original problem of the widespread complaints of employers about the undersupply of typists sufficiently skilled at vocational typing tasks, the evidence seems compelling that near-reversal in conventional instructional practices may be expected to ameliorate employers' complaints. Drastic reduction in emphasis on ordinary stroking skills, early introduction of vocational typing tasks, explicit instruction in how to make placement decisions, and ample practice in applying those decisions, without teacher guidance, to realistic materials (unarranged longhand) are clearly indicated. In the present instance, the foregoing tactics were implemented via programed (self-instructional) materials dealing with placement processes. Their excellent success under disadvantageous conditions (low-ability students and teachers inexperienced with programed instruction, plus long-established expectations by both of teaching and learning via live, oral instruction) points to the usefulness of programed instruction for the objectives given above and promises even greater success among students of at least average abilities, especially upon appropriate retraining of teachers for their modified roles in support of programed instruction. Even among low-ability students, "clerical" curricula confined to typing skills of little marketable value can be replaced by typing skills desired by employers.

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Appendix Contents

	Pages
Supplementary table (No. 26)	100
Instructions for program use	101-102
Teacher questionnaire	103-105
Criterion (June) test instructions	106
Criterion (June) test materials*	107-112
January test materials*	112-117
December test materials	118-123
Error scoring manual	124-129

*Letter 23 was used in both January and June testing.

Table 26

Criterion Test Means of Individual Teachers

Variable	Conventional						Programed					
	A	B	C	D	E	F	A	B	C	D	E	F
Vocabulary	7.9	8.6	8.3	8.1	6.5	7.4	8.1	7.9	8.5	8.5	7.2	6.4
SC Speed*	27.7	33.0	37.8	36.7	37.2	33.0	31.0	27.6	36.9	38.5	36.7	34.9
SC Errors	6.8	7.6	8.3	8.1	6.5	7.4	8.1	7.9	8.5	8.5	7.2	6.4
No. of Tasks	5.5	4.5	5.3	6.3	6.1	5.9	5.4	4.6	5.1	4.6	5.5	5.5
Speed**												
Letter 2	68.3	84.0	67.8	71.5	67.7	78.4	105.2	113.6	73.5	84.4	88.7	90.6
Letter 17	40.5	55.0	37.7	40.2	35.1	38.2	46.1	54.7	39.7	38.5	45.3	44.5
Letter 23	--	--	--	42.8	--	61.5	64.4	85.7	51.0	53.8	67.4	59.9
Table 4	48.2	111.5	62.3	68.0	67.7	63.9	90.9	102.9	64.1	84.7	76.4	80.5
Ms. 1	72.3	92.0	58.9	56.0	61.3	75.8	75.2	92.8	65.8	74.8	72.2	68.8
Ms. 15	29.5	49.5	35.9	41.9	31.4	48.5	43.0	54.5	34.9	33.1	41.6	40.6
Total***	258.8	392.0	262.5	320.3	263.2	366.3	424.7	504.3	329.0	369.3	391.6	385.0
Form Errors												
Letter 2	10.7	10.5	7.4	5.0	8.2	8.1	4.1	3.8	3.8	3.5	3.7	4.5
Letter 17	4.5	4.7	4.0	3.2	4.5	4.6	1.8	1.5	2.2	1.5	2.5	2.7
Letter 23	--	--	--	4.0	--	3.8	2.1	2.0	1.8	1.5	1.6	2.4
Table 4	12.1	8.5	7.1	4.7	8.7	10.1	4.8	2.4	4.0	5.2	4.5	5.5
Ms. 1	11.2	9.2	10.4	7.8	10.2	9.5	8.3	4.6	5.8	4.4	4.4	5.8
Ms. 15	3.4	3.0	3.0	2.3	3.3	3.4	1.8	1.7	2.4	1.8	1.6	2.5
Total***	41.8	35.9	32.0	26.9	35.0	39.5	22.9	16.0	20.0	17.9	18.3	23.4
Typos												
Letter 2	6.6	8.0	3.8	1.5	3.8	5.7	5.0	3.8	3.9	3.6	4.3	4.1
Letter 17	3.2	3.5	2.9	1.7	2.7	3.0	2.1	2.1	1.9	2.2	1.7	2.0
Letter 23	--	--	--	4.2	--	3.6	4.5	2.8	3.3	3.4	3.7	3.6
Table 4	2.4	4.5	2.0	1.0	3.1	2.2	3.6	2.8	2.9	3.2	3.0	2.7
Ms. 1	6.2	5.2	4.7	3.6	4.2	3.7	5.7	4.2	6.5	4.4	5.6	5.4
Ms. 15	1.4	1.0	1.2	1.0	1.4	1.7	2.2	1.4	1.5	1.6	1.6	1.6
Total***	19.8	22.2	14.6	13.0	15.2	20.5	23.2	17.0	19.8	17.8	19.8	19.2
Range of Ns	13-25	2-20	21-46	2-30	9-37	6-55	47-55	34-54	40-49	43-65	41-56	50-64

*In words per minute. **In quarter minutes of completion time. ***Rounded.

How to Use These Instructional Materials

These materials are an example of what is called Programed Instruction. They are designed so that you can learn from them without the aid of a teacher and are different from ordinary textbooks.

The materials are "programed" in a series of small steps called frames. Each frame gives a bit of information. You show that you have understood the information by filling in one or more missing words in the frame. In that way, you will be paying close attention and will be taking an active role in your learning. After you have filled in the blanks, check your answers against the model answers given alongside the next frame.

A program is not a test. The frames are designed to teach you, not to trick you. You fill in blanks only to see whether you have learned the information given in the frames.

Three features of programed instruction give these materials a simple appearance:

1. The step-by-step presentation of subject matter
2. Your activity in filling in the blanks
3. The immediate checking of your answers against model answers

But it is just these three features that insure that you will learn, PROVIDED you give full attention and complete concentration to each frame. If you skim through the program in a casual way, you will not learn much.

This is what you do:

1. Read each frame carefully and fill in the blanks. Sometimes a frame will have one blank, sometimes several.

2. After you have filled in all the blanks in a frame, check your answers against the model answers shown at the left of the next frame.

a. Your answers will usually be correct IF you have read the frame with close attention and IF you remember what you learned in earlier frames. If they are correct, go on to the next frame.

b. If your answers are wrong, read the frame again or refer back to the earlier frame that contains the necessary information. Try to understand why your answers are wrong and why the model answers are the correct ones. In that way you will probably avoid making the same kind of mistake again. Do not erase any wrong answers you may make; instead, draw a light line through your wrong answer and fill in the correct answer above (or below or alongside) your original wrong answer. When you have made the correction, go on to the next frame.

3. Continue in this manner throughout the program:

   Read attentively
   Answer by filling in blanks
   Check your answers against the model answers
     Reconsider your answers if they were incorrect; lightly line out any wrong answer and fill in the correct one
   Continue with the next frame

Since a program is not a test, you have nothing to gain--and much to lose--if you look at the model answers in advance. Cover the model answers with a card; uncover and examine them only after you have written in your answers.

In this program each frame has one or more blanks to be filled in. Some examples of the types of fill-ins are given below. Notice that the model answer is given alongside (at the left) of the next frame.

		What You Do
	1. The day after Monday is _____.	Write Tuesday in the blank
Tuesday	2. The first president of the U.S. was _____. (a/b/c/d) a. Thomas Jefferson b. Abraham Lincoln c. George Washington d. Woodrow Wilson	Write the letter of the correct answer in the blank--write c (for George Washington)
c	3. A week has _____ days. (how many?)	Write 7 in the blank
7	4. The number of states in the Union is _____. (48/49/50)	Select the right answer from the choices given in parentheses and write it in the blank--write 50
50		

The four most important points are these:

1. Don't just read the frames; read with close attention.
2. Remember what you learn in each frame so that you can use the information in later frames.
3. Before you fill in a blank, make sure you understand the question.
4. If an answer does not occur to you immediately, don't give up too quickly. THINK about it and try hard to supply an answer before you look at the model answer.

Programed Typewriting Teacher's Questionnaire

Name _____

1. List below the assigned (by LJW) subsections of the program that time did not permit your students to complete. [E.g., 9g, 14(28-40)]

_____ _____ _____ _____ _____ _____

2. List below the subsections of the program completed by students, but for which time did not permit providing at least 2 class days of pertinent application practice (i.e., actual typing of materials based on the program).

_____ _____ _____ _____ _____ _____

3. As best you can, estimate the percentage of students who had each of the attitudes toward the program given below. (The sum should be 100%.)

Unfavorable _____ Neutral _____ Favorable _____

4. In your judgment, for what proportion of your students was the program:

Highly suitable _____ Moderately suitable _____ Unsuitable _____

5. List below the particular subsections of the program that you consider to have been most difficult for the students. Start with the most difficult subsection and list up to 6 subsections in descending order of difficulty.

_____ _____ _____ _____ _____ _____

6. Listed below are several possible sources of poor results of program use. Add as many more as you think are applicable. Then, to the right of each indicate (by SD, D, NS, A, SA) whether you "strongly disagree," "disagree," are "not sure", "agree," or "strongly agree" with each statement.

a. These students, on the average, do not and will not do homework--especially for a subject like typewriting. ____

b. The reading level of these students is, on the average, so low that they are unlikely to learn much from any material that requires reading. ____

c. These students, in general, probably could have learned more from the typing program if it had been written more simply. ____

d. Weakness in arithmetic is a prominent reason for students' difficulties with certain portions of the program. ____

e. The typical student has a negative attitude toward school in general. ____

f. ____

g. ____

h. ____

Teacher's Questionnaire

7. During the Spring 1970 semester, what percentage of class time was spent on activities directly related to the program and what percentage to ordinary stroking skills (e.g., daily warmup, speed and accuracy practice on ordinary prose materials, straight copy practice and test timings, number and symbol practice, etc.)? [The total should be 100%.]

   Related to the program _____ Related to stroking skill _____

8. Refer to your collection of supplementary practice materials (including those supplied by LJW) and to your lesson plans and record the number of items of each kind (as listed below) actually typed by students during the Spring 1970 semester.

   a. Ordinary business letters from longhand copy, not accompanied by a word count (ones in which the student had to make his own estimate of length). ____

   b. Business letters containing a table. ____

   c. Tables containing at least 1 column heading of more than 1 line. ____

   d. Tables in which intercolumn space was up to the student. ____

   e. Manuscripts containing at least 1 footnote. ____

   f. Connected longhand matter for which the student had to estimate length as a basis for selecting margins leading to a typed product centered both vertically and horizontally. ____

9. On how many occasions during the Spring 1970 semester did you collect, examine, score, and return to students their work on letters, tables, and mss.? [Count all such work done on any one day as one occasion.] ____

10. List below the particular placement features taught in the program that you feel are superior to those you had used formerly (e.g., vertical placement of business letters).

    a. _____ Others _____

    b. _____

    c. _____

    d. _____

11. What topics and procedures contained in the program were not in your curriculum in earlier years (e.g., fixed date line in letters, backspace method of centering tables, side-bound mss., footnotes, etc.)?

    a. _____ b. _____

    c. _____ d. _____

    e. _____ f. _____

    g. _____ h. _____

Teacher's Questionnaire

12. To what extent in your future teaching do you expect to teach topics and placement procedures contained in the program that you had not employed in your preprogram teaching years? [Check one of the blanks below.]

To a considerable extent _____; To some extent _____; Not much _____

13. What proportion of student proficiency would you estimate is due to the program and what proportion to your live teaching. [The total should sum to 100%.]

Program _____ Live teaching _____

14. To the best of your knowledge, what proportion of your students feel that, in future years, typewriting will be a primary skill for them, either vocationally or personally? A subsidiary or secondary skill? Of no use to them?

Primary use _____ Secondary use _____ Little or no use _____

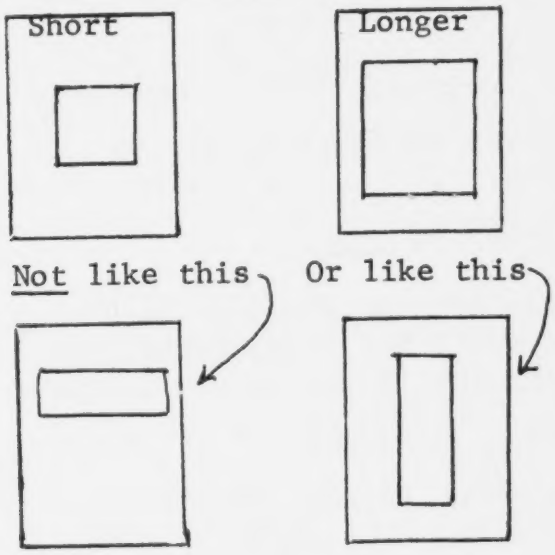
15. Rate yourself as a typewriting teacher in relation to your colleagues. [Check one and note the percentage of all typewriting teachers in each category.]

Excellent ____, Very good ____, Average ____, Fair ____, Poor ____
10% 20% 40% 20% 10%

16. If there are aspects of the program work not covered above that you feel are pertinent or if you wish to comment or expand on any of your earlier answers, please do so below in your own words. For example, what are your recommendations for program use? What sorts of program revisions are desirable? For what sorts of students might a revised program be applicable?

Student Test Instructions

1. A business letter should look like this:



The longer the letter, the narrower the side margins and the closer to the top of the page it should start.

Type each letter in accordance with the conventions that lead to an attractive appearance, using any acceptable letter style.

Be sure that each of your business letters has all the information required (for example, a date).

If a letter contains a table, the table should be centered horizontally; that is, the right margin should be the same as the left margin. Note the instructions in paragraph 3, below, for the way in which column headings must be typed.

2. Specific instructions for the rough draft copy are given at the top of each manuscript. If a manuscript contains a footnote, it should be typed at the bottom of the page, leaving a 1-inch bottom margin. The divider line should be 20 underscoring strokes. If the instructions state that the manuscript is to be centered both vertically and horizontally, you will have to estimate in advance how much space will be needed for the rough draft copy after all corrections are made--and place it on the page accordingly.

3. Type each table in accordance with the conventions that lead to attractive appearance, but follow the test copy exactly in determining the number of lines to use. Do not use column headings unless they are shown in the copy. Tables must be EXACTLY centered, both vertically and horizontally. Look at the table below for some other requirements. This is an example only!

abcdefghij		abcde abc		abcd abcdef
abcd abc ab abcd	←1→	abcdefghi abcde ab abcdefg	←2→	abc abcdefghijkl abcde abcdefg

Notice that the space between columns is the same; that is, distance 1 equals distance 2.

Notice, also, that each column heading is centered over its column, and each line of the column heading is centered in relation to the other line, as well as over the column. Type all tables across the 8½" width of the paper.

4. In all work, erase and correct all errors, on both originals and carbons.

DO NOT MAKE ANY MARKS ON THE TEST COPY. DO EACH TASK IN THE ORDER IN WHICH IT APPEARS IN THE TEST BOOKLET. HAND IN EACH TASK AS SOON AS YOU COMPLETE IT.

Mr. George Parks Harris
819 Frontenac Lane
Newark, New Jersey 07103

(2)

Dear Mr. Harris:

We have received your letter in which you ask about flights from New Orleans to Atlanta, leaving New Orleans after 6:00 p.m. We are happy to send the following:

Flight No.	Leaves New Orleans	Arrives Atlanta
6	7:45 p.m.	10:16 p.m.
4	9:23 p.m.	12:28 a.m.

There are eight regularly scheduled flights each day. A timetable showing all flights is enclosed for your additional information.

If you would like to make reservations with The Amos W. Paul Travel Agency, we shall be glad to make them for you.

Yours very truly,

Robert Torrence
Reservations Department

Enclosure: Airplane Timetable

(17)

Mrs. Jane Smith
16 Main Street
Westfield, Mass. 01085

Dear Mrs. Smith:

Stanley Home Products welcomes you!

Each dealer has at least four assets:

1. They sell a quality line of goods.
2. People have money to buy.
3. Customers like the method of merchandising.
4. Dealers like the method of selling.

Best wishes for success.

Sincerely,

C. Jay

Jackson Bakeries, Inc. — Board of Directors

Name	Occupation	City of Residence	Present Age
Howard C. Kaye	Attorney at Law	Albany	56
Albert P. Ward	Labor Arbitrator	Buffalo	48
Samuel N. Dunn	Purchasing Agent	Auburn	37
Donald G. Bell	Professor	Utica	52
James L. Wilson	Company Treasurer	New York	49
Alice E. Macon	University Dean	Rochester	40

(4)

Manuscript #1 Instructions: Begin 1½ inches from the top, using a 1½ inch left side margin, and a 1 inch right side margin.

Solid Caps → THE OFFICE ENCOUNTERS CHANGE

Gone is the day of the old-fashioned office where one may have found the bookkeeper at a tall desk, perched on a high stool very much resembling that reserved for the class dunce. The modern bookkeeper no longer wears a green shield over his eyes to protect ~~them~~ him from the glare of poorly shaded electric lights.

Gone, too, is the quill pen, often replaced these days by bookkeeping machines ~~and~~ computers.[1] and

Close up to no spaces

The "note-takers"—the male secretaries of early office days—have disappeared, replaced, as we know, by the ~~efficient~~ female secretaries who are now indispensable to the businessman.

Indent first line 5 spaces; 2nd line at margin.

[1] Peter N. Mason, Automation in the Office (Newark, N.J.: Arthur Jones Co., 1966), p. 46.

Manuscript #15 Instructions: Center this copy both vertically and horizontally. You will have to estimate in advance how much space you will need, and place it on the page accordingly.

CREDIT POLICY

Paul Blake & Sons was founded on the principle of giving maximum quality and service for minimum cost.

Basic to this is the need for keeping down the cost of collections. Therefore, we have cash dealings with all our customers, with the exception of those with high credit ratings, to whom credit is extended for 7 days following receipt of the goods.

Mr. John Frederick Jackson
502 Livingstone Blvd., S.W.
Worcester, Massachusetts 01605

(23)

Dear Mr. Jackson:

We note, with regret, that you have decided to terminate your savings account with our bank. We hope that no lack of alertness or courtesy on our part has prompted your decision to withdraw. If so, we would appreciate some statement of the circumstances.

We have attempted to render a courteous and thorough service constantly and we want you to realize that your account with us has been very much appreciated. Naturally, we do not want to lose a customer and we hope you will find it convenient to reinstate your account in the near future.

Very sincerely yours,

Jeffrey T. Washington
Vice-President

Type the letter below in any acceptable style; its message contains about 45 words. Use your initials as typist and the current date.

8

Mr. John Smith
17 Park Avenue
Worcester, Mass. 01605

Dear Mr. Smith:

In checking our guest lists, I noticed that you have not been with us since August, 1963.

I hope you enjoyed your visit, and that there were no shortcomings on our part. If, however, Pinehurst failed to accommodate you somehow, your comments will be helpful.

Sincerely,

Ed Hart

Center the table below horizontally and vertically on a full sheet. Use 8 spaces between columns.

2

Bache & Co. Bond Offerings

Cleveland, City of	5%	25 years
Detroit, City of	4%	18 years
Iowa, State of	4%	20 years
New York, School District of	5%	19 years
Pittsburgh, City of	5%	23 years

Center the table below horizontally and vertically on a full sheet. Use 5 spaces between columns.

20

Textile Remnants and Odd Lots for Clearance

Muslin	Unbleached	5 yards
Foulard	Blue, White Dots	7 yards
Worsted	Charcoal	1 bolt
Rayon	Canary Yellow	3 yards
Cashmere	Sepia	8 feet
Netting	Loose-knit, White	4 yards
Gabardine	Olive Green	2 bolts
Linen	White, Boiled	6 yards
Suede	Dark Blue	4 feet
Broadcloth	Pale Blue	9 yards
Buckram	Gray, Irregular	8 yards
Flannel	Green	1 bolt

Center the table below horizontally and vertically on a full sheet. Use 11 spaces between columns.

12

Greenside College Secretarial Department Program

Number	Course Title	Instructor
106	Shorthand	Baker
110	Typing	Cox
221	Filing	Gill
403	Accounting	Lee

Center the table below horizontally and vertically on a full sheet. Use 5 spaces between columns.

22

Bourne Elementary School Textbook Requisitions

Number	Author	Title	Edition
34	Strongman	How Airplanes Work	Third
29	Vincent	How Trains Work	Second
65	Kerrigan	How We Travel on Water	Second
18	Bottomley	Let's Read for Fun	Fourth
37	Kirstenburg	Adventures in Art	First
29	Cheney	How Clothing is Made	Third
64	Carson	Travels Around the World	Fifth

Type the letter below, arranging it attractively on the page in any acceptable style. Its body contains about 45 words. Use your initials as the typist of the letter and the current date.

Mr. J. Snow
Box 4
Troy, NY 12180

Dear Mr. Snow:

Thank you for your letter asking about the possibility of securing a sales position with our Company.

Unfortunately, we recently filled the position that was open. We shall, however, keep your resume on file should a vacancy occur some time in the future.

Sincerely,

Roy Finley
Sales Manager

Type the letter below, arranging it attractively on the page in any acceptable style. Use your initials as the typist and the current date. The body of the letter has about 115 words.

Mr. Ted Adams
64 Penn Drive
Boston, Mass. 02137

Dear Mr. Adams:

Thank you for your letter of December 8 regarding the convention of business teachers to be held in Chicago next February. I shall be glad to participate in the program.

Since there will be four speakers during the 1-hour session, I assume each speaker will be allowed 15 minutes. I plan to discuss with the audience some of this country's occupational needs during the next five years and some of the things the schools can do to help meet these needs. In the area of office occupations the demand for typists and secretaries will be especially large. Therefore, I plan to make some recommendations for improvement in training

Sincerely yours,

Robert Grant

Center the table below horizontally and vertically on a half-sheet of paper. Use 8 spaces between columns.

NEW BOOKS
Christmas Listing

Master and Commander	Patrick O'Brien	$6.95
Fire from Heaven	Mary Renault	7.95
Witchcraft at Salem	Chadwick Hansen	6.95
The Beauty Trap	Jeanne Rejaunier	5.95

Center the table below horizontally and vertically on a full sheet of paper. Use 5 spaces between columns.

OFFICE EMPLOYMENT OPPORTUNITIES

Week of December 8

Billing Clerk	$105	Mahony Agency	670-4296
Bookkeeper	145	Stanton Agency	790-1306
Cashier	110	Marvin & Griffiths	349-3800
File Clerk	110	Career Girls Agency	267-9788
Receptionist	115	Horn Agency	560-4247
Secretary	160	Franklin Agency	913-8266
Stenographer	140	Goldsmith Bros.	224-0353
Typist	115	Floyd Hanna & Co.	671-9164

Center the table below horizontally and vertically on a half-sheet of paper, using proper vertical spacing within the table. Leave 8 spaces between columns.

RECENT BOND OFFERINGS

Heavy Industry

Company	Yield	Maturity
Amalgamated Copper	9.1%	1980
Bethlehem Steel	8.6%	1986
Grace, Inc.	7.9%	1988
Western Industries	8.8%	1974

Center the table below horizontally and vertically on a full sheet of paper, using proper vertical spacing within the table. Leave 5 spaces between columns.

EVENING SESSION COURSES

Hunter College

Course	Department	Title	Professor
151	Sociology	Urban Problems	Grant
163	History	The French Revolution	Potter
175	English	Survey of English Literature	Cole
178	English	American Poetry	Deming
180	Romance Languages	Advanced Italian	Orsini
207	Psychology	Theories of Learning	Bender

Error Scoring Manual

The scoring manual applies to the scoring of the office-typing tasks for uncorrected typographical errors and form errors.

Uncorrected Typographical Errors

The following are to be considered as errors. No one word can have more than 1 error.

Spacing: two spaces between words
extra space within word
one space after a period or colon, except in enumerations
two spaces after a comma or semi-colon
omission of space between words

Mis-strokes: incorrect letter
transposed letters or words (count as one error only)
strike-over (count as one error per word)
capital letters not on line
letter not visible

Other: word or phrase repeated (count as 1 error)
word or phrase omitted (if omitted in succession, count the entire omission as 1 error. But if ommissions are separated, count each such omission as a separate error)
incorrect word division

Form Errors

Form errors differ from one class of task to another. Reference should thus be made to the particular class of task being scored. If a form error is consistently made throughout a task, it is counted the first time only, except where otherwise indicated. In addition, each error is to be counted without regard to the relationship of one

error to another. For example, if a student does not center a column heading over a column, and this makes for an unequal number of spaces between columns, two errors, rather than one, would be counted.

Scoring for Tables

Table Headings

Title omitted

More or less than 2 blank lines following table heading or less than 1 blank line if table rows are single spaced

Table heading not centered horizontally (Allow a difference of 2 spaces)

Table heading underscored

Columnar Arrangement

Columns and/or rows out of order (1 error for each inversion)

Column not blocked at the left

Space between columns not the same

Less than 4 spaces between columns (except on Table #6, Pica, 3 spaces is permissible) or more than 20 spaces. (1 error for total table unless the constant column (i.e., the one used most often) is 4 or more spaces, in which case the error is counted each time it occurs)

Column Headings

More or less than 1 blank line following column headings

Column headings not exactly centered over column (if odd space, can be on either side) (count each time)

2-line heading with underscore not extending the width of the longest heading line and not typed on the bottom line

Column heading in solid caps

Column headings not underscored (count each time)

Column headings omitted (count each heading)

Vertical and Horizontal Spacing

Top margin exceeds bottom margin by more than 1 line

One side margin exceeds other side margin by more than 2 spaces

Left and right margins of less than 6 spaces, except for Table #6 if Pica type is used (count as only 1 error)

Braced Headings

Not centered exactly over the two columns (i.e., not the same number of spaces to right and left of headings braced)

(Optional)

Braced heading can be directly over column headings or can be separated by one blank line

Underscore of braced heading can be only under the braced heading or can extend over the columns that are braced

Other column headings should be on the same line as the headings that are braced, or they should be centered between the braced heading and the headings braced

Options

Table headings may be in either upper or lower case

Tables may be either on whole sheets or half sheets, but must be centered

If a wrong word is used, count as a typographical error

Miscellaneous

Table typed on onion skin rather than on bond paper

Hole in paper from erasing

Short table single spaced; single or double spacing option on others

Spacing of more than double in short tables

Carbon copy typed

Omitted line

Unnecessary part

Scoring for Letters

Paper Usage

Original typed on onionskin rather than on bond paper

Carbon copy not typed

Hole in paper from erasing

Carbon copy typed on back of original

Carbon copy typed on bond paper

Vertical and Horizontal Spacing

Top margin should equal bottom margin (Allow a difference of up to 6 lines)

Letter not wquarely placed on the page, i.e., crooked

Initials following Enclosure notation

Writing line width should be:

	Pica	Elite
Short letter	40-50	50-60
Long letter	50-60	60-70

Right margin should be equal to left or narrower, but not by more than 1/2 inch

Enumerations

Enumerations may be blocked under wording or at left margin

Enumerations not separated from paragraphs by a blank line

Table Within Letter

Table must follow rules for scoring tables

Table not centered WITHIN the letter

Unequal space above and below a table

Miscellaneous

Omitted line
(one error per line)

Internal Spacing

Letter not single spaced, except for a short letter, which must then use indented paragraphs

Less than 3 blank lines between date and inside address

More or less than 1 blank line between inside address and salutation

More or less than 1 blank line between salutation and body

More or less than 1 blank line between paragraphs

More or less than 1 blank line between body and complimentary close

Less than 3 lines or more than 6 blank lines between complimentary close and typed signature

Blank line between typed signature and title

More or less than 2-3 spaces before ZIP Code

Initials above signature line or more than 4 lines below

Letter Parts

Complimentary closing omitted

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Initials omitted

Date omitted

Options

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Enumerations may be indented

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VT 014 069
WILLIAMS, DAVID L., AND OTHERS
DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE. FINAL REPORT.

ILLINOIS UNIV., URBANA. DIV. OF AGRICULTURAL EDUCATION.
ILLINOIS STATE BOARD OF VOCATIONAL EDUCATION AND REHABILITATION, SPRINGFIELD. PROFESSIONAL AND CURRICULUM DEVELOPMENT UNIT.
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DESCRIPTORS - *WORKSHOPS; *CURRICULUM DEVELOPMENT; *OFF FARM AGRICULTURAL OCCUPATIONS; EDUCATIONAL PLANNING; *PROGRAM PLANNING; STUDENT NEEDS; EDUCATIONAL CHANGE; PROGRAM DEVELOPMENT; CHANGE AGENTS; *VOCATIONAL AGRICULTURE; AGRIBUSINESS; AGRICULTURAL EDUCATION

ABSTRACT - FORTY-TWO PERSONS PARTICIPATED IN A WORKSHOP DESIGNED TO HELP TEACHERS OF APPLIED BIOLOGICAL AND AGRICULTURAL OCCUPATIONS ADJUST THEIR INSTRUCTIONAL PROGRAMS TO MEET THE NEEDS OF STUDENTS INTERESTED IN NONFARM OCCUPATIONS. MATERIALS AND INFORMATION USEFUL IN DEVELOPING AND CONDUCTING PROGRAMS FOR THE ABOVE STUDENTS WERE PROVIDED EACH PARTICIPANT, AS WELL AS THE OPPORTUNITY TO DEVELOP PLANS FOR IMPLEMENTING NEEDED CHANGE. A REVIEW OF THE PLAN OF ACTION FORMS DEVELOPED BY THE PARTICIPANTS INDICATED THAT THE TEACHERS' PLANS FOR PROGRAM IMPROVEMENT INCLUDED THE FOLLOWING: (1) USE OF ADVISORY COUNCILS IN DEVELOPING AND CONDUCTING NEW COURSES, (2) USE OF STUDENT SURVEYS, (3) DETERMINATION OF MANPOWER NEEDS, (4) DEVELOPMENT AND IMPLEMENTATION OF AGRIBUSINESS COURSES, AND (5) USE OF TEACHING TECHNIQUES DEMONSTRATED AT THE WORKSHOP. (AUTHOR/JS)

VT 014 069

DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE

An Agribusiness Curriculum Workshop Report

Final Report
Project No. PDT-A2-009

David L. Williams

August 1971

Agricultural Education Division
Vocational and Technical Education Department
College of Education
University of Illinois
Urbana, Illinois

VT014069

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DIFFUSION OF NONFARM AGRICULTURAL OCCUPATIONS CURRICULA INTO VOCATIONAL EDUCATION IN AGRICULTURE

An Agribusiness Curriculum Workshop Report

Final Report
Project No. PDT-A2-009

UNIVERSITY OF ILLINOIS PROJECT STAFF

David L. Williams, Project Director
David Cattron, Research Associate
Ronald Heisner, Research Associate

August 1971

The project reported herein was performed pursuant to a contract with the State of Illinois, Board of Vocational Education and Rehabilitation, Professional and Curriculum Development Unit. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated, do not, therefore, necessarily represent official Board of Vocational Education and Rehabilitation position or policy.

Agricultural Education Division
Vocational and Technical Education Department
College of Education
University of Illinois
Urbana, Illinois

2626

TABLE OF CONTENTS

	Page
INTRODUCTION	1
Objectives of the Project	1
Planning the Workshop	2
WORKSHOP SUMMARY	4
Overview of the Workshop	4
Great Challenges in the Seventies	4
Determining Student Interest	5
Involving Citizens in Local Planning	6
Local Planning	6
Individualized Program Planning	7
Developing Agricultural Occupations Programs	7
Using Agribusiness Teaching Modules	8
Training Plans for Cooperative Education	9
Local Planning	11
Developing Local Plan of Action	11
References and Teaching Aids for Agribusiness	11
Innovative Techniques for Teaching Agribusiness	12
Reviewing Agribusiness Reference Materials	13
Developing Local Plan of Action	13
Analyzing Local Plans	13
Workshop Evaluation	13
Individual Consultation	14
SUMMARY AND CONCLUSIONS	15
APPENDIX A	16
APPENDIX B	24
APPENDIX C	27

2627

INTRODUCTION

The technological advancements in agriculture have expanded the employment opportunities in the broad field of agriculture. Jobs are still available in the production of agricultural products, but an increasing number of nonfarm agricultural jobs are also available to properly trained individuals. Nonfarm agricultural businesses need employees with knowledge and skills in agriculture to process products and to provide the services demanded by their customers.

The employment opportunities in nonfarm agricultural occupations have been identified by statewide studies in Illinois and other states. However, applied biological and agricultural occupations instructors have been cautious in expanding their programs to prepare youth for agricultural careers beyond the farm. Preparing youth for nonfarm agricultural occupations is a relatively new idea to the teacher. He needs encouragement and support in organizing resources to adjust the instructional content of his program to current and predicted career opportunities.

Objectives of the Project

The purpose of this project was to innovate programs in secondary schools that will prepare youth for careers in nonfarm agricultural businesses. Since the teacher is the key ingredient in the educational change process, emphasis was placed on assisting the teacher in analyzing his present program, interpreting employment opportunities and needs of his students, and revising his instructional program. The specific objectives were:

1. To make secondary teachers of applied biological and agricultural occupations aware of the need for expanding their programs by including nonfarm agricultural occupations curricula.
2. To assist teachers in adjusting old and designing new curricula in applied biological and agricultural occupations that will meet the needs of their clients in light of present and predicted career opportunities.
3. To introduce instructional materials in nonfarm agricultural occupations to in-service teachers of applied biological and agricultural occupations.
4. To nurture articulation of programs among secondary schools, area vocational centers and community colleges.

Planning the Workshop

The project includes two major phases, (1) planning a workshop and (2) conducting the workshop. The planning phase included development of the workshop agenda, identifying and collecting materials related to the objectives of the project and contacting teachers and registering participants. The target population for the workshop was the applied biological and agricultural occupations instructors in Illinois secondary schools.

During the last week of April 1971, fliers were mailed to all secondary school teachers of applied biological and agricultural occupations in Illinois, announcing the July 6, 7, 8 and 9, 1971, "Agribusiness Curriculum Workshop." A tear sheet was included as a part of the announcement. Teachers who planned to attend the workshop were requested to return the tear sheet. A copy of the announcement appears in Appendix A. Announcement of the workshop was also made in the Vocational Agriculture Aids, a publication distributed by Vocational Agriculture Service, College of Agriculture, University of Illinois, Urbana-Champaign. The workshop was also announced in connection with summer offerings of the Vocational and Technical Education Department, College of Education, University of Illinois, Urbana-Champaign.

The objectives of the project directed the formulation of the workshop agenda. The agenda included a sequence of events commonly followed in curriculum planning. Emphasis was placed on revising programs that will equip youth for employment in nonfarm agricultural occupations. The following activities were included in the workshop:

1. Analyzing findings of local, county, state and national surveys conducted to determine employment opportunities in jobs that require knowledge and skills in agriculture. Information concerning employment opportunities coupled with needs of students provided direction for local teachers in planning new courses or in redesigning present courses.
2. Identifying agribusiness courses appropriate for secondary schools to include in their curriculum. Curriculum content which will provide for occupational competency development for youth and adults was introduced.
3. Identifying instructional materials which teachers may use to equip students with competencies needed for employment in nonfarm agricultural occupations. Materials developed in Illinois and other states were examined in terms of their usefulness in the proposed programs developed by workshop participants.

4. Developing a plan of action which teachers may follow in revising their local programs to include instruction which will better equip youth for entry into careers in nonfarm agribusinesses.

A guide which paralleled the activities of the workshop was developed for teachers to use in analyzing their present program and in developing plans for improving their curriculum. A copy of the workshop agenda and the "Plan of Action" guide appears in Appendix A.

About two weeks prior to the workshop teachers who were preregistered for the workshop were mailed a copy of the workshop agenda with a cover letter explaining the workshop activities. A copy of the letter appears in Appendix A.

WORKSHOP SUMMARY

Overview of the Workshop

David L. Williams, Assistant Professor of Agricultural Education, University of Illinois, Urbana, Illinois.

I. Dr. Williams welcomed the workshop participants, introduced the workshop staff, and had participants introduce themselves. Lists of the workshop participants and the resource persons appear in Appendix B.

II. In previewing the workshop agenda, Dr. Williams emphasized the following points:

   A. The primary purpose of the workshop is to help teachers analyze their local applied biological and agricultural occupations programs and to develop plans for revising their curricula to meet the needs of all students in their communities who have occupational objectives in agriculture. Special attention will be given to planning a curriculum that will equip students with the competencies needed for successful entry-employment in nonfarm agribusinesses.

   B. Teachers should intellectualize ideas and materials presented during the workshop in terms of implication for curriculum planning and teaching in their local communities.

   C. Time is scheduled during the workshop for each participant to individually analyze the applied biological and agricultural occupations curriculum in his school and to develop a plan of action for upgrading the curriculum. A guide has been developed by the workshop staff to direct the planning activities.

Great Challenges in the Seventies

Jack Schlick, Vice-President, Market Communications, Inc., and Special Projects Coordinator of Top Farmers of America, Woodstock, Illinois.

I. American agriculture faces the paradox of a one-half overfed world and a one-half starved world. The challenge to teachers of agricultural occupations is to lead young men into meaningful careers in agriculture. There are not enough American farm youths to fill all the jobs that are and will be available in agriculture. Young people with 15 years of on-the-job training (living and working on a farm) are going outside of agriculture

to choose their occupations. Teachers must challenge these youths to continue in agriculture by choosing a career in the broad field of agribusiness.

II. Six challenges for agriculture in the seventies are as follows:

A. Develop a plan for agribusinesses and farms to grow.

B. Acquire more capital for expansion of business units.

C. Develop high quality labor and management personnel.

1. Agricultural courses and programs should be career oriented.

2. Upgrade the image of agricultural education in the secondary schools.

D. Find the highest profit form of organization for business units.

E. Meet the challenge of corporate agriculture.

F. Work to maintain a healthy economic framework in agriculture.

III. Mr. Schlick conducted a question-and-answer period at the conclusion of his presentation.

Determining Student Interest

Marty Thornton, Research Assistant, Agricultural Education Division, University of Illinois, Urbana, Illinois.

I. Teachers must identify students who have an interest in applied biology and agriculture and encourage them to enroll in appropriate vocational courses.

A. Teachers may use the slidefilm, "Your Opportunities in Agriculture," to communicate to junior high school students the career opportunities in agriculture. Mr. Thornton showed the slidefilm as a part of his presentation. Teachers may purchase the slidefilm and audio tape from Vocational Agriculture Service, College of Agriculture, University of Illinois, Urbana.

B. Interest of students in agriculture must be objectively measured using an instrument such as The Applied Biological and Agricultural Interest Inventory available from Interstate Printers and Publishers, Inc., Danville, Illinois. Mr. Thornton administered the interest inventory to the workshop participants and explained the scoring techniques and procedures for interpreting results.

C. Results of interest inventory should be reported to the students and their parents.

II. Mr. Thornton previewed other new slidefilms being developed to motivate students to seek training that will prepare them for a career in agriculture. These slidefilms will also be available from Vocational Agriculture Service.

Involving Citizens in Local Planning

Ted Shipley, Consultant, Rurban Educational Development Laboratory, Vocational and Technical Education Department, University of Illinois, Urbana, Illinois.

I. Rurban Educational Development Laboratory (REDL) is a service arm of the Vocational and Technical Education Department, College of Education. The laboratory serves as a catalytic force to enlist the aid of citizens, educators and scholars in an interdisciplinary attack on the educational problems of rurban areas (small cities and towns surrounded by open country).

II. REDL offers the following services to educational institutions in Illinois:

   A. Identification of resources.

   B. Development of resources.

   C. Clearinghouse of resources.

   D. Publishes advisory council newsletter.

   E. Free consultant service.

III. School personnel should involve local citizens in planning educational programs. The agricultural occupations teacher should have an active advisory council to assist in planning and conducting programs. School policies should be developed to define the role of each advisory group.

IV. Mr. Shipley showed a slidefilm, "Citizens Advisory Council for Agricultural Occupations," developed by REDL. The slidefilm explained the organization and function of an advisory council for applied biological and agricultural occupations. The slidefilm and audio tape is available from REDL for use by local schools.

Local Planning

The workshop staff directed the participants in analyzing the following aspects of their local programs using the "Plan of Action" form.

A. What courses are currently being offered?

B. How are the interests of students being measured?

C. How are advisory councils being used?

D. What types of data or information related to manpower needs and employment opportunities have been used in planning instructional programs.

Individualized Program Planning

The workshop staff directed the participants in developing future plans using the "Plan of Action" form as a guide. Attention was given to the following questions:

A. How will the needs and interests of students be measured?

B. How will local citizens be involved in planning?

C. How will manpower needs and employment opportunities information be gathered?

Developing Agricultural Occupations Programs

Hollie B. Thomas, Assistant Professor of Agricultural Education, University of Illinois, Urbana, Illinois.

I. Educational priorities must be established to maintain quality agricultural occupations programs. Priorities established in the past become obsolete or are superseded by new priorities. Reasons for new priorities in agricultural occupations include:

   A. Administrative expectancies change.

   B. Societal pressures change.

   C. Funding procedures change.

   D. Needs of students change.

   E. Industries served by vocational programs change.

II. Planners of agricultural occupations programs need the following data to establish educational objectives on which priorities can be based:

   A. Local, state, and national employment opportunities in agriculture.

   B. Measures of student interest in agriculture.

   C. Indication of agricultural industry support in the community.

   D. Information regarding funding patterns.

   E. Information regarding skills needed for employment in the various agricultural occupation areas.

   F. Information concerning the type of instructional program needed to meet the educational objectives of the school.

III. Teachers should think in terms of completely new programs, not just additional courses. It is possible to revise an agricultural occupations program with only one teacher with hopes of adding a second or third teacher later.

IV. To improve an agricultural program and not merely change it, the teacher must:

A. Develop a wide spectrum of agricultural options to meet both student and community needs.

B. Maintain a high quality youth organization.

C. Utilize supervised occupational experience programs.

D. Maintain high quality instruction in production agriculture and at the same time prepare students for employment in nonfarm agribusinesses.

E. Avoid allowing students to take a selection of courses which do not lead to occupational proficiency.

F. Expand programs for adults.

G. Develop a public relations program.

H. Develop informational programs concerning opportunities in agricultural occupations.

I. Establish credibility that we are giving taxpayers the "bang for their buck" that they deserve.

J. Identify students who have an interest in agricultural occupations.

Using Agribusiness Teaching Modules

David L. Williams, Assistant Professor of Agricultural Education, University of Illinois, Urbana, Illinois.

I. The speaker presented the results of a project, "Curriculum Materials for Teaching Students the Competencies Needed for Employment in Nonfarm Agricultural Businesses," which was completed at the University of Illinois in 1971. The project was funded by State of Illinois, Board of Vocational Education and Rehabilitation, Professional and Curriculum Development Unit.

II. The objectives of the project were:

A. To identify the major mutual competencies needed by beginning employees in different types of nonfarm agricultural businesses which are related to one of the following business activities: (1) moving products into a nonfarm agricultural firm, (2) handling products and personnel within the agricultural firm, and (3) moving agricultural products from the firm to the customer.

B. To identify content for a secondary agribusiness curriculum based on competencies needed for entry-level employment in nonfarm agricultural business firms.

C. To articulate the competencies taught in secondary and postsecondary agribusiness curricula.

D. To develop teaching source units that teachers may use to plan learning activities for students in a secondary agribusiness curriculum.

III. The competencies validated by a committee of agribusinessmen and teachers as the ones needed by nonfarm agribusiness employees were used to develop a course of study and materials which teachers may use as a guide to planning learning activities for students preparing to engage in agricultural occupations other than farming.

IV. The materials developed included five modules:

A. Human relations in agribusiness.

B. Communications in agribusiness.

C. Agricultural salesmanship.

D. Agricultural sales promotion.

E. Agribusiness operations.

V. Dr. Williams distributed to the participants Interim Report No. 1, "A Competency Pattern Approach to Curriculum Development in Agribusiness," and Interim Report No. 2, "Education for Agribusiness Occupations--A Guide to Secondary School Course Planning and Teaching." The following points were made concerning the materials:

A. The materials are primarily concerned with human elements and general information which are applicable to most nonfarm agribusiness occupations.

B. Technical agricultural competencies which are essential for most agribusiness jobs are not necessarily included.

C. The materials were developed with the assumption that students may be concurrently enrolled in a supervised occupational experience program.

D. Modules and instructional areas within each module may be incorporated into existing courses or new agribusiness courses established in the applied biological and agricultural occupations department.

Training Plans for Cooperative Education

Martin B. McMillion, Associate Professor of Agricultural Education, University of Minnesota, St. Paul, Minnesota.

I. A training plan denotes an individualized arrangement for training for a specialized job or task.

A. "Training plan" is a relatively new term in agricultural education.

B. The training plan is a list of jobs to be done in "learning by doing."

C. The student should develop knowledge, skills and attitudes about what he is doing.

D. Learning on the job has a motivating factor, but gives a narrow education.

E. Analyze the needs of students and give group instruction where needs are common.

F. Performance usually indicates skill and perhaps attitude.

II. The training supervisor needs to know what is being done in the classroom. Course outlines can be used to inform the supervisor what the student is learning at the school.

III. The plan should be individualized for each training station and each student.

A. A station may limit the student's experiences.

B. Earning while learning may become a hinderance to some learning activities.

IV. Placement employment experience may be supplemented as follows:

A. Simulated work experiences at school.

B. Independent study.

C. Observation in a business.

D. Self-employment.

V. Procedure for developing a training plan may include:

A. Teacher and student prepare a preliminary training plan.

B. Select references for developing training plan.

C. Place experiences in seasonal order.

D. Plan experiences in a sequence of difficulty.

E. Teacher, student and training supervisor develop tentative training plan.

F. Include nonpaid activities on the job as a part of the plan.

VI. Some characteristics of a good training plan include:

A. Prepared by student trainee, the training supervisor, and the coordinating teacher.

B. Provides experiences which are increasing in difficulty up to the limit of the student's ability.

C. Permits student to become acquainted with the total business operation.

D. Contains activities associated with all seasons of the year.

E. Comprehensive activities are not overlooked.

F. Includes nonpaid as well as paid activities.

G. Revised as needed during the year.

H. "Tailor made" for each individual student.

VII. Dr. McMillion conducted a question-and-answer session on problems in implementing cooperative education programs in agriculture.

Local Planning

The workshop staff directed the participants in individually analyzing the following aspects of their local program using the "Plan of Action" form:

A. How much time is presently being devoted to teaching agribusiness competencies?

B. What agribusiness materials are being used in teaching?

C. What types of supervised occupational experience programs are available to students.

Developing Local Plan of Action

The workshop staff directed the participants in developing future plans using the "Plan of Action" form. Attention was given to the following questions:

A. What types of supervised experiences can be planned for students with career objectives in nonfarm agricultural occupations.

B. What improvements should be made in the instructional program to more adequately prepare students for nonfarm agricultural occupations.

References and Teaching Aids for Agribusiness

David Cattron, Research Assistant, University of Illinois, Urbana, Illinois.

The objective of this session was to give the workshop participants a chance to become familiar with teaching materials presently available for use in teaching agribusiness. For this session, references and teaching aids were divided into five displays (stations) with a resource person located at each. The participants moved from station to station at intervals of 12-15 minutes. Stations and resource persons included:

A. Vocational Agriculture Service materials, John H. Herbst and Eugene Trotter.

B. Recommended references, David Cattron.

C. Illinois Bell Telephone Company "Teletrainer," Kenneth Huddleston.

D. Supplementary references, David Williams and Paul Curtis.

E. Films and records, Ronald Heisner.

Innovative Techniques for Teaching Agribusiness

Ronald Heisner, Graduate Assistant and Kenneth Huddleston, EPDA Fellow, University of Illinois, Urbana, Illinois.

I. In teaching agribusiness, techniques must be used that will allow for human interaction and yet maintain a practical grip on the work-a-day world.

II. The objectives of this session were:

A. To give the workshop participants concrete examples from which they could begin to develop their own teaching techniques.

B. To further explain the "Learning Activities" section of the agribusiness teaching modules published in Education for Agribusiness Occupations--A Guide to Secondary School Course Planning and Teaching. (The publication is available from the Agricultural Education Division, University of Illinois, Urbana.)

III. By using role playing in which the workshop participants assumed the role of an agricultural occupations class, the following techniques were demonstrated:

A. Public interview, an introductory technique that can be used to introduce each class member to his peers and to his teacher and vice versa, creating cohesiveness and rapport in the process.

B. Sticky situations, a peer-evaluated activity which can help a student think through and determine his system of values in a difficult situation.

C. Communications under stress, an activity that illustrated many principles of communications, and also many of the reasons for communication breakdowns.

D. Role playing, a group of activities which allow students to simulate situations they are likely to encounter later in their careers.

E. Working with real products. Products from an agribusiness firm were used to show how such products can add authenticity to classroom and laboratory activities.

IV. An advisory council should be organized to give men currently in agriculture and agribusiness an opportunity to provide meaningful input into the agribusiness training program.

Reviewing Agribusiness Reference Materials

Participants were free to review reference materials presented in the earlier session.

Developing Local Plan of Action

The workshop staff directed the participants in the following activities:

A. Identifying references and teaching aids for teaching agribusiness.

B. Identifying learning activities which they may use in teaching agribusiness.

Analyzing Local Plans

I. Participants presented their plans for implementing ideas and using materials presented during the workshop. Participants and the workshop staff discussed the various plans developed which included:

A. Organization of advisory councils.

B. Measuring student interest in agriculture.

C. Acquiring new reference material and teaching aids.

D. Using different teaching techniques.

E. Planning cooperative training programs.

F. Implementing new agribusiness courses.

G. Identifying manpower needs in agriculture.

II. Participants developed a timetable for implementing their plans for improving the agricultural occupations curriculum in their local school.

Workshop Evaluation

Each participant was asked to evaluate the workshop using the "Participants Workshop Evaluation" form provided by the Professional and Curriculum Development Unit, Division of Vocational and Technical Education. The completed forms were forwarded to the Division of Vocational and Technical Education. A copy of the evaluation form appears in Appendix C.

Teachers who participated in the workshop were given a certificate of completion. A copy of the certificate appears in Appendix C.

Individual Consultation

This portion of the workshop provided an opportunity for the participants to do one or more of the following:

A. Complete "Plan of Action" form.

B. Consult with members of the workshop staff and fellow teachers.

C. Secure teaching aids.

D. Review reference materials.

E. Utilize resources at the University.

SUMMARY AND CONCLUSIONS

The basic purpose of the project was to plan and conduct a workshop which would help teachers of applied biological and agricultural occupations adjust their instructional programs to meet the needs of students who want to prepare for a career in agriculture other than farming. The workshop was planned for 30 to 40 participants. A total of 42 persons participated. Eighty percent of the participants were employed as teachers of applied biological and agricultural occupations in secondary schools in Illinois. The other participants were involved in some phase of vocational education. Eighty-one percent of the participants had less than five years teaching experience. This indicates that the teachers in Illinois were not equally represented according to years of teaching experience, and that the workshop reached primarily the younger and less experienced teachers.

The plans completed by the participants during the workshop indicated that teachers plan to adjust their programs to include more instruction in areas related to nonfarm agricultural occupations. The workshop provided the participants with materials and information useful in developing and conducting programs for students with interest in nonfarm agricultural occupations.

A review of the plan of action forms developed by the participants indicated that teachers made the following plans to improve their programs of applied biological and agricultural occupations:

1. Use advisory councils in developing and conducting new courses.
2. Survey the needs and interest of students.
3. Determine the manpower needs in agriculture.
4. Obtain and use references and teaching aids displayed at the workshop.
5. Develop and implement agribusiness courses.
6. Use teaching techniques demonstrated at the workshop.
7. Use agribusiness teaching materials developed by Vocational Agriculture Service and the Agricultural Education Division, University of Illinois.
8. Develop relevant supervised experience programs for students interested in nonfarm agricultural occupations.

APPENDIX A

A N N O U N C I N G . . . .

AGRIBUSINESS CURRICULUM WORKSHOP

FOR

SECONDARY TEACHER OF AGRICULTURAL OCCUPATIONS

AT

University of Illinois, Urbana, Illinois

on

July 6, 7, 8, and 9, 1971

Sponsored by

Division of Vocational and Technical Education, State of Illinois

and

Department of Vocational and Technical Education, University of Illinois

Workshop activities

1. Analyzing manpower needs in agriculture.
2. Identifying competencies needed for employment in agricultural occupations.
3. Determining interest of students.
4. Revising programs to include instruction for nonfarm agricultural occupations.
5. Determining content for agribusiness courses.
6. Identifying instructional materials for group and individualized activities.

Special features

1. No tuition fees.
2. Teachers attending summer schol may participate.
3. New teaching source units for agribusiness introduced.
4. Teachers and others with experience in planning and conducting agribusiness programs will provide assistance.

Dr. David L. Williams of the Agricultural Education Division is in charge of the workshop. Registration will be from 9:00 to 10:00 a.m. on July 6, 1971, in 314B Illini Union. All Illinois high school teachers of agricultural occupations are invited to participate, but registration is limited to 30-40 teachers. If interested, please send in the completed application form on the tear sheet below.

TEAR SHEET

I plan to attend the four-day Agribusiness Curriculum Workshop on July 6-9, 1971.

Send to: David L. Williams
Agricultural Education Division
361 Education Building
University of Illinois
Urbana, Illinois 61801

Signed_____

Address_____

_____Zip_____

AGRIBUSINESS CURRICULUM WORKSHOP

July 6-9, 1971

314B Illini Union
University of Illinois
Urbana, Illinois

Tuesday, July 6

9:00-10:00 a.m.	Registration
10:00-10:30	Overview of the Workshop--David Williams
10:30-12:00 noon	Great Challenges in the Seventies--Jack Schlick, Vice President, Farm Management Market Communications, Inc., Woodstock, Illinois
1:30-2:15 p.m.	Determining Student Interest--Marty Thornton
2:15-3:00	Involving Citizens in Local Planning--Ted Shipley
3:00-4:00	Local Planning--Workshop Participants

Wednesday, July 7

9:00-10:00 a.m.	Individualized Planning--Workshop Participants
10:00-11:00	Developing Agricultural Occupations Programs--Hollie Thomas
11:00-11:45	Using Agribusiness Teaching Modules--David Williams
1:00-3:00 p.m.	Training Plans for Cooperative Education--Martin McMillion
3:00-4:00	Local Planning--Workshop Participants

Thursday, July 8

9:00-10:00 a.m.	Developing Local Plan of Action--Workshop Participants
10:00-11:45	References and Teaching Aids for Agribusiness--David Cattron
1:00-3:00 p.m.	Innovative Techniques for Teaching Agribusiness--Ronald Heisner and Kenneth Huddleston
3:00-4:00	Reviewing Agribusiness Reference Materials--Workshop Participants

Friday, July 9

9:00-10:00 a.m.	Developing Local Plan of Action--Workshop Participants
10:00-11:30	Analyzing Local Plans--Workshop Staff and Participants
11:30-12:00 noon	Workshop Evaluation--Workshop Staff
1:30-4:00 p.m.	Individual Consultation--Workshop Participants

2645

A GUIDE FOR DEVELOPING A PLAN OF ACTION FOR TEACHING AGRIBUSINESS

_____High School

_____,Illinois

Prepared by: _____

I. Present situation:

A. Describe the current applied biological and agricultural occupations program in your school by listing each course offered under one of the following occupational areas:

01.0100 Agricultural Production

01.0200 Agricultural Supply and Service

01.0300 Agricultural Mechanics

01.0400 Agricultural Products

01.0500 Ornamental Horticulture

01.0600 Agricultural Resources

01 0700 Forestry

B. Estimate the amount of instructional time devoted to the following units and the title of the course(s) in which they are taught:

	Estimated time (hours)	Course(s) in which taught
Human Relations in Agribusiness		
Communications in Agribusiness		
Agricultural Salesmanship		
Agricultural Sales Promotion		
Agribusiness Operations		

2646

C. Outline the types of data or information related to manpower needs and employment opportunities (local, state and national) which you have utilized in planning the instructional program for your school.

D. Describe how local citizens have been involved in planning the instructional program in your school.

E. Describe the measures used to determine the needs and interest of students in applied biological and agricultural occupations.

F. List the agribusiness materials (materials related to nonfarm agricultural occupations) you have used in teaching.

G. List the types of supervised occupational experiences (supervised farming programs, cooperative placement, etc.) received by students enrolled in courses in your department.

H. Other situations (describe).

2647

II. Plans for the future:

A. Explain how you will involve local citizens in planning for agribusiness education in your community.

B. Explain how you will gather and use manpower needs and employment opportunity data in local planning.

C. Explain how you will determine the needs and interest of student in applied biological and agricultural occupations.

D. List new references and teaching aids you plan to secure to use in teaching agribusiness.

E. List new learning activities you plan to use in teaching agribusiness.

F. Explain the types of supervised experiences you will plan to help students prepare for nonfarm agricultural occupations.

G. Other plans (describe).

H. Describe potential changes that could be made in your instructional program to include or extend the teaching of agribusiness to prepare students for nonfarm agricultural occupations. (Examples: Add agribusiness course, introduce agribusiness units in existing courses.)

I. My timetable for completing activities associated with implementing or extending agribusiness instruction in my school is as follows:

Activity	Planned date of completion

2649

(Copy of letter sent to teachers who preregistered for the workshop)

We are pleased that you will be participating in the Agribusiness Curriculum Workshop July 6-9, at the University of Illinois, Urbana-Champaign. Registration will be from 9:00-10:00 a.m. on July 6, in 314B Illini Union.

A copy of the tentative workshop program is enclosed for your information. The workshop is designed to help teachers plan and implement instructional programs for nonfarm agricultural occupations in their local school.

To help make the workshop more beneficial to you and other participants, we suggest that you bring the following materials and information to the workshop:

1. Instruments used to measure students' interests and needs.

2. Constitution and bylaws for advisory council.

3. Outlines of the present courses in your department.

4. Instruments used to determine manpower needs and employment opportunities.

5. Results of surveys conducted to determine manpower needs.

6. A list of references and teaching aids used in teaching agribusiness.

7. Sample references and teaching aids used in teaching agribusiness.

8. Training plans used in cooperative education.

Multiple copies of materials and information which may be useful to other participants would be appreciated. We are planning an "exchange-of-ideas" exhibit for the workshop.

We will plan to see you on July 6.

Sincerely,

David L. Williams
Assistant Professor
Agricultural Education

2659

APPENDIX B

2651

WORKSHOP PARTICIPANTS

Name	Professional Position (1971-72)	Location
John Abell	Instructor	Teutopolis High School
T. W. Anderson	Instructor	Kaneland High School
Doug Arends	Instructor	Tri-City High School
George Blankinship	Instructor	Hillsboro High School
Norman Bruce	Instructor	Easton High School
Carl Burkybile	Instructor	Armstrong High School
Donald Carlson	Instructor	Waterman High School
David Cattron	Instructor	Joliet Junior College
Robert Cobb	Instructor	Kishwaukee College
John Craig	Graduate Student	University of Illinois
Gerold Davis	Instructor	Williamsville High School
Ray Davis	Instructor	Bunker Hill High School
Allen Dietz	Instructor	Malta High School
James Elliot	Instructor	Lexington High School
Art Englebrecht	Instructor	Sparland High School
Michael Donnan	Instructor	Ashland High School
Dan Duncan	Instructor	Amboy High School
Larry Fischer	Instructor	East Pike High School
Arturo Galo	Graduate Student	University of Illinois
Lyn Grandt	Instructor	Eureka High School
Jim Hanlin	Instructor	Atwood High School
Ron Heisner	Graduate Student	University of Illinois
Allen Hornbrook	Instructor	Paris High School
Ken Huddleston	EPDA Fellow	University of Illinois
James Jones	Instructor	LaPlata, Maryland
Dale Law	Instructor	Rushville High School
Richard Lowe	Instructor	St. Elmo High School
Anthony Marten	Instructor	Edwardsville High School
Glen Mills	Instructor	Brownstown High School
Rick Morris	Instructor	Olympia High School
Saturnino Ocampo, Jr.	Graduate Student	University of Illinois
Dave Pennington	Instructor	Sandwich High School
Merlyn Raber	Instructor	Havana High School
James Rice	Administrator	Orland Park Jr. High School
Bob Scherer	Instructor	Lawrenceville High School
Gary Schmidt	Instructor	Carthage High School
Richard Seidel	Instructor	Altamont High School
Calvin Twenhafel	Instructor	Bement High School
Gene Vaughan	Instructor	Elmwood High School
Jim Webb	Instructor	Hamilton High School
Robert Wolf	Instructor	Paris High School
Ted Shipley	Graduate Student	University of Illinois

WORKSHOP RESOURCE PERSONS

Name	Professional Position	Location
Cattron, David	Graduate Assistant	University of Illinois
Curtis, Paul	Lead-Instructor Agriculture Department	Parkland College
Heisner, Ronald	Graduate Assistant	University of Illinois
Herbst, John	Professor Vocational Agriculture Service	University of Illinois
Huddleston, Kenneth	EPDA Fellow	University of Illinois
McMillion, Martin	Associate Professor Agricultural Education	University of Minnesota
Schlick, Jack	Vice-President of Market Communications, Inc.	Woodstock, Illinois
Shipley, Ted	Consultant - Rurban Educational Development Laboratory	University of Illinois
Thomas, Hollie	Assistant Professor Agricultural Education	University of Illinois
Thornton, Marty	Graduate Assistant Agricultural Education	University of Illinois
Trotter, Gene	Graduate Assistant Vocational Agricultural Service	University of Illinois
Williams, David	Assistant Professor Agricultural Education	University of Illinois

Guests

Hemp, Paul	Chairman, Agricultural Education Division	University of Illinois
Phipps, Lloyd	Chairman, Vocational and Technical Education Department	University of Illinois
Utech, Allan	Consultant - Applied Biological and Agricultural Occupations	Springfield, Illinois

APPENDIX C

2654

PARTICIPANTS WORKSHOP EVALUATION

Dear Participant:

The workshop just completed was supported by the Division of Vocational and Technical Education. Your appraisal of it will be greatly appreciated. Please complete the following:

Workshop Title_____

University_____ Workshop Director_____

1. Will this workshop prove valuable to you in your job?_____

2. Was this workshop consistent with what you believe to be the new directions in vocational education? _____

3. Was your experience such that you would take a follow-up workshop next summer? _____

   From the same instructor? _____

4. Comments:_____

   _____

   _____

5. What workshops would you like to see offered next year?_____

_____

_____

6. Signature optional_____

   Years teaching_____ Presently teaching_____ _____
   (Subject(s))

You have the option of placing this evaluation in the envelope the workshop has, or forwarding it yourself to:

Professional and Curriculum Development Unit
Division of Vocational & Technical Education
405 Centennial Building
Springfield, Illinois 62706

CERTIFICATE OF COMPLETION

This is to certify that_____has successfully completed an intensive four-day workshop entitled Diffusion of Nonfarm Agricultural Occupations Curricula into Vocational Education in Agriculture, July 6-9, 1971, at the University of Illinois, Urbana-Champaign.

The purpose of the workshop was to improve vocational education programs to better prepare youth for occupations in nonfarm agricultural businesses.

_____
David L. Williams
Assistant Professor
Workshop Director

VT 014 073
DUIS, HAROLD F., COMP.
TRENDS IN VOCATIONAL EDUCATION: ENROLLMENTS, EXPENDITURES, AND TEACHERS.

BUREAU OF ADULT, VOCATIONAL, AND TECHNICAL EDUCATION (DHEW/OE), WASHINGTON, D.C. DIV. OF VOCATIONAL AND TECHNICAL EDUCATION.
MF AVAILABLE IN VT-ERIC SET.
VOC-EDU-INF-III
PUB DATE - JUN71

DESCRIPTORS - *VOCATIONAL EDUCATION; *PROGRAM EVALUATION; *TABLES (DATA); *TREND ANALYSIS; *EDUCATIONAL TRENDS; ENROLLMENT TRENDS; PROGRAM DEVELOPMENT; VOCATIONAL EDUCATION TEACHERS; EXPENDITURES; DATA ANALYSIS; ANNUAL REPORTS; MANPOWER DEVELOPMENT

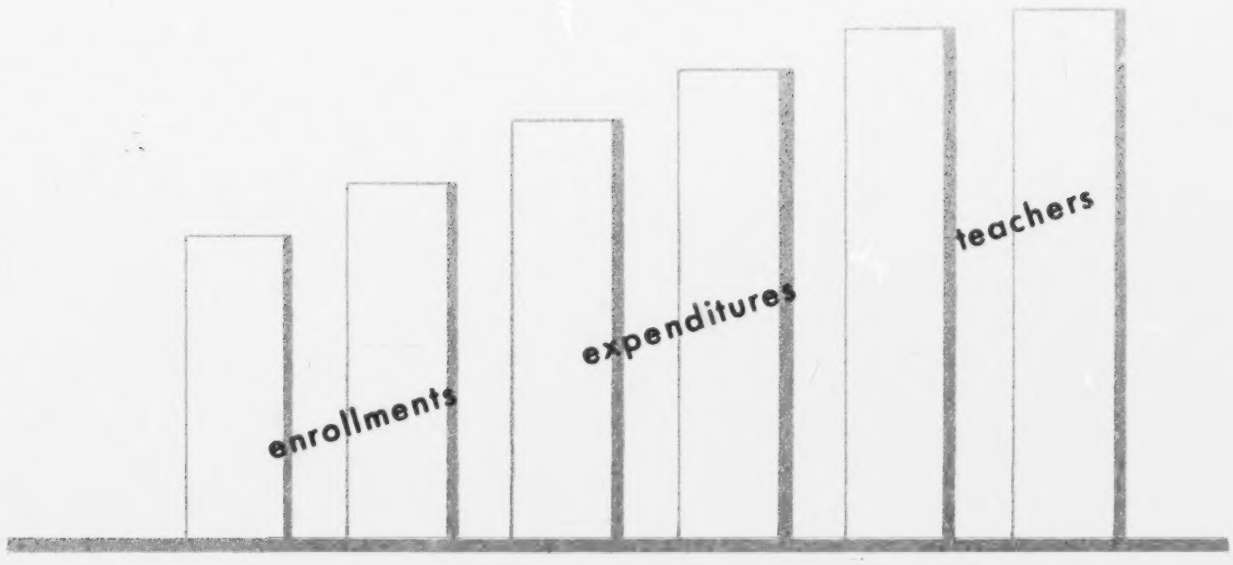
ABSTRACT - BASED ON STATISTICAL INFORMATION DERIVED FROM ANNUAL REPORTS AND UNPUBLISHED DATA, THIS DOCUMENT PRESENTS TABLES AND GRAPHS TO SHOW TRENDS RELATED TO VOCATIONAL EDUCATION ENROLLMENTS, EXPENDITURES, AND TEACHERS. AS THE THIRD IN THE "VOCATIONAL EDUCATION INFORMATION" SERIES FOR FISCAL YEAR 1970, THESE TABLES AND GRAPHS SHOW THAT VOCATIONAL EDUCATION HAS EXPERIENCED SIGNIFICANT GROWTH, PARTICULARLY AFTER THE VOCATIONAL EDUCATION ACT OF 1963. IN ADDITION TO EXPANSION IN ENROLLMENTS AND INCREASED EXPENDITURES, POSITIVE CHANGES ALSO HAVE OCCURRED IN THE QUALITY AND SCOPE OF VOCATIONAL PROGRAMS. NEW FACILITIES AND EQUIPMENT HAVE BEEN PROVIDED, CURRICULUMS HAVE BEEN UPDATED, AND IMPROVEMENTS IN THE REPORTING SYSTEM ARE BEING DEVELOPED. RELATED DOCUMENTS ARE AVAILABLE AS VT 013 488 AND VT 013 489 IN ARM VOL. 5 NO. 1. (AUTHOR/JS)

VT 014 073

2658

VOCATIONAL EDUCATION INFORMATION NO. 3

[redacted]



TRENDS IN VOCATIONAL EDUCATION

VT 014 073
c.2

Vocational Education Information No. III

T R E N D S

I N

V O C A T I O N A L E D U C A T I O N

Enrollments

Expenditures

Teachers

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Education
Bureau of Adult, Vocational, and Technical Education
Division of Vocational and Technical Education
Washington, D.C. 20202

2659

FOREWORD

This document, the third in the "Vocational Education Information" series for fiscal year 1970, includes tables and graphs to show trends in enrollments (Section I), expenditures (Section II), and teachers (Section III) for the United States and outlying areas.

Statistical information was derived from annual reports published by the Division of Vocational and Technical Education and unpublished data compiled by Harold F. Duis, Reports and Statistical Data Section, from State annual reports and State plan projections. The actual data cover fiscal year 1960 and other selected fiscal years through 1970, and the projected data are for fiscal year 1975.

Several changes have been made in the vocational education reporting system to reflect new priorities in legislation. Consequently, compatible data are not available in a few instances. In others, adjustments have been made so that data are compatible and are explained in the text or in the tables.

The tables and graphs show that vocational education has experienced significant growth, particularly after the Vocational Education Act of 1963. The full impact of the Vocational Education Amendments of 1968 was not apparent during fiscal year 1970, since funds became available late in the fiscal year. In addition to expansion in enrollments and increased expenditures, positive changes have occurred in the quality and scope of vocational programs. New facilities and equipment have been provided, curriculums have been updated, and improvements in the reporting system are being developed.

This information on trends should be useful to all persons interested in the nature and scope of vocational education in the United States, and particularly to those individuals involved in program administration.

Edwin L. Rumpf
Acting Director
Division of Vocational
and Technical Education

June 1971

SECTION I. VOCATIONAL EDUCATION ENROLLMENTS

Figures 1 through 5 picture the growth of vocational enrollments for selected periods. Figure 1 traces enrollment trends from 1918 to 1970, showing the influence of major legislation on enrollment growth. Within the 52-year period, enrollments grew from 164,168 to more than 8.5 million.

Figure 2 charts the year-to-year changes in enrollments from 1960 through 1970 and projects a total enrollment in excess of 13.5 million by 1975.

Enrollment data by level were first reported in 1963. Figures 3, 4, and 5 show yearly changes in secondary, adult, and postsecondary enrollments for the period 1963-1970.

Table 1 shows that total vocational education enrollments increased from 3,768,149 in 1960 to 8,793,960 in 1970. During the last half of the 1960's enrollments grew 62 percent compared to 47 percent for the 1960-64 period, when enrollments increased yearly by about 200,000. The 1963 Act went into effect in 1965 and total enrollment jumped 18.9 percent, the largest percentage increase for any one year. It exceeded the 1964 enrollment by some 860,000. Yearly gains after 1965 were about 500,000 except for increases of over 1 million in 1967 and 800,000 in 1970.

Reporting by level began in 1963 (see Figures 3-5). Table 1 shows that 51.9 percent of the vocational enrollees in 1965 were in secondary programs, a proportion which remained constant until the 58.2-percent increase in 1970. Postsecondary enrollment, only 3.8 percent of the 1965 enrollment, passed the 1-million mark in 1970 and made up 11.5 percent of that year's total. Conversely, adult enrollment dropped to 30.3 percent of the 1970 total and the 1975 projection forecasts a declining trend, a drop to 27.0 percent.

The first year for reporting services to persons with special needs was 1965, during which 25,638 of these persons were in separate classes. After that year, and until 1970, enrollment data reported (1) those in separate classes and (2) those who received special services in regular classes. The 1968 Amendments changed this breakdown by stipulating programs specifically for the handicapped and for the disadvantaged. Thus, Table 1 shows inclusion of 805,384 disadvantaged persons and 115,219 handicapped persons in the 1970 enrollment totals.

Table 2 compares secondary vocational enrollment to the total secondary enrollment. Vocational enrollment for the 1965-1970 period increased more rapidly than the total secondary enrollment, from 24.2 percent to 38.5 percent. For the same period, enrollment in vocational programs which prepare for gainful employment increased from 11.9 percent to 24.4 percent.

Enrollment projections show that in 1975 over half (54.6 percent) of the Nation's secondary school population will be enrolled in vocational education.

Table 3 shows the percentage distribution of male and female enrollees by level and by program. The proportion of female enrollees increased from less than half the total in 1960 to 55.6 percent in 1969, and then dropped to 55.0 percent in 1970. By level, however, females account for almost two-thirds of the secondary enrollment. Male enrollees at the postsecondary level decreased in proportion, but continued to be 60 percent of the total. The proportion of females at the adult level increased from 42.7 percent in 1965 to 46.1 percent in 1970.

A look at enrollment distribution in the several vocational programs reveals a new trend in agriculture enrollment. In 1960 no females were enrolled in agriculture, but in 1965 females constituted 0.4 percent of the program's enrollment. This trend accelerated in the next 5 years and by 1969 they represented 2 percent of the enrollment in agriculture. Male enrollment in health increased from 1.4 percent to 7.8 percent between 1960 and 1969, and in home economics from 2.8 percent to 13.3. The enrollment distribution by sex remained relatively stable in other vocational programs.

Enrollments by program, as shown in Table 4, were largest in homemaking and trades and industry for the period 1960-1970, and in office from 1965 to 1970. From 1960 the greatest rate of increase occurred in health, technical, and trades and industry, all exceeding the growth rate in total enrollment. Off-farm agriculture, gainful home economics, and office programs, first reported in 1965, grew rapidly and had large percentage shares of the total enrollment. Agriculture and homemaking enrollments constituted a significantly smaller percentage of the total enrollment in 1970 than in 1960. Other program enrollments remained relatively stable, considering the addition of office programs in 1965.

Table 5 details enrollments by level and by program for the period 1966 through 1970.

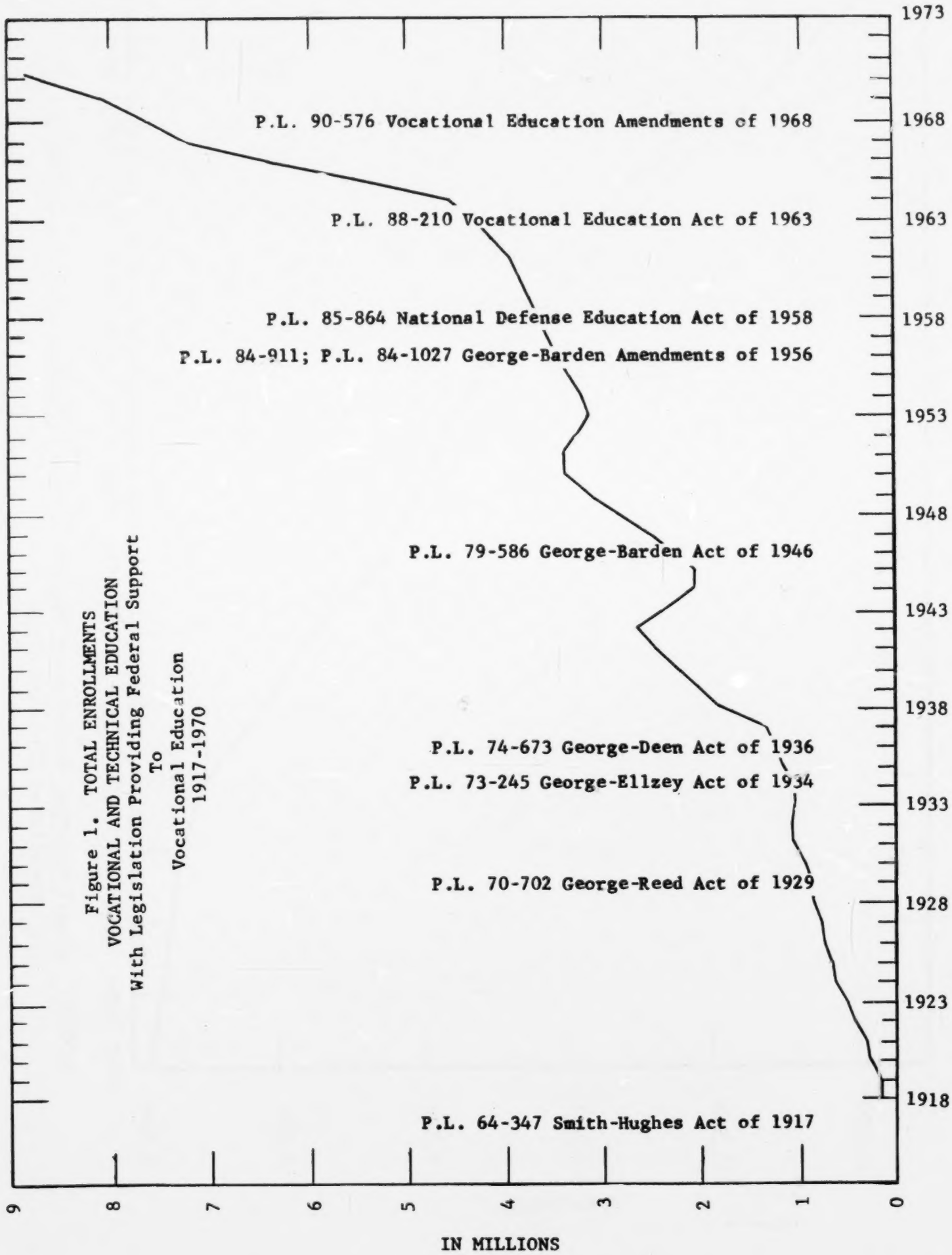
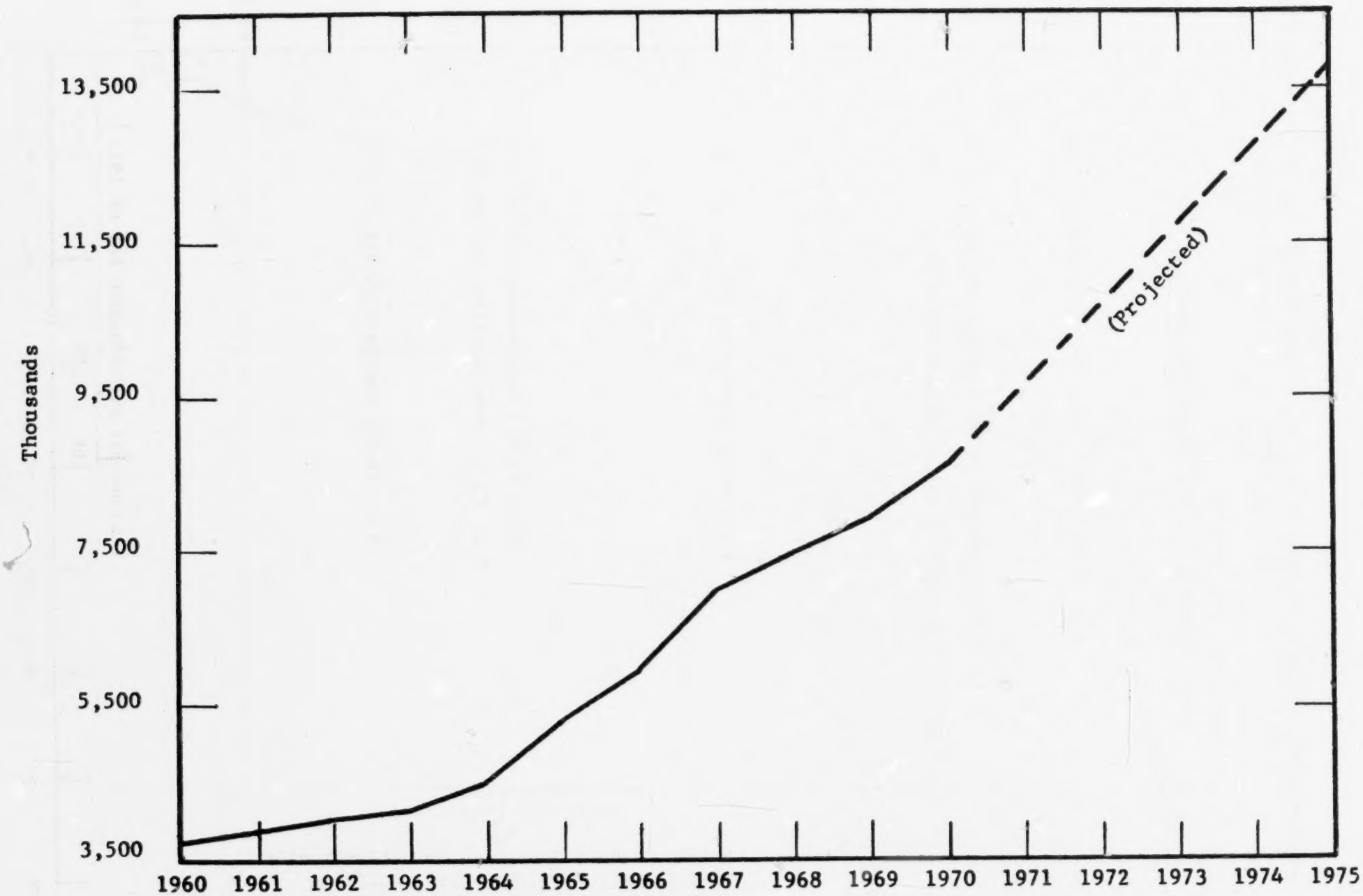


Figure 1. TOTAL ENROLLMENTS
VOCATIONAL AND TECHNICAL EDUCATION
With Legislation Providing Federal Support
To
Vocational Education
1917-1970

Source: Annual Reports, Division of Vocational and Technical Education, 1918-1970, and unpublished Division data.

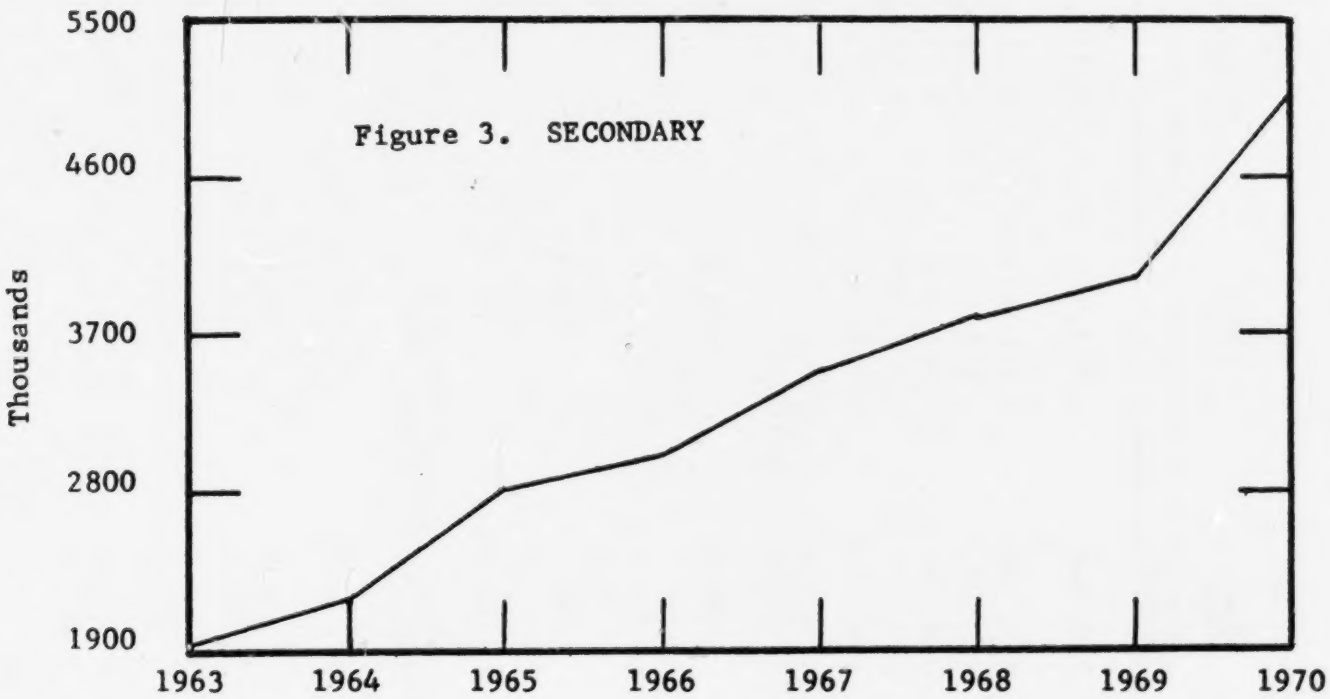
2663

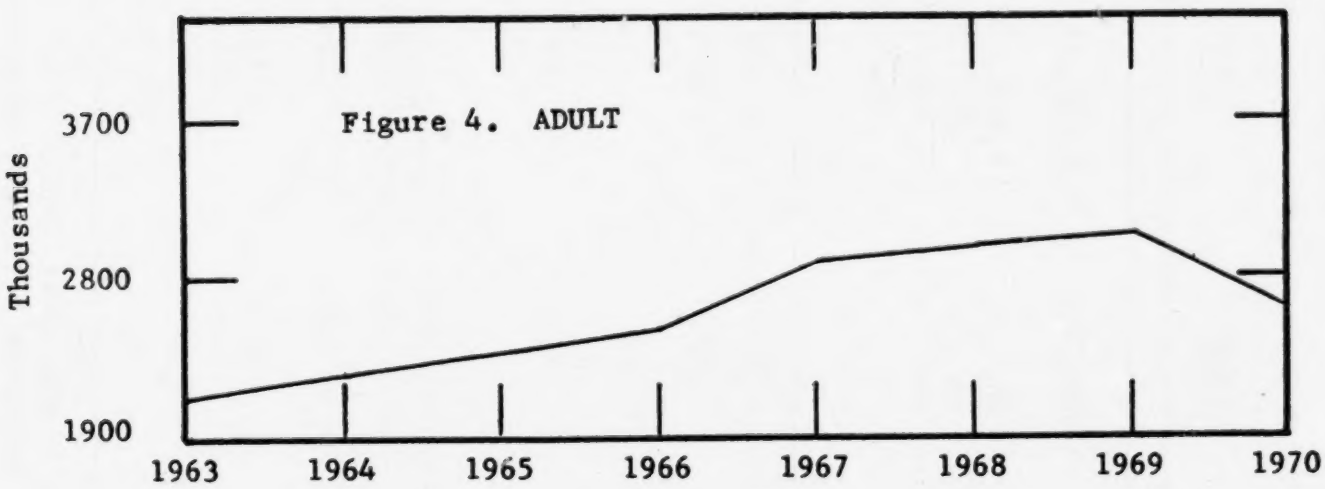
Figure 2. TOTAL ENROLLMENTS IN VOCATIONAL EDUCATION
1960-1975

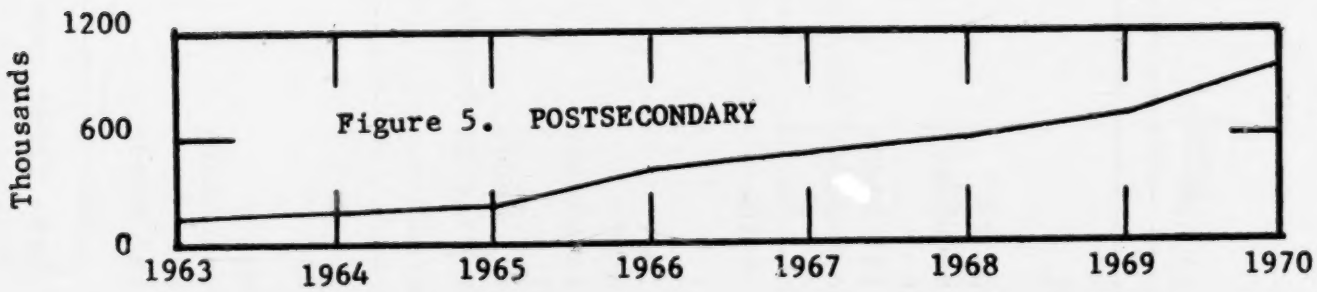


SOURCE: Annual Reports, Division of Vocational and Technical Education, 1960-1970, and unpublished Division data.

ENROLLMENTS IN VOCATIONAL EDUCATION, BY LEVEL
1963-1970







SOURCE: Annual Reports, Division of Vocational and Technical Education, 1963-1970, and unpublished Division data.

Table 1. ENROLLMENTS IN VOCATIONAL EDUCATION, BY LEVEL
FISCAL YEARS 1960-1975

Level	1960	1965	1969	1970	1975 (Projected)
			Number		
Total	3,768,149	5,430,611	7,979,366	8,793,960	13,800,000
Secondary	NA	2,819,250	4,079,395	5,114,451	8,247,000
Postsecondary	NA	207,201	706,085	1,013,426	1,830,000
Adult	NA	2,378,522	3,050,466	2,666,083	3,723,000
Special Needs		25,638 1/	143,420 1/	(805,384) 2/	(1,412,000) 2/
(In Regular Programs)			(144,274)	(115,219) 3/	(337,000) 3/
			Percentage Distribution		
Total	100.0	100.0	100.0	100.0	100.0
Secondary	NA	51.9	51.1	58.2	59.8
Postsecondary	NA	3.8	8.9	11.5	13.2
Adult	NA	43.8	38.2	30.3	27.0
Special Needs		0.5 1/	1.8 1/	(9.2) 2/	(10.2) 2/
(In Regular Programs)			(1.8)	(1.3) 3/	(2.4) 3/
			Percentage Change From Previous Year		
Total	1.8	18.9	5.9	10.2	---
Secondary	---	31.7	6.2	25.4	---
Postsecondary	---	21.3	19.1	43.5	---
Adult	---	5.5	2.1	-12.5	---
Special Needs		---	29.2	220.0	--

1/ Data first reported in fiscal year 1965.
2/ Disadvantaged persons included by level, starting in fiscal year 1970.
3/ Handicapped persons included by level, starting in fiscal year 1970.

62666

Table 2. SECONDARY ENROLLMENT IN VOCATIONAL EDUCATION (GRADES 9-12)
FISCAL YEARS 1960-1975

	1960	1965	1969	1970	1975 (Projected)
Total Secondary Enrollment 1/	8,485,000	11,628,000	12,972,000	13,282,000	15,100,000 2/
Vocational Education Enrollment	--	2,819,250	4,079,395	5,114,451	8,247,000
Percentage in Vocational Education	--	24.2	31.4	38.5	54.6
Vocational Education Enrollment (Less Homemaking)	--	1,390,443	2,449,587	3,246,629	6,176,000
Percentage in Vocational Education	--	11.9	18.9	24.4	40.9

1/ U.S. Office of Education, National Center for Educational Statistics. Digest of Educational Statistics (OE-10024-69), Table 26. Washington: U.S. Government Printing Office.
2/ U.S. Office of Education, National Center for Educational Statistics. Projections of Educational Statistics to 1976-77 (OE-10030-67), Table 2. Washington: U.S. Government Printing Office.

2667

Table 3. PERCENTAGE DISTRIBUTION OF ENROLLMENT IN VOCATIONAL EDUCATION PROGRAMS, BY SEX
FISCAL YEARS 1960-1970

	1960	1965	1969	1970
Total	100.0	100.0	100.0	100.0
By Level				
All Programs				
Male	51.1	45.5	44.4	45.0
Female	48.9	54.5	55.6	55.0
Secondary				
Male	--	34.0	33.9	37.4
Female	--	66.0	66.1	62.6
Postsecondary				
Male	--	65.4	60.0	60.7
Female	--	34.6	40.0	39.3
Adult				
Male	--	57.3	54.7	53.9
Female	--	42.7	45.3	46.1
By Program				
Agriculture				
Male	100.0	99.6	98.0	NA
Female	0.0	0.4	2.0	NA
Distribution				
Male	51.4	55.7	55.5	NA
Female	48.6	44.3	44.5	NA
Health				
Male	1.4	4.9	7.8	NA
Female	98.6	95.1	92.2	NA
Home Economics				
Male	2.8	3.1	13.3	NA
Female	97.2	96.9	86.7	NA
Office				
Male	--	20.7	22.0	NA
Female	--	79.3	78.0	NA
Technical				
Male	94.8	91.6	91.3	NA
Female	5.2	8.4	8.7	NA
Trades and Industry				
Male	88.6	89.6	88.9	NA
Female	11.4	10.4	11.1	NA

Table 4. ENROLLMENTS IN VOCATIONAL EDUCATION, BY PROGRAM
FISCAL YEARS 1960-1975

	1960	1965	1969	1970	1975 (Projected)
			Number		
Total	3,768,149	5,430,611	7,979,366	8,793,960	13,800,000
Agriculture	796,237	887,529	850,705	852,983	793,700
(Off-Farm)	--	(55,681)	(205,846)	(268,226)	(348,400)
Distribution	303,784	333,342	563,431	529,365	793,600
Health	40,250	66,772	175,101	198,044	450,000
Homemaking	1,588,109	2,084,351	2,335,755	2,419,216	2,879,074
Home Economics (Gainful)	--	14,169	113,297	151,194	233,800
Office	--	730,904	1,835,124	2,111,160	2,734,800
Technical	101,279	225,737	315,311	271,730	564,700
Trades and Industry	938,490	1,087,807	1,720,859	1,906,133	2,363,900
Other 1/	--	--	69,783	354,135	2,986,426
			Percentage Distribution		
Total	100.0	100.0	100.0	100.0	100.0
Agriculture	21.1	16.3	10.6	9.7	5.8
(Off-Farm)	---	(6.3)	(2.6)	(3.1)	(2.5)
Distribution	8.1	6.1	7.1	6.0	5.8
Health	1.1	1.2	2.2	2.3	3.2
Homemaking	42.1	38.6	29.3	27.5	20.9
Home Economics (Gainful)	---	0.07	1.4	1.7	1.7
Office	---	13.5	23.0	24.0	19.8
Technical	2.7	4.2	3.9	3.1	4.1
Trades and Industry	24.9	20.0	21.6	21.7	17.1
Other 1/	---	---	0.9	4.0	21.6

1/ Includes occupational programs N.E.C. in 1969 and also prevocational, prepostsecondary, and remedial programs in succeeding years.

Table 5. ENROLLMENT IN VOCATIONAL EDUCATION, BY LEVEL AND PROGRAM
FISCAL YEARS 1966-1970

Level and Type of Program	1966	1967	1968	1969	1970
All Programs	6,070,059	7,047,501	7,533,936	7,979,366	8,793,960
Secondary	3,048,248	3,532,823	3,842,896	4,079,395	5,114,451
Postsecondary	442,097	499,906	592,970	706,085	1,013,426
Adult	2,530,712	2,941,109	2,987,070	3,050,466	2,666,083
Special Needs	49,002	73,663	111,000	143,420	(805,384) 1/
(In Regular Programs)	(53,154)	(92,925)	(107,942)	(144,274)	(115,219) 2/
Agriculture 3/	907,354	935,170	851,158	850,705	852,983
Secondary	510,279	508,675	528,146	536,039	550,823
Postsecondary	5,987	8,093	11,036	15,816	23,381
Adult	390,388	413,454	305,357	290,336	278,779
Special Needs	700	4,948	6,619	8,514	(69,087) 1/
(In Regular Programs)		(12,488)	(14,691)	(27,215)	(10,046) 2/
Distribution	420,426	481,034	574,785	563,431	529,365
Secondary	101,728	151,378	175,816	184,206	230,007
Postsecondary	15,833	21,003	44,824	60,718	82,160
Adult	301,116	303,783	349,730	307,976	217,198
Special Needs	1,749	4,870	4,415	10,531	(47,272) 1/
(In Regular Programs)		(9,065)	(17,469)	(11,846)	(5,219) 2/
Health	83,677	115,109	140,987	175,101	198,044
Secondary	9,793	16,734	20,952	23,207	31,915
Postsecondary	36,496	54,135	64,592	91,922	102,515
Adult	37,065	42,721	52,865	56,603	63,614
Special Needs	323	1,519	2,578	3,369	(20,179) 1/
(In Regular Programs)		(1,146)	(1,529)	(4,243)	(2,951) 2/
Home Economics 4/	1,897,670	2,186,992	2,283,338	2,449,052	2,570,410
Secondary	1,280,254	1,475,235	1,558,004	1,670,347	1,934,059
Postsecondary	2,652	3,506	4,395	13,490	44,259
Adult	602,363	685,225	677,478	718,817	592,092
Special Needs	12,401	23,026	43,461	46,398	(233,000) 1/
(In Regular Programs)		(33,437)	(26,783)	(36,315)	(26,591) 2/

2670

Office	1,238,043	1,572,335	1,735,997	1,835,124	2,111,160
Secondary	798,368	985,398	1,059,656	1,122,198	1,331,257
Postsecondary	165,439	192,639	225,182	218,448	331,001
Adult	271,149	389,194	443,481	482,160	448,902
Special Needs	3,087	5,104	7,678	12,318	(197,359) 1/
(In Regular Programs)		(18,475)	(28,540)	(35,517)	(18,720) 2/
Technical	253,838	266,054	269,832	315,311	271,730
Secondary	28,865	27,614	36,286	31,833	34,386
Postsecondary	100,151	97,156	104,746	130,564	151,621
Adult	124,730	140,431	127,418	151,714	85,723
Special Needs	92	853	1,382	1,200	(13,373) 1/
(In Regular Programs)		(2,927)	(568)	(3,301)	(2,555) 2/
Trades and Industry	1,269,051	1,490,807	1,628,542	1,720,859	1,906,133
Secondary	318,961	367,789	421,719	458,554	692,396
Postsecondary	115,539	123,374	137,732	174,201	261,182
Adult	803,901	966,301	1,030,723	1,042,362	952,555
Special Needs	30,650	33,343	38,368	45,742	(182,642) 1/
(In Regular Programs)		(15,387)	(17,527)	(22,148)	(30,155) 2/
Other			49,297	69,783	354,135 5/
Secondary			42,317	53,011	309,608
Postsecondary			463	926	17,307
Adult			18	498	27,220
Special Needs			6,499	15,348	(42,472) 1/
(In Regular Programs)			(835)	(3,689)	(18,982) 2/

1/ Disadvantaged persons, included by level.
2/ Handicapped persons, included by level.
3/ Includes enrollments in off-farm agriculture as follows: 1966 - 112,368; 1967 - 151,781; 1968 - 171,554; 1969 - 205,846; 1970 - 268,226.
4/ Includes enrollments in gainful home economics as follows: 1966 - 41,846; 1967 - 62,245; 1968 - 73,048; 1969 - 113,297; 1970 - 151,194.
5/ Includes enrollments in exemplary, prevocational, prepostsecondary, and remedial programs.

1292

SECTION II. EXPENDITURES FOR VOCATIONAL EDUCATION

As shown in Table 6, the 1963 Act significantly increased the funds available for vocational and technical education. Including the portions appropriated under the Smith-Hughes and George-Barden Acts, Federal allotments rose from $57 million in 1964 to $169 million in 1965 and increased to $255 million in the four succeeding years. The 1970 allotment, appropriated under the 1968 Amendments, totaled $365 million.

The table also shows total expenditures by source of funds and that State and local expenditures consistently overmatched the Federal dollar, even in 1965 when the ratio declined because of the influx of Federal funds. State and local expenditures accounted for more than 80 percent of the total, except in 1965.

It should be noted that the Federal funds expended in 1970 were considerably less than the allotment because the appropriation was not available until late in the fiscal year. The funds, however, were carried forward by the States to be expended in 1971.

Figure 6 shows graphically the increase in total expenditures from 1966 through 1970, including the actual totals spent by source.

Figure 7 presents a general picture of total expenditures for the years 1960 through 1970 and predicts that combined expenditures will reach $4 billion by 1975.

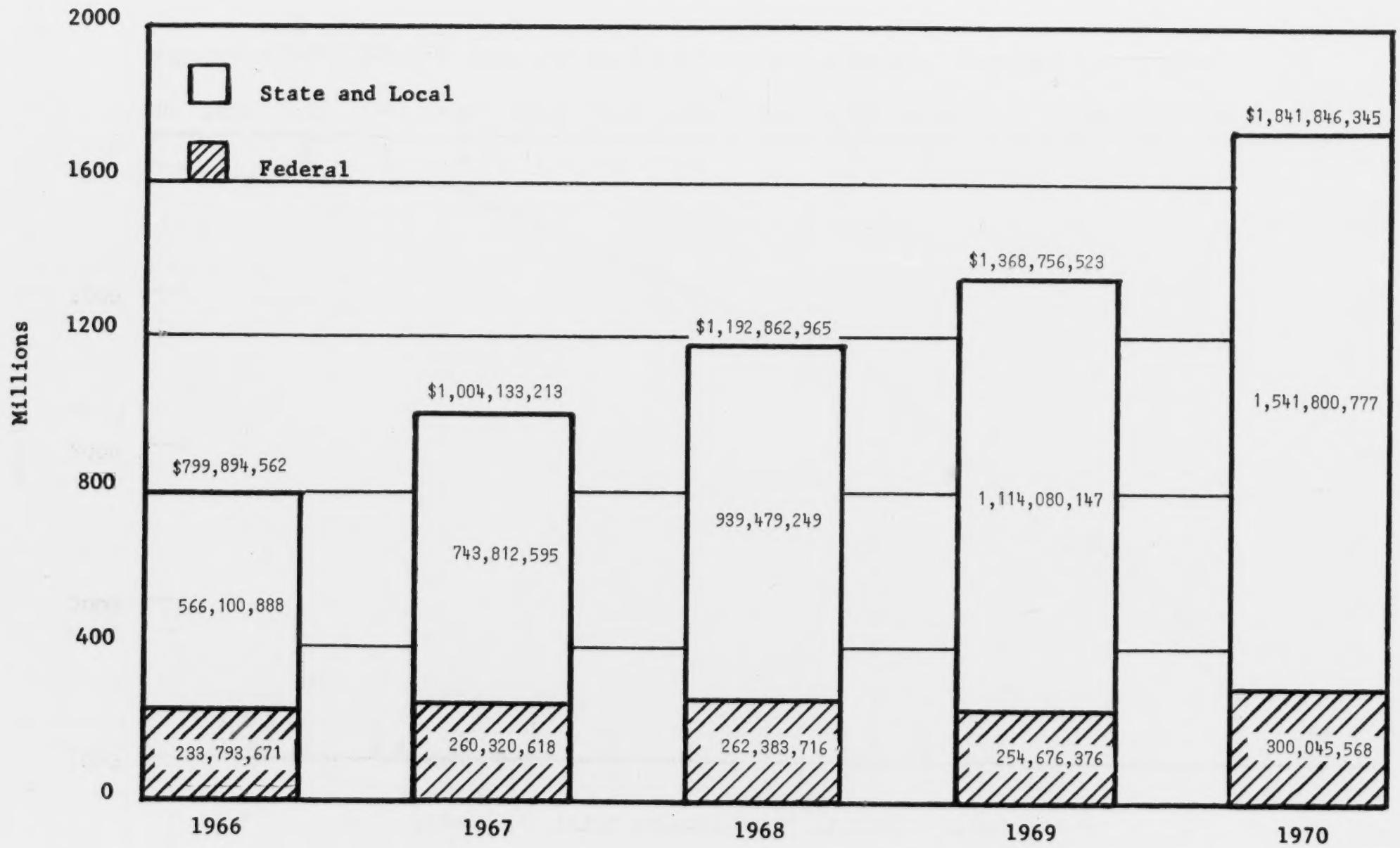
Table 7 shows expenditures and percentage distribution by function. The 1963 Act provided more flexibility in funding than the Smith-Hughes and George-Barden Acts. This resulted in the addition of several new categories. The proportion for instruction, although declining, still constituted over 60 percent of the total expenditures in 1970. Expenditures for instructional equipment and administration rank next. It is interesting to note that administrative expenditures were only 6.8 percent of the 1970 total. Other expenditures reported separately in 1970 included student transportation, space rental, insurance, teacher travel, and utilities.

Table 8 shows the allocation of Federal funds expended for the various purposes outlined in the 1963 Act and the 1968 Amendments. Of significance is the percentage decrease in expenditures for secondary programs and construction and the accelerated percentage increase in funding programs for the disadvantaged and the handicapped. Also noteworthy is the increased proportion, 23 percent, expended for postsecondary programs, which was above the 15-percent minimum required by the 1968 Amendments. The 10-percent minimum required for programs for the handicapped was not met in 1970, but sufficient funds were carried over to more than meet this requirement in 1971.

Table 6. TOTAL EXPENDITURES FOR VOCATIONAL EDUCATION, BY SOURCE OF FUNDS
FISCAL YEARS 1960-1975

	1960	1965	1969	1970	1975 (Projected)
			Amount		
Grand Total	$238,811,764	$604,645,727	$1,368,756,523	$1,841,846,345	$4,000,000,000
Federal	45,313,236	156,936,015	254,676,376	300,045,568	667,000,000
State/Local	193,498,528	447,709,712	1,114,080,147	1,541,800,777	3,333,000,000
Ratio: State/Local to Federal	$4.27	$2.90	$4.37	$5.14	$5.00
			Percentage Distribution		
Grand Total	100.0	100.0	100.0	100.0	100.0
Federal	19.0	26.0	18.6	16.3	16.7
State/Local	81.0	74.0	81.4	83.7	83.3
			Percentage Change from Previous Year		
Grand Total	4.6	81.7	14.7	34.6	---
Federal	9.5	185.2	-2.9	17.8	---
State/Local	3.5	61.2	19.7	38.4	---
			Federal Allotments		
Total Allotments	$47,863,393	$168,607,278	$255,377,278	$365,347,467	
Smith-Hughes Act	7,296,312	7,266,455	7,161,455	7,161,455	
George-Barden Act	40,567,081	49,690,823	49,990,823	---	
VE Act of 1963		111,650,000	198,225,000	---	
1968 Amendments				358,186,012	

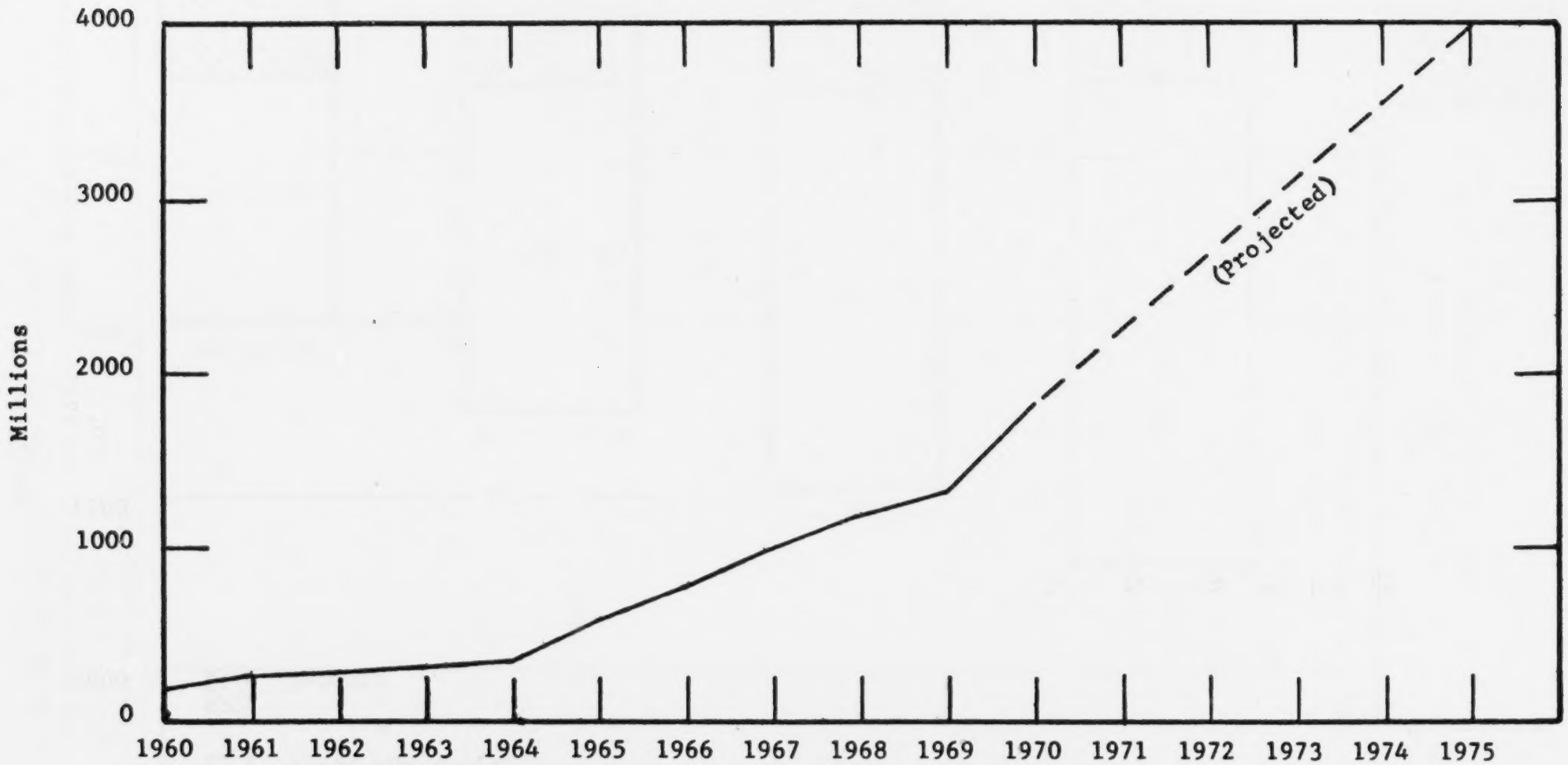
Figure 6. EXPENDITURES FOR VOCATIONAL EDUCATION, BY SOURCE OF FUNDS
1966-1970



SOURCE: Annual Reports, Division of Vocational and Technical Education, 1966-1970.

2624

Figure 7. TOTAL EXPENDITURES, FEDERAL - STATE - LOCAL
1960-1975



SOURCE: Annual Reports, Division of Vocational and Technical Education, 1960-1970, and unpublished Division data.

2675

Table 7. TOTAL EXPENDITURES FOR VOCATIONAL EDUCATION, BY FUNCTION*
FISCAL YEARS 1960-1970

Function	1960	1965	1969	1970
		Amount		
Total	$238,811,765	$491,993,986	$1,152,121,442	$1,654,602,501
Administration	3,700,213	8,318,449	83,811,037)	
			)	112,923,796
Supervision)		27,169,658	21,315,407)	
)	23,422,409			
Teacher Education)		9,508,092	20,552,426	33,094,548
Instruction 1/	211,689,143	360,514,111	923,325,739	1,006,777,288
Research		1,171,613	7,709,925	4,411,258
Instructional Equipment		57,290,213	69,299,284	202,064,399
Vocational Guidance		3,094,832	26,107,624	57,299,303
Curriculum Development				2,932,235
Other 2/		24,927,018		235,099,674
		Percentage Distribution		
Total	100.0	100.0	100.0	100.0
Administration	1.6	1.7	7.3)	
			)	6.8
Supervision)		5.5	1.8)	
)	9.8			
Teacher Education)		1.9	1.8	2.0
Instruction 1/	88.6	73.3	80.1	60.8
Research		0.2	0.7	0.3
Instructional Equipment		11.7	6.0	12.2
Vocational Guidance		0.6	2.3	3.5
Curriculum Development				0.2
Other 2/		5.1		14.2

* Excludes construction and work-study
1/ Includes instructional salaries in 1970.
2/ Other allowable expenditures N.E.C. in 1965. Other instructional costs exclusive of salaries in 1970, previously included in instruction.

Table 8. EXPENDITURES FROM VOCATIONAL EDUCATION ACT OF 1963 FUNDS*, BY PURPOSE
FISCAL YEARS 1965-1970

	1965		1969		1970	
	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total
Total	$100,308,804	100.0	$227,527,428	100.0	$265,811,962	100.0
Secondary	32,398,818	32.3	70,602,561	29.3	60,964,268	23.0
Postsecondary	13,444,552	13.4	52,823,156	21.1	61,291,196	23.1
Adult	6,131,385	6.1	10,914,613	6.0	12,453,465	4.7
Special Needs	345,978	0.3	7,884,454	3.9	--	-
Disadvantaged	---	--	--	---	42,352,806 1/	15.9
Handicapped	--	--	--	--	21,407,829 1/	8.1
Construction	42,729,943	42.6	50,909,869	25.2	34,429,935	13.0
Ancillary	5,258,128	5.3	34,392,775	14.5	28,164,754	10.6
Guidance & Counseling	--	--	--	--	4,259,865 2/	1.6
Contracted Instruction					(1,208,798) 3/	(0.5)

* Includes Vocational Education Act of 1963, Section 3 funds in 1965 and 1969. Includes Vocational Education Act of 1963, as amended, Part B funds in 1970.

1/ Special needs expenditures reported separately for disadvantaged and handicapped starting in 1970.

2/ Included in ancillary services prior to 1970.

3/ First reported in 1970; memo amount expended by level.

SECTION III. TEACHERS IN VOCATIONAL EDUCATION

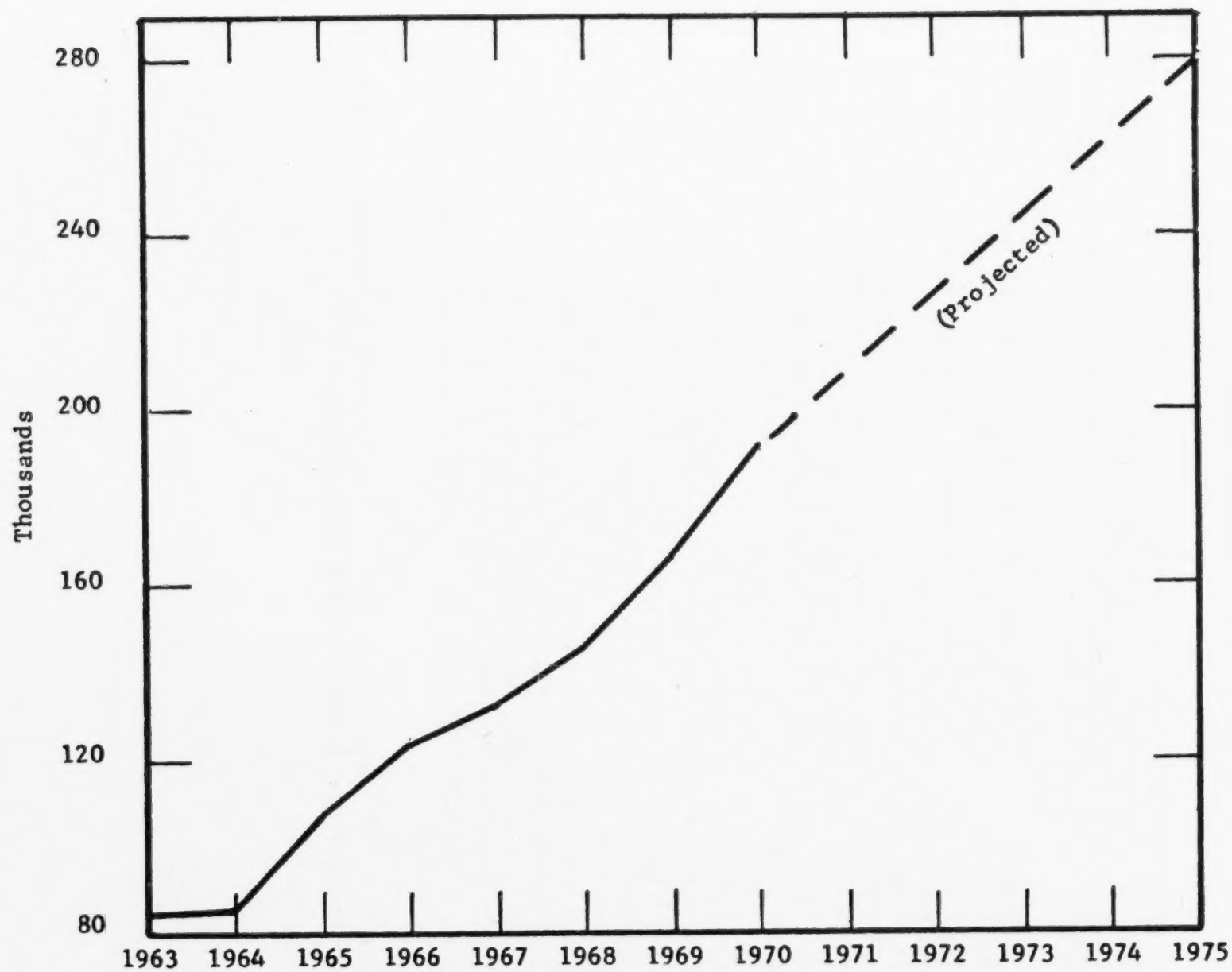
In Figure 8, the growth in number of teachers from 1963 through 1970 is presented graphically. It also shows the projected trend in teacher growth through 1975 and predicts that the teacher supply will reach some 280,000.

The number of individual teachers in vocational education, as shown in Table 9, grew from 109,136 in 1965 to 190,364 in 1970. For the same period, the greatest increase in number of teachers was at the post-secondary level--up about threefold. Secondary-level teachers almost doubled in number, and the number of teachers at the adult level remained about the same. Secondary-level teachers increased to about 50 percent of the total between 1965 and 1970, but the percentage distribution for teachers at the adult level dropped from 43.8 percent in 1965 to 30.5 percent in 1970.

Table 10 shows the number and distribution of teachers by program. Trade and industrial education accounts for the largest number of teachers, followed by office education and home economics. Significant growth in the number of health, office, technical, and trade and industrial teachers occurred from 1965 to 1970. The number of home economics and distribution teachers increased moderately and agriculture teachers declined in number. Percentages of the total number of teachers in distribution, technical, and trade and industrial show little change from 1965 to 1970. Health and office doubled in proportion to the total and agriculture and home economics showed substantial decreases in percentages during the 6-year period.

Figure 9 shows the total number of teachers in preservice and inservice teacher-education programs from 1966 through 1970.

Figure 8. NUMBER OF TEACHERS IN VOCATIONAL EDUCATION
1963-1975



SOURCE: Annual Reports, Division of Vocational and Technical Education, 1963-1970, and unpublished Division data.

26179

Table 9. TEACHERS OF VOCATIONAL EDUCATION, BY LEVEL
FISCAL YEARS 1965-1975

	1965	1968	1969	1970	1975 (Projected)
			Number		
Total (Unduplicated)	109,136	146,552	166,898	190,364	280,422
Secondary	54,748	76,378	84,245	101,043	145,480
Postsecondary	13,583	26,310	36,607	41,416	53,166
Adult	54,048	63,544	66,434	62,399	81,776
Special Needs	1,102	4,091	6,906	*	*
			Percentage Distribution		
Total	100.0	100.0	100.0	100.0	100.0
Secondary	44.3	44.8	43.4	49.3	51.9
Postsecondary	11.0	15.5	18.8	20.2	18.9
Adult	43.8	37.3	34.2	30.5	29.2
Special Needs	9	2.4	3.6	*	*

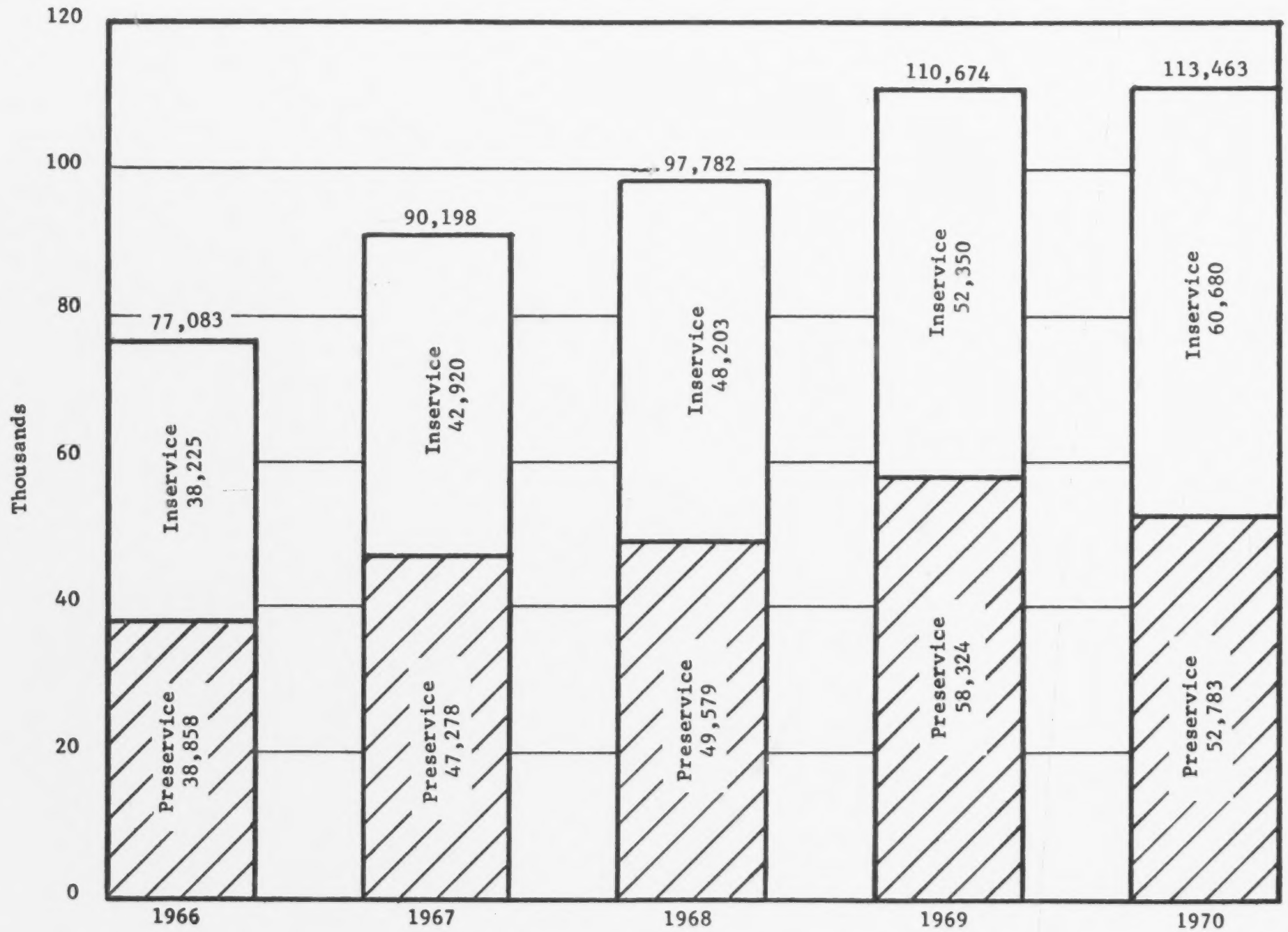
* Included by level.

2680

Table 10. TEACHERS OF VOCATIONAL EDUCATION, BY PROGRAM
FISCAL YEARS 1965-1970

	1965	1967	1968	1969	1970
			Number		
Total (Unduplicated)	109,136	132,581	146,552	166,898	190,364
Agriculture	17,608	11,849	12,262	12,565	12,420
Distribution	7,200	7,523	8,542	9,741	10,458
Health	3,429	5,153	6,521	8,876	10,483
Home Economics	31,243	27,744	29,402	31,845	34,225
Office	15,850	29,431	31,428	37,923	45,081
Technical	9,213	9,637	10,276	13,488	14,241
Trades and Industry	39,804	40,248	47,742	50,592	56,720
Other	488	996	892	2,087	6,736
			Percentage Distribution		
Total	100.0	100.0	100.0	100.0	100.0
Agriculture	15.1	8.9	8.3	7.5	6.5
Distribution	5.9	5.7	5.8	5.8	5.5
Health	2.8	3.9	4.4	5.3	5.5
Home Economics	23.9	20.9	20.0	19.1	18.0
Office	12.7	22.2	21.4	22.7	23.7
Technical	6.9	7.3	7.0	8.1	7.5
Trades and Industry	30.8	30.4	32.5	30.3	29.8
Other	1.9	0.7	0.6	1.2	3.5

Figure 9. ENROLLMENTS IN TEACHER EDUCATION
1966-1970



SOURCE: Annual Reports, Division of Vocational and Technical Education, 1966-1970, and unpublished Division data.

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2662

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HIEBERT, DON
A HANDBOOK OF COOPERATIVE PROGRAMS FOR
OKLAHOMA VOCATIONAL AND TECHNICAL EDUCATION.

OKLAHOMA STATE DEPT. OF VOCATIONAL AND
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PROGRAM EVALUATION; *PROGRAM GUIDES; PROGRAM
DESCRIPTIONS; ADVISORY COMMITTEES; RESOURCE
MATERIALS

ABSTRACT - DEVELOPED WITH THE AID OF NUMEROUS
VOCATIONAL EDUCATORS AND SPECIALISTS, THIS
HANDBOOK SHOULD BE OF SPECIAL INTEREST TO
THOSE INTERESTED IN DEVELOPING AND IMPROVING
COOPERATIVE VOCATIONAL EDUCATION PROGRAMS.
USEFUL AS A REFERENCE SOURCE FOR THE
INSTRUCTOR/COORDINATOR AS WELL AS THE
EDUCATION ADMINISTRATOR, SECTIONS OF THE
HANDBOOK TREAT SUCH TOPICS AS THE: (1) TYPES
OF COOPERATIVE PROGRAMS IN OKLAHOMA, (2)
TEACHER-COORDINATOR, (3) ADVISORY COMMITTEES,
(4) REGULATIONS, (5) TRAINING STATIONS, (6)
SELECTION OF STUDENTS, (7) EVALUATION, (8)
YOUTH ORGANIZATIONS, (9) COORDINATION OF
PROGRAMS, AND (10) LEGAL CONSIDERATIONS.
ADDITIONAL INFORMATION INCLUDED IN THE
APPENDIX ARE: (1) APPLICATION PER ENROLLMENT,
(2) INTERVIEW RATING SHEET, (3) MEMO OF
TRAINING, (4) SCHEDULE OF PROCESS, (5) JOB
RECORD, AND (6) RECORD OF OBSERVATION. (JS)

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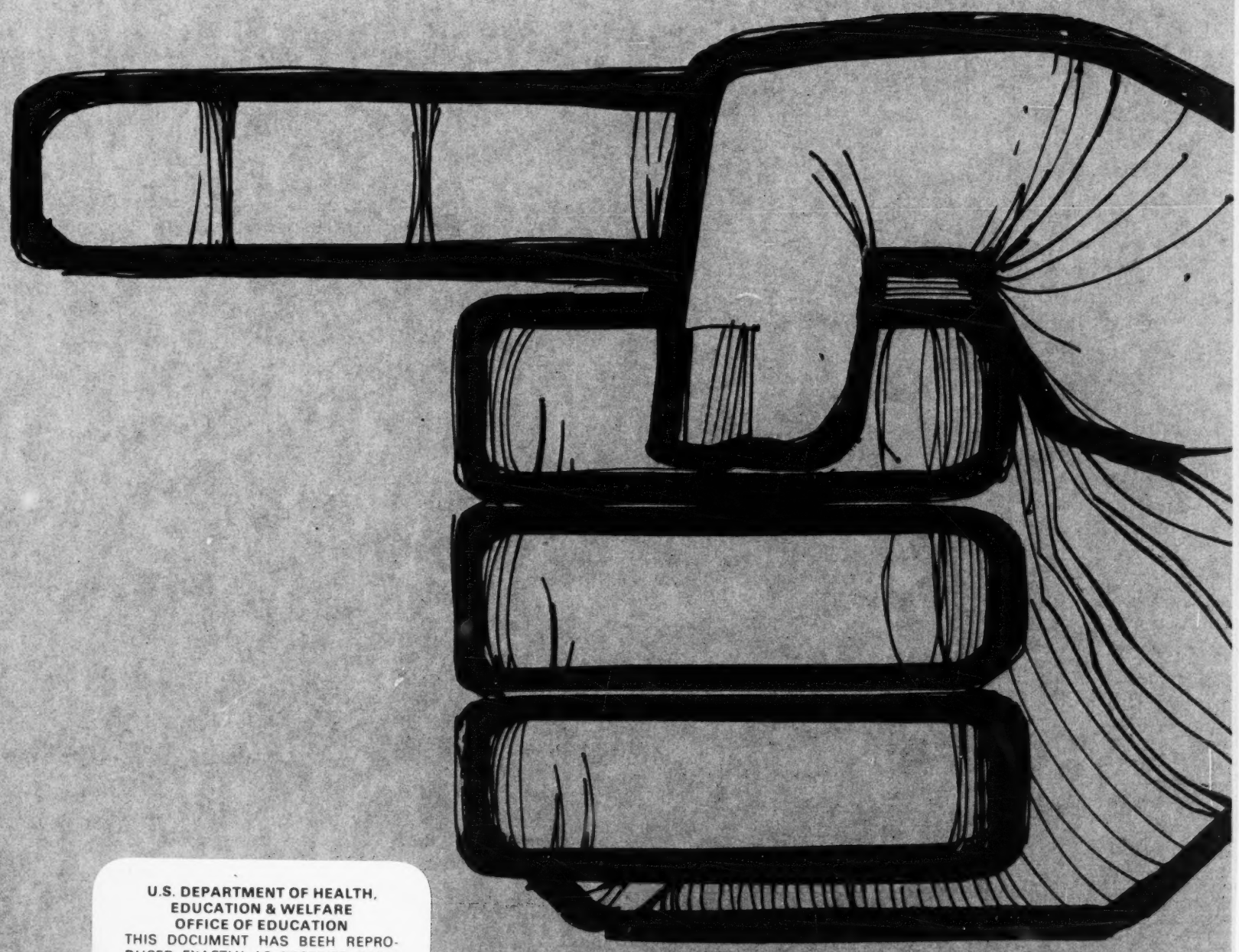
"This is a handbook for Oklahoma's Cooperative Programs in Vocational Education."



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STATE DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION, STILLWATER, OKLAHOMA

A HANDBOOK OF COOPERATIVE PROGRAMS

for

OKLAHOMA VOCATIONAL AND TECHNICAL EDUCATION

Compiled and edited by the
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1971

2685

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Table of Contents

Section	Title	Page
I.	Purposes of Vocational Education	1
II.	Types of Cooperative Programs in Oklahoma	1
III.	Teacher-Coordinator	5
IV.	Advisory Committee	5
V.	Regulations	13
VI.	Training Stations	15
VII.	Selection of Students	19
VIII.	Evaluation	37
IX.	Youth Organizations	39
X.	Coordination of Programs	43
XI.	Legal Considerations	47
	Appendix	57
	1. Application for Enrollment	59
	2. Check List of Desirable Attributes for Prospective Cooperative Students	61
	3. Interview Rating Sheet	63
	4. Memo of Training	65
	5. Schedule of Process	67
	6. Application for Employment Certificate (Work Permit)	69
	7. Employment Certificate	71
	8. Job Record	79
	9. Personal Rating Chart	81
	10. Application for Sub Minimum Wage (WH 205)	83
	11. Record of Observation	85

I. PURPOSES OF VOCATIONAL EDUCATION

It is the purpose of Title I, Vocational Education, 1968 Amendments, to assist, to maintain, to extend, and to improve existing programs and to develop new programs so all people will have access to training or retraining which is of high quality and realistic in the light of actual or anticipated opportunities for gainful employment which is suited to their needs, interests, and abilities and can benefit from such training.

The term "Vocational Education" means vocational or technical training and retraining which is given in school or classes including field or laboratory experience under public supervision. These should be designed to prepare individuals for gainful employment as semiskilled or skilled workers or technicians or subprofessionals in recognized occupations and in new and emerging occupations.

Cooperative Education programs offer many advantages in preparing young people for employment that they could not get otherwise. Through such programs, meaningful work experience is combined with "formal" education enabling students to acquire knowledge, skills, and appropriate attitudes. Such programs remove artificial barriers which separate work and education by involving educators with employers and create interaction whereby the needs and problems of both are known to each other. Such interaction makes it possible for occupational curricula to be revised to reflect current needs in the various occupations.

II. TYPES OF COOPERATIVE PROGRAMS IN OKLAHOMA

COE - COOPERATIVE OFFICE EDUCATION

COE is designed to train students at the twelfth-grade level to further develop their skills in training for business and office occupation. In this type of program, two hours of classroom instruction would be followed by on-the-job training through part-time employment in a local business or industry. The classes should be organized through voluntary cooperative agreements in writing between the schools and employers which provide for employment of the student in conformity with Federal, State, and local laws and regulations.

CVE - COOPERATIVE VOCATIONAL EDUCATION

This program varies somewhat from other cooperative programs in that training may take place in any or all of the various occupational fields. Almost any type of cooperative training station is acceptable as long as sufficient required training is available in the occupation to justify evaluation as an educational endeavor. CVE is designed to allow smaller schools and communities to establish a comprehensive vocational offering at very reasonable expense. (This should not be confused with CVET--Coordinated Vocational Education Training--a program for disadvantaged and handicapped individuals.)

DE - DISTRIBUTIVE EDUCATION

Distributive education is a vocational program of occupational instruction in the field of distribution and marketing. It is designed to prepare individuals to enter, to progress, or to improve competencies in distributive occupations. Emphasis is placed on attitudes, skills, and understandings related to marketing, merchandising, and management. Distributive occupations are found in such businesses as retail and wholesale trade, finance, insurance, real estate, services and service trades, transportation, and communications.

HERO - HOME ECONOMICS RELATED OCCUPATIONS

Gainful employment programs in vocational homemaking education are those which prepare students for employment in occupations requiring knowledge and skills in one or more of the home economics subject areas including Care and Guidance of Children, Commercial Foods Management, Fashion Design Production, Home and Community Management, and Housing and Interior Design.

HOE - HEALTH OCCUPATIONS EDUCATION

The HOE is designed to provide juniors and seniors experience in nursing homes, hospitals, and related agencies emphasizing nursing techniques, nutrition, and dietary skills. The student receives instruction and supervised experience in the different areas.

ICT - INDUSTRIAL COOPERATIVE TRAINING

The cooperative program in Industrial Education is designed to prepare students for entry jobs in the skilled trades or other skilled industrial occupations. The inschool phase involves instruction in both general employment information common to all vocational and trade theory which is applicable to the trade in which the student is employed.

VAOT - VOCATIONAL AGRICULTURE OCCUPATIONAL TRAINING

There are many occupations in addition to farming or production agriculture in which agricultural competencies are needed. Examples are: grain elevator operators, farm equipment suppliers, animal science and animal health workers, feed, seed, and fertilizer dealers, livestock and agricultural product brokers, and many others. On-the-job supervised occupational experience in conjunction with related classroom learning experiences can be one of the answers to insure an adequate supply of competent people for related off-farm occupations.

III. TEACHER-COORDINATOR

The key for a successful cooperative program is a competent teacher-coordinator.

A well-qualified, enthusiastic teacher-coordinator is an absolute essential for the success of a cooperative program. It is primarily through the personality and varied abilities of the teacher-coordinator that the program will develop and permeate the life of the community.

The teacher-coordinator is a regular member of the school staff but must serve in dual roles--teaching in the classroom and coordinating student activities. The teacher-coordinator is responsible to at least five groups: the students, the parents, the training station, the school, and the state office.

Teacher-coordinators need to have certain qualities if they are to meet the challenges facing them in the near future. Some of these qualities include:

1. Ability to work with people effectively
2. Ample interest in and desire to provide guidance to youth
3. Willingness to conform to accepted standards
4. Ability to represent the school in the community
5. Ability to provide effective instruction

The degree of success of your program is directly dependent upon the teacher-coordinator's planning and execution of those plans. Failure to assume responsibility in any one of these functions may seriously handicap your undertakings. There are five primary functions of a teacher-coordinator, which are:

1. Operations and administration
2. Teaching
3. Coordination
4. Guidance
5. Public relations

IV. ADVISORY COMMITTEE

The advisory committee, composed of school personnel and local business and industrial leaders, serves to bridge the interests of the community and the school to achieve conditions which will accrue, above all, to the benefit of each student.

Experience proves that vocational programs provide the highest degree of service to the community and the student when training programs are planned and managed with the advisory assistance of management, labor, businessmen, merchant organizations, laymen, and all other groups concerned with the program is in direct proportion to the degree that school authorities seek and use their counsel through advisory committees.

Committee members individually and collectively can become vitally interested in helping to find solutions to problems.

Purpose

The primary purpose of the advisory committee is to make the program as efficient and effective as possible, so that the community and the students may be served to the greatest advantage. Committee recommendations and duties should include advice to the local school authorities on such matters as the following:

1. Determining training needs and training possibilities of the area
2. Selecting equipment and instructional materials
3. Establishing standards for the selection of students
4. Counseling and placement of students
5. Advisement regarding the adequacy of training agencies
6. Assisting the local teacher-coordinator in making plans for the continuous improvement of the program
7. Assisting the teacher-coordinator in developing an effective adult program for those interested
8. Approving training agreements
9. Evaluating the program

Organization

The members of the advisory committee should be appointed by the teacher-coordinator with the approval of the superintendent using graduated terms.

The superintendent of the school, the principal, or coordinator should be authorized by the local board of education to provide an advisory committee. Appointment carries more weight when committee members are notified of their appointment formally by letter bearing board of education representatives' signatures.

The teacher-coordinator may ask the local organization to recommend several of their members from which the selection for the committee may be made.

The local teacher-coordinator should attend and participate in the meeting (normally as secretary).

The superintendent or principal could be an ex officio member of the committee.

The committee may select the chairman from its membership. The teacher-coordinator then has a relationship to the committee similar to that of the superintendent to the school board.

Size

There should be a fair representation of employees (not trainees) and a fair representation of employers.

A good working committee should consist of approximately five to seven members (to maintain flexibility and effectiveness) depending on local conditions. Too many on a committee make scheduling of meetings difficult. The advisory committee should be composed of equal representation of management, labor, and the public.

Qualification

Each member should be a recognized leader in his particular field. He should be interested in training students to be better citizens in the community, and he should be interested in the problems of the school system. He should be selected from personnel who have shown interest in the program.

Term of Appointment

A regular system of selecting replacement of members is preferred. Such an arrangement allows the school to replace individuals who have shown no desire to cooperate or make contributions to the thinking of the committee.

A committee with rotating terms of office injects new people with fresh, enthusiastic ideas and educates an increasing number of people with respect to the vocational program of the school.

Provisions should be made for staggered replacements. Members appointed for a definite term generally serve for one to three years, maintaining a more experienced member on the committee at all times.

Roles and Functions

Experience in working with advisory committees has emphasized certain guidelines that should be kept in mind as a guide to success. The following are presented for consideration:

1. Committees are not administrative in their functions but are organized to advise and counsel with school authorities on matters concerning the program and to make suggestions and recommendations for the guidance of local school authorities about the program operation. They should be given a clear understanding of their objectives and their responsibilities at the outset of their service.

2. Since members of committees serve on a voluntary basis, they should not be expected to carry out functions involving considerable detail work.

3. School authorities should acquaint committees with the total vocational program including all of the various services.

4. Informational material should be made available to committee members. This material should include pertinent releases and publications of the local board of education, State Board for Vocational Education, and the U.S. Office of Education.

5. Regularly scheduled meetings should be held, and special meetings may be called at the request of school authorities, chairman of the committee, or any three members of the committee.

6. Insofar as possible, committee meetings should be held in the building in which the training program is conducted.

7. Committees working in connection with new programs or courses should meet at least once a month the first year of operation or until such time the program is functioning smoothly.

8. All committees should meet not less than four times during the year.

9. All facts pertaining to the phase of the program for which they are particularly responsible should be made available to them.

10. A representative of the vocational department of the local school system should be in attendance at all meetings.

11. Complete information on financing of vocational education programs should be given to all members.

12. Information on existing and pending vocational legislation should be provided to all members, and the aid of members should be solicited in support of constructive new legislation.

13. Teacher-coordinators should maintain a complete file of minutes of all committee meetings. Copies of minutes should be distributed to all committee members and alternates.

Agenda of First Meeting

1. Introduction of all members
2. Appointment of a temporary chairman
3. Election of a permanent chairman
4. Election of a secretary (local director or teacher-coordinator may be available to serve)
5. Explanation of the program and the need for an advisory committee
6. Discussion of the functions of the advisory committee
7. Definition of the responsibilities of the advisory committee
8. Explanation of the term of appointment
9. Selection of time, place, and duties of meetings

V. REGULATIONS

Hours On The Job

Student-trainees should be regularly and lawfully employed in an acceptable training situation, ideally for 15 clock hours a week.

School and Work Coordination

An outline of typical jobs, processes, (See Appendix 5) or operations, prepared cooperatively with the prospective employer, is the first real step and the basis for all coordination. The training outline serves as an excellent check list in subsequent observations at training stations.

If adequate coordination between school studies and occupational activities is to be accomplished, the teacher-coordinator must have time scheduled for regular and frequent supervision of student-trainee activities.

Related Instructions

Classes of one or two periods a day may be scheduled for instruction in theory and related topics to supplement the practical training the student-trainee receives on the job.

High School Credit*

One unit of credit is allowed for each hour the class meets during the day for the school year. One unit of credit may be allowed for on-the-job training for a minimum of 15 hours a week for the school year.

* Annual Bulletin for Accreditation, Bulletin No. 113-Q, July 1970, page 64.

VI. TRAINING STATIONS

Before approaching employer:

1. Plan to contact employer personally.
2. Know all training regulations.
3. Find out as much about each firm as possible.
4. Know what you would like to emphasize.
5. Make an appointment.

Approaching the employer:

1. Be on time.
2. Be considerate of employer's time.
3. Try to meet when there will be few interruptions.
4. Allow employer to talk and ask questions.
5. Try to find his needs.
6. Listen to objections and answer briefly, but don't argue.
7. Be sure to record results of visit for return call.
8. Teacher-coordinator should be in continuous contact with new firms.

9. Evaluate the establishment to see if the needs of the student-trainee will be met.

Selection of Training Station

1. The employer should have a sincere interest in training a student.

2. The student-trainee's duties and responsibilities should challenge his abilities and interests.

3. The facilities should be of the type that will provide the most up-to-date training.

4. The personnel should be of high character.

5. Adequate provisions must be made for the protection of the physical, moral, and mental welfare of the student.

6. The student should be under the supervision of a qualified training sponsor at all times.

7. The student should be paid at least the prevailing rate for beginning workers.

8. The employer should be willing to provide hours that are conducive to good learning.

9. The firm should be able to provide steady employment.

10. Employer and personnel must be willing to work with teacher-coordinator.

11. The firm should be able to provide advancement for the student.

12. The firm must not exploit student-trainees for private gain.

13. Location should be satisfactory to all concerned for coordination of activities.

14. The training should be compatible to the student-trainee's career objective.

15. The employer should provide job rotation.

16. The establishment must meet Federal, State, and local laws.

VII. SELECTION OF STUDENTS

The student-trainee, the training station, the school, and the program can best be served by selecting and enrolling students in the class who are most likely to profit from the instruction and to follow careers in the program. Of course, it is not always possible or desirable to choose only those students who are likely to succeed, but the process of screening and interviewing described in this section will assist the teacher-coordinator in selecting students who possess the necessary interests and abilities for success in an occupational area. Before continuing with techniques of screening and selecting students, however, there are basic considerations regarding this important function of the teacher-coordinator that should be discussed.

1. Preliminary considerations regarding enrollment

   a. High school students are often undecided about their future plans. It would be pleasant if all students who will eventually be employed in an occupational area could foresee their destiny upon entrance into high school. Possessed of this knowledge, they could program themselves accordingly with the course--a natural in the senior year. Unfortunately, this isn't the case.

   b. Since vocational classes are elective subjects, each must compete with all other elective subjects for the student's time. Thus, the teacher-coordinator must actively recruit and publicize the benefits of the program to insure an ample supply of qualified students. (This may be done by career days, assemblies, announcements on a public address system, etc.)

   c. Students do not have the proper image of vocational education. Being uninformed of the benefits and opportunities inherent in Vocational Education, many students who could profit from these programs shy away due to erroneous attitudes and opinions. This necessitates a proper promotional program not only in the school but in the community as well.

   d. Cooperative education programs are not welfare programs. Monies are provided for one purpose, and that is to train individuals for gainful employment in the occupations of their choice. Enrollees must be able to profit from the training received.

   e. The student's need for financial help must be a secondary consideration to whether he is enrolled in the program. Financial need should be the last determining factor to be considered when enrolling a student in the program.

   f. It is necessary to be realistic about the reasons students have for enrolling in cooperative programs. If the initial motives don't reflect all the zeal and enthusiasm for a career that

is desired, it is the teacher-coordinator's responsibility to develop these attitudes among his students. Here are some of the possible reasons given by students for enrollment:

(1) Wanted to earn extra money

(2) Wanted school credit for job already held

(3) Thought the course would be an easy one

(4) Did not do well in other courses and thought they could better achieve in vocational education

(5) Desired on-the-job experience as offered through the program

(6) Thought it would be possible to get a better salary after graduation

(7) Were interested in learning about different phases of selected occupations

(8) Felt time spent in the class would be more useful than time spent in academic class

(9) Considered that it would be easier to get a job after graduation

2. Selection is--

a. Student selection is a systematic method of counseling students into the programs which will be of most benefit to them. It is a cooperative guidance function carried on by the:

(1) Teacher-coordinator

(2) Guidance counselor

(3) Faculty

b. The most important consideration in student selection is whether or not the individual student will benefit from the program.

3. Selection is not--

a. Selection is not a substitute for good classroom management and discipline; hence, it is not a method for the pre-elimination of discipline problems.

b. It is not a method of forming a class composed exclusively of high-ability, "honor" students.

c. It is not a method of serving exclusively students in a "work-experience program."

4. Reasons for student selection

a. Because the student trainee is under school supervision and represents the school in the community, the actions of the student will reflect on the program and the school system as well--either positively or negatively.

b. Students who are interested in pursuing a career in an occupation will often receive greater satisfaction and success in the program and in his field of endeavor than the student who enrolls for other reasons not conducive to learning.

c. Unless the student possesses or accrues certain mental, social, and personal attributes, he will likely experience extreme difficulty in successfully meeting the requirements of an occupation.

5. Results of effective student selection

a. If the teacher-coordinator, his program, and his standards are recognized and respected throughout the school and community:

(1) Parents will want him as a teacher for their children.

(2) The business community will cooperate by making good training stations available.

(3) The business community will recommend the course to young people and their parents.

(4) The administration will allow him freedom to strengthen his program.

(5) The guidance counselors and other faculty members will counsel eager, enthusiastic, interested students into the program.

(6) Students from all ability levels who are interested, who want to learn, and who are willing to work at it, will request permission to enroll in the program.

b. If the teacher-coordinator has not earned this respect, no amount of freedom of selection will help him develop a good course because he will have no choice of students from which to make a selection.

If an individual student is to be efficiently prepared for profitable employment, he should be able to benefit from the instruction he receives. For this reason, the following qualifications have been established as a basis for selection of high school students in cooperative programs:

1. Students should be interested in the program as a means for achieving career goals.

2. Students must be at least sixteen years of age.

3. Students should be able to profit from their experiences and plan to continue gainful employment following graduation or receive further training.

4. Students should be willing to receive on-the-job training an average of 15 hours per week in an approved training station.

5. Students should have parental permission to participate in school planned and supervised learning experiences, such as field trips, work experience, participation in projects, etc.

6. Students should be able to participate in the club activities, since it is a learning experience and an integral part of the program.

Generally speaking, students should be selected that have at least one of the following objectives as their goal for career development:

1. Those who will enter full-time employment in the occupation following graduation

2. Those who plan to continue their education and training at the post high school level and have a specific goal in a particular occupation

3. Those who plan to seek admittance to a four-year institution upon graduation from high school and pursue a baccalaureate degree that will be used in pursuing a career goal in a particular occupation or who plan to teach courses in the occupation

4. Those whose present employment indicates an interest in the occupation as a career field

Since the student-trainee will represent both the program and the school in the community, he should possess certain standards of personality and physical attributes that would enable him to profit from the training he will receive. These standards discussed in this section, therefore, should provide a basis for selecting students who have met the minimum requirements for being considered as potential student-trainees. Thus, if the teacher-coordinator believes that certain students show eventual promise of developing into productive employees but do not possess those standards for immediate employment, they should not be placed for training until they have met the employment standards. Such

students should be enrolled in other classes until they have met basic standards and fulfilled the minimum requirements expected for employability. As soon as the student reaches an acceptable level of proficiency, he should be placed in an approved training station.

The following standards should be attained before students are recommended for work experience and should be maintained throughout enrollment in cooperative classes:

APPEARANCE--Students should have a pleasing appearance. They should be clean and well-groomed, demonstrating conservative taste in dress and appearance.

ATTENDANCE--Since the employer will expect the student to be punctual and regular in his attendance at work, the student should have a school record showing regular attendance or develop such a record before employment.

HONESTY--Careful evaluation of all students should be made concerning this standard. Any student with acts of dishonesty in his past record should not be accepted in the cooperative program until he proves that he can be trusted. The program cannot accept the responsibility of reforming individuals at the expense of the community unless the training sponsor freely accepts responsibility of the student and fully understands the situation.

INTEREST--A student should have expressed an interest in pursuing a career goal in his chosen field before being accepted in the program for employment. He should also be willing to work with the teacher-coordinator, training sponsor, and school in developing himself for a career in an occupation.

ALERTNESS--Students should have demonstrated "wide-awake" attitudes toward their training so they might receive the full benefit of their experiences.

DESIRE--Students should possess the desire to do a job well, to learn as much as possible, and to accept responsibility granted when this desire is conveyed to the trainer.

ACADEMIC ACHIEVEMENT--Students who are unable to perform in the academic community should be carefully selected before they are allowed to receive on-the-job training. They must be able to accept responsibility and show desire in this manner before the school can recommend them for employment.

HEALTH--Students whose health prevents their reporting regularly for work should not be considered for employment until this condition is eliminated.

(NOTE: A student might be permitted to enroll in the program although he might fail to meet the minimum standards previously discussed. However, he should not be allowed to participate in on-the-job training experiences or engage in projects in the community until he domonstrates that he can attain and maintain the minimum standards of employment in the occupation. Students who are unable to meet the employment standards or who continually fall short of the standards should be guided out of the program. Since the student may not profit from the program, he should be allowed to develop occupational goals in a more meaningful and more beneficial area.)

The teacher-coordinator is now ready to review the mechanics of student selection. A thorough understanding of the enrollment procedure and delegation of responsibilities for various activities is mandatory for successful selection of student-trainees. The

teacher-coordinator should discuss the criteria for scheduling students for the grade in which they may enter the program.

1. Compiling lists of prospective students

   Some of the sources of student names for a prospect list include:

   a. Names submitted at guidance assemblies.

   b. Names referred by guidance counselors.

   c. Names referred by employers.

   d. Students who apply for Work Permits (employment certificates). (See Appendix 7-A,B,C)

   e. Students who inquire about part-time employment.

   f. Students' names secured by complete study of cumulative guidance folders for likely students.

   g. Students who inquire about the program at career day programs.

   h. Students whose Kuder Preference Test or Differential Aptitude Test show above average vocational interest or aptitude for the occupations.

   i. Students of parents who indicate interest at guidance meetings for parents.

   j. Students recommended by present and past students.

   k. Students referred by other teachers who have worked with them.

2. Student's application for enrollment (See Appendix 1)

   a. Each prospective student-trainee should complete his application in detail and return it to the teacher-coordinator.

   b. Evaluation of the application form after collection should be similar to that of a training station when a person is applying for a position. The teacher-coordinator should be concerned with the following:

      (1) Legibility

      (2) Neatness

      (3) Spelling

      (4) Completeness of answers

      (5) Honesty

      (6) Previous experience

(7) Occupational objective (The applicant is to choose an occupation in which he would want to prepare himself.)

c. Schedule a personal interview with each applicant.

3. Personal interview preparation

a. Prepare and distribute "Check List of Desirable Attributes for Trainees" (See Appendix 2) to teachers who have had experience with this student applicant. Additional forms could be given to:

(1) Principal

(2) Vice-principal

(3) Counselor

(4) Attendance officer

(5) Financial secretary

(NOTE: Although this activity is time-consuming, both for teacher-coordinator and evaluator, it is extremely valuable in selecting students. Each of the above evaluators may have had contact with that student and have opinions or knowledges that might affect one's decision in accepting an applicant.)

b. Obtain scholastic and attendance records of each applicant.

c. Prepare a Personal Interview Rating Form. (See Appendix 3)

d. Collect the Check List of Desirable Attributes for students to be interviewed. Evaluate each and note discrepancies.

e. Schedule a personal interview with each student who is qualified after reviewing the following information.

4. Personal interview

a. The following techniques should be followed during the initial interview:

(1) Be natural--Meet each student pleasantly. Do not attempt to pressure the student; allow him the opportunity to see that you are attempting to help him find the correct career path during and after school.

(2) Put the student at ease--Be friendly and convey this atmosphere to the applicant so he understands the true purpose of the interview.

(3) Don't waste time--Come to the point of the interview as quickly as circumstances will allow.

(4) Allow the student to express his feelings--Create a permissive attitude in the mind of the student that will allow him to express himself freely.

(5) Be a good listener--The student has something to say and many times he can inform you of attitudes that are not in the best interest of the program in the minds of the student body. Interviews will allow an opportunity to evaluate the present program and make necessary adjustments or revisions.

(6) Allow student to make decisions--Psychologically, it is better to allow the student to believe that the decision made was his, and in doing so the student will be apt to benefit from the training.

(7) Be objective--The teacher-coordinator should not become emotionally involved with the applicant--positively or negatively.

(8) Respect the personality of the applicant--Avoid prying, sarcasm, or superiority. Allow the student to maintain dignity and self-respect. Too many times a teacher will put a student in a position that does not allow him to keep his self-respect or dignity as an individual and prevents his profiting from training received from the teacher.

(9) Remember your limitations--Do not attempt to counsel a student whose problem is beyond your knowledge or experience. You should especially be careful of students who have emotional problems and if at all possible, do not become involved.

(10) Conclude the interview with a constructive thought--Be as optimistic as circumstances allow. Allow the student to leave thinking he has profited from his effort in attempting to make a vocational choice whether it be in your program or not. Remember that the students who are denied entrance can affect the image of the program--whether their statements are truth or fiction. Every attempt should be made to point out to them where their limitations exist in as objective and constructive manner as possible.

b. The following information and activities need to be accomplished in the interview.

(1) Make friends with the applicant and convey to him a desire to assist him with his occupational decisions.

(2) Discuss the student's future plans concerning his career.

(3) With his career goal in mind, discuss with him the abilities, aptitudes, and interests necessary for successful completion

of this goal and have him compare what is necessary with what he presently possesses.

(4) Point out occupational opportunities and benefits that the program has to offer the student with his ability.

(5) Discuss the program and what it offers the student in accomplishing his career goal.

(6) Determine whether or not the student can profit from the training program.

(7) If the teacher-coordinator does not believe that the student will profit from the program, he should make plans with the student for vocational guidance in another field of endeavor.

(8) If the student can profit from the training program, a follow-up interview should be scheduled if necessary. The student should be given appropriate information concerning the program.

(NOTE: The initial interview is a time-consuming activity. However, its importance in the eventual school and career pattern of the student is such that the coordinator's time is well spent. The time spent in careful selection of those students will show aptitude and interest in the program and genuine interest as a career choice. In the long run, this interest will strengthen the educational services which the program is equipped to offer to interested and qualified students.)

5. Interview follow-up

a. Compile individual files for each applicant, including:

(1) Application for Enrollment (See Appendix 1)

(2) Check List of Desirable Attributes for Trainees (See Appendix 2)

(3) Personal Interview Rating Form (See Appendix 3)

(4) Memorandum of Training Plan (See Appendix 4)

(5) Schedule of Processes (See Appendix 5)

(6) Scholastic Record (obtain from school record)

(7) Employment Certificate (Work Permit) (See Appendix 7-A, B, C)

b. Evaluate each applicant individually.

c. Applicants may be listed as follows:

(1) Definitely desirable

(2) Acceptable

(3) Doubtful

d. Review list of applicants with counselors, teachers, etc.

e. Make the final selection.

f. Make an appointment with the principal.

(1) List students who were not selected.

(2) Explain specific reasons for not selecting them.

(3) Review students who were accepted.

g. Schedule meetings with the following applicants.

(1) Students not selected, giving reasons why.

(2) Students selected, giving reasons why they were given the opportunity to benefit from the program.

6. Post-selection activities

a. Plan a "Welcome" party for new student-trainees so they may become acquainted with each other and present trainees.

b. Contact training sponsors, prior to the semester in which the newly selected students will begin their training, and make appointments for the trainees.

c. During the summer months, keep in contact with the students so you might notify them of any training stations that become available while school is in recess.

d. During the two weeks before school begins in the fall, the teacher-coordinator should contact all student-trainees and set appointments for discussing their plans for the school year.

VIII. EVALUATION

Evaluation is an important factor of the cooperative program but a little different from the usual class.

The teacher coordinator may want to evaluate the student-trainee in relation to classwork as well as on-the-job training. Evaluation on the job may be by visitation and/or using a job rating sheet (See Appendix 9) provided to the training sponsor each grading period.

(NOTE: Be sure to get the rating sheet to the training sponsor in time to get it back by report card deadline.)

The training sponsor should evaluate the student as to his work, his attitudes, his ability to grasp the work involved, and his ability to get along with his fellow employees, his supervisors, and his customers.

The training sponsor may also evaluate the cooperative program at the end of the school year and make suggestions for improvement. The teacher-coordinator will want to evaluate the training station to determine whether or not the firm warrants a trainee in the coming year.

IX. YOUTH ORGANIZATIONS

Membership in one of the youth organizations should be encouraged for all vocational students. The activities of the clubs provide opportunities to further develop competencies normally learned in the classroom and on the job.

At the present time the five organizations include:

DECA

The purpose of the Distributive Education Clubs of America (DECA) is to develop respect for education which will contribute to occupational competence in the field of marketing and distribution. It also promotes understanding of and appreciation for the responsibilities of citizenship in America's free competitive enterprise system.

National DECA had its beginning in 1947 with Oklahoma as one of the 17 charter states. Nationally there are over 125,000 DECA members in 3,300 chapters in every state and Puerto Rico. In Oklahoma's 68 chapters there are nearly 2,500 young men and women who proudly wear the blue blazer of the organization.

Membership in DECA is open to any full-time student enrolled in a distributive education instructional program. As a member of DECA, students have the opportunity to associate with other youths who share common job and career interests in the field of marketing and distribution. They are also eligible to serve on DECA committees, attend state and national leadership conferences, and compete for recognition and awards in DE contests.

FBLA

One of the chief objectives of the Future Business Leaders of America (FBLA) is to develop strong, aggressive leadership so these future businessmen and women may participate more effectively in the business and community life of which they are a part.

FBLA, on the national level, was organized in 1941. Oklahoma was granted an association charter in 1954. In the state there are over 3,200 FBLA members in some 70 chapters. The national membership is 90,000.

FBLA is designed particularly for those students who are looking forward to careers in business. Members of the organization learn how to compete honorably with their colleagues on the local, state, and national levels. They gain the knowledge of how to engage in individual and group business enterprises and how to hold office and direct the affairs of a group. Members also have an opportunity for close contact with successful businessmen and women.

The organization serves to strengthen the confidence of young men and women in themselves and in their work and to create more interest and understanding in the intelligent choice of business occupations.

FFA

The oldest youth organization in Oklahoma is the Future Farmers of America (FFA). Oklahoma's FFA Association was one of the charter members of the national organization, founded in 1928.

FFA is an organization of, by, and for students of vocational agriculture in the public secondary schools which operate under the provisions of the National Vocational Education Acts. FFA is an integral part of the vocational agricultural instructional program and is designed to develop leadership, character, thrift, scholarship, citizenship, and patriotism.

Students must be enrolled in vocational agriculture to be eligible for FFA membership. Young people may retain their membership for three years following graduation from high school, or until they are 21 years old, whichever length of time is greater.

There are over 450,000 FFA members in 9,000 chapters in 49 states and American possessions. Oklahoma's FFA Association has over 16,000 members.

The FFA leadership program builds self-confidence in young men by teaching them how to conduct themselves before a group. Future Farmers also have the opportunity to compete in public speaking contests on the local, district, state, and national levels.

FHA

Future Homemakers of America (FHA) is an organization of high school home economics students dedicated to the overall goal of helping individuals improve personal, family, and community living, now and in the future.

Throughout the state of Oklahoma there are nearly 17,000 members in 365 chapters in both large and small high schools. Nationally the membership is more than 600,000. FHA was organized in 1945, and the Oklahoma FHA Association was granted a charter in 1946.

FHA members prepare themselves for the responsibilities of leadership through such experiences as serving on committees, planning and presenting programs, planning and carrying out projects, presiding at meetings, and working with others in both school and community.

Objectives of the organization are selected on the national level every three to four years. Projects are planned and carried out to accomplish these objectives. One of the most popular state projects has been "Oklahoma Beautiful."

By working together toward a common goal, Future Homemakers learn to share responsibilities and to get along with adults and peers.

VICA

The Vocational Industrial Clubs of America (VICA) is a national organization of 75,000 young men and women enrolled in secondary vocational trade and industrial education. In Oklahoma there are over 7,000 VICA members striving for individual self-improvement through scholarship, citizenship, and participation in home, school, and community activities.

Oklahoma's VICA Association, composed of 115 chapters, is a charter member of the national organization which was founded in 1965. Purposes of VICA include fostering a deep respect for the dignity of work, establishment of realistic vocational goals, creation of enthusiasm for learning, and helping a student attain a purposeful life.

The organization also promotes high standards in trade ethics, workmanship, scholarship, and safety. VICA is used to develop the abilities of students to plan together, organize, and carry out worthy activities and projects through use of the democratic process.

In each chapter meeting the members recite the VICA pledge which begins: "Upon my honor, I pledge myself by diligent study and ardent practice to become a worker whose services will be recognized as honorable by my employer and fellow workers."

X. COORDINATION OF PROGRAMS

Periodic personal observation at the training stations is necessary for efficient program operation. This is valuable for correlating related classroom instruction with job training in making comparison between actual work accomplished with training outline content and in evaluating rate and quality of student progress on the job. (See Appendix 11)

The first step in supervision of a trainee is done in school when job records are studied. (See Appendix 8) A job record for one day only is of little significance except to check number of hours and generally what the trainee is doing on the job. It is an accumulation of such reports that indicates the actual pattern of the job progress. Job records also give information regarding regular attendance of work.

1. Frequency of observation

   a. Mandatory, at least once a month

   b. Daily, for students who have trouble making necessary adaptations

   c. Daily, for students in doubtful training stations

   d. Less frequently, for students in good training stations and who are good students

   e. More frequently, for students doing poorly in school

   f. More frequently, for students who have other problems

2. Purpose of observation

   a. To identify with the training program

   b. To make certain that the student is being trained

   c. To gain helpful suggestions from the training station designated trainer

   d. To determine the relationship between trainee and others in the agency

   e. To see if sufficient job rotation is given to trainee

   f. To see if trainee is applying technical training to his job

   g. To see that the trainee is regularly on the job

   h. To determine whether or not the agency is satisfied with trainee

3. How to observe

   a. Make the observation as unexpectedly as possible.

   b. Observe as inconspicuously as possible.

   c. Normal work of the agency should not be interrupted.

d. Make observations and conferences as businesslike as possible.

e. Make observations and conferences as pleasant as possible.

4. What to do on an observation and conference

a. Observe and make notes of the situation.

b. When convenient, discuss the progress of student-trainee with training sponsor.

c. Talk with student-trainee in private conference at school.

5. Some possible problems

a. Employer may expect too much of the beginning trainee.

b. Trainee claims that rate of pay is too low for work performed.

c. Trainee is uninformed of duties and responsibilities.

d. Trainee may have friends visit him while on the job.

e. Trainee may be expected to work at irregular hours.

XI. LEGAL CONSIDERATIONS

Any infringement of labor laws is certain to give cooperative vocational education a poor image. The teacher-coordinator is expected to know the local, State, and Federal labor regulations that apply to students and the training stations where they are placed. It is not the function of the teacher-coordinator to serve as a law enforcement officer, but he is expected to inform participating employers when they are unknowingly violating regulations. If an employer refrains from complying with the law, the teacher-coordinator should discontinue the cooperative arrangement and seek another training station for the student. Problems of violations of labor laws are best avoided by selecting suitable training stations and by advising training sponsors of their responsibilities.

1. Students enrolled in a cooperative vocational program and receiving on-the-job training are subject to the provisions of all local, State, and Federal labor laws, unless exempt by special application and approval.

2. The teacher-coordinator is expected to know the regulations which apply to the students, the occupations, and the participating training stations.

3. The principal kinds of regulations pertain to: (1) age restrictions, (2) minimum wage and overtime pay, (3) hours of work, (4) hazardous occupations, (5) insurance, and (6) minimum wage exemptions for student-learners.

4. The teacher-coordinator does not enforce the laws; however, he informs the employers of provisions which apply to students and avoids placing students in training stations which do not comply with the laws.

5. Failure to comply with labor laws is damaging to the image of the program, and in instances where students' health and safety are impaired, make the teacher-coordinator vulnerable to criticism (or even legal action).

6. Information on Federal Labor Laws may be obtained from the regional office (Wage and Hours and Public Contracts Division, Regional Director, 34 D Mayflower Building, 411 North Akard Street, Dallas, Texas 75201) (U.S. Department of Labor--USDOL); and Oklahoma Labor Laws from (State Department of Labor, State Capitol, Oklahoma City, Oklahoma 73105).

Fair Labor Standards Act

The Fair Labor Standards Act provides minimum wage and overtime standards, requires equal pay for equal work regardless of sex, and contains certain child labor standards. Teacher-coordinators should contact the nearest local or regional office of the Wage and Hours and Public Contracts Division of the U.S. Department of Labor to obtain up-to-date information on provisions and requirements and to get assistance in determining the application of the law to the employment.

This Federal Wage and Hour Law applies to workers engaged in interstate or foreign commerce, or in the production of goods for such commerce, and to employees in certain enterprises so engaged. A large portion of the student-trainees are in occupations covered by the Act. An employer is expected to know if the Federal Wage and Hour occupations and types of enterprises are covered by the law and make certain the law is not violated in the employment of student trainees. (This law may change any time.)

WAGES

The minimum wage rate for employment covered by the Fair Labor Standards Act is $1.60 per hour. The law requires not less than time and one-half for all hours worked in excess of 40 per week, except in the case of agricultural workers. Students, unless exempt, are subject to the minimum wage and equal pay provision.

Special minimum wages--Some employers pay student-trainees less than the statutory minimum for their on-the-job training but must apply for the

special student-learner minimum wage rates. When exemptions are requested, they are not approved if:

1. The occupation does not require a sufficient degree of skill to necessitate a substantial learning period.

2. Another worker is displaced.

3. Wage rates or working standards of experienced workers would be depressed.

4. The occupational needs of the community or industry do not warrant the training of students at less than the statutory minimum.

5. There are serious outstanding violations of the Fair Labor Standards Act.

6. The number of students at certificate rates is more than a small proportion of the establishment's working force.

Certificates (WH 205) (See Appendix 9)--Special minimum wage certificates (WH 205) for students contain certain age, wage, hours, and record-keeping requirements as follows:

1. Age: At least 16 years

2. Wage: Not less than seventy-five percent of the statutory minimum

3. Hours: In general, the hours of work permitted at certificate rates plus the hours of school instruction (not including study hall, homeroom, and activity periods with no academic credit) may exceed 40 hours a week. If school is not in session, such hours of employment training may not exceed 8 a day or 40 a week.

4. Records: Each student-trainee paid certificate rates, his occupation, and rate of pay should be identified in the payroll records, which should also note when additional hours are worked at certificate rates because school was not in session. The application should be retained for three years.

5. Application: An application for a special minimum wage certificate (WH 205) (See appendix 9) is filed for each student with the Regional Director, Wage and Hours and Public Contracts Division (address given previously). It is signed jointly by the employer, a school official, and the student-trainee. Among other things, it gives information on the employment training and related school instruction to be provided, the certificate rates needed and for what period of time, and the age of the student.

HAZARDOUS OCCUPATIONS

There are provisions for 16- and 17-year-olds to be employed in certain hazardous occupations provided they are enrolled in a cooperative program under the supervision of the public schools. There are certain requirements for exemptions that are described in detail in Child Labor Bulletin 101, available from Regional Director, Wage and Hours and Public Contracts Division.

Employment certificate

Form V.E.D. 600--Application blank (See Appendix 6)

Form V.E.D. 606--For children employed under conditions which permit attendance at a part-time school or have finished school (See Appendix 7A)

Form V.E.D. 609--For children who are attending regular day school and working outside school hours (See Appendix 7B)

Form V.E.D. 612--For children employed during vocational period when school is not in session (See Appendix 7C)

An employment certificate, sometimes called a "work permit" or "age and schooling certificate," is a special instrument issued only by the county superintendents of public instruction, or some school official designated by him, or her, and called an "Issuing Officer." The importance of an employment certificate, when legally issued, is that it affords protection to the employer, to the parent, to the child, and to society in general, and is the only method of establishing the age of a child in court, as the child's work, the parent's word, or the parent's sworn affidavit, is not acceptable in court as a means of establishing the age of a child. It has been known that in order to procure employment, a false age is sometimes given by the child or the parents, which might be alright until and if the child should sustain an accident and file a claim with the insurance carrier. The insurance company, not willing to accept the statement of the child or parent as to its truthful age, on investigation finds that the child was illegally employed; then the responsibility of paying the amount of damages a jury might assess rests entirely upon the employer. There is some confusion between a state-issued employment certificate and a Federal employment certificate. As a matter of explanation (and the fact that the Federal Government requires an employment certificate), there is no such instrument issued by anybody in the State of Oklahoma as a Federal employment certificate; however, the Federal authorities accept a regularly and properly issued State employment certificate as proof of age.

The employment certificates are supplied to the issuing officers by the State Commissioner of Labor, State Capitol, Oklahoma City, Oklahoma 73105.

Employment certificates are required whether school is or is not in session, or whether the worker is or is not enrolled in school, or whether he is or is not employed during or outside the regular school hours, until he reaches the age of eighteen.

Unemployment insurance

Students are not eligible for unemployment insurance since they are not available for full time employment. For further information contact: Oklahoma Security Commission, Oklahoma City, Oklahoma 73102.

Social Security

Social Security is a government sponsored program administered by the Bureau of Old Age and Survivor's Insurance under the Federal Social Security Act. It provides the worker and his dependents and survivors with a partial replacement of earnings lost through retirement at or about age 65 or by death.

Most workers are entitled to benefits from the Social Security Act. If problems arise, contact your nearest Social Security Office; they will supply additional information as needed.

Students should understand that they and employers are both contributing toward the support of this program on a percentage basis.

Minimum wages

Students must be legally employed at all times. Employers must not exploit student-learners for private gain. The students should be paid at least the prevailing rate for beginner workers. For information on Federal wages write: U.S. Department of Labor, Wage and Hour and Public Contracts Division, Regional Director, 340 Mayflower Building 411 North Akard Street, Dallas, Texas 75201. For information on Oklahoma wages write: Labor Department, State Capitol Building, Oklahoma City, Oklahoma 73105.

APPENDIX

1. Application for Enrollment
2. Check List of Desirable Attributes for Prospective Cooperative Students
3. Interview Rating Sheet
4. Memo of Training
5. Schedule of Process
6. Application for Employment Certificate (Work Permit)
7. Employment Certificate
8. Job Record
9. Personal Rating Chart
10. Application for Sub Minimum Wage (WH 205)
11. Record of Observation

APPENDIX 1

COOPERATIVE TRAINING PROGRAM

City _____ School _____ Date _____

Student's Application for Enrollment

THIS APPLICATION NOT COMPLETE UNTIL YOUR PICTURE FILLS THIS SPACE

1. Name _____ Sex _____
   (Last) (First) (Middle)
2. Address _____ Telephone No. _____
3. Date of Birth _____ Age _____ Height _____ Weight _____
4. Parent or Guardian _____ Occupation _____
5. Where parent or guardian is employed _____
6. Business address of parent or guardian _____
7. Telephone No. of parents or guardian: Residence _____ Business _____
8. State General condition of health _____
9. Explain physical handicaps, if any _____
10. Church preference _____ Nationality _____
11. Why do you wish to enroll in this program of training? _____
12. Do you plan on going to college? _____
13. Have you discussed this program with your parents or guardian? _____
14. Have they given you their permission to enroll in the program? _____
15. How do you consider you record as a student? _____
16. What subjects have you enjoyed most? _____
17. What subjects have you enjoyed least? _____
18. What are your hobbies? _____
19. List organizations, both school and other, or which you are a member _____
20. Your Social Security Number _____

PRESENT HIGH SCHOOL SCHEDULE

PD.	SUBJECT	TEACHER	ROOM
1.			
2.			
3.			
4.			
5.			
6.			

PREVIOUS WORK EXPERIENCE

Kind of Work	Employer

NOT TO BE FILLED IN BY APPLICANT

	GOOD	AVERAGE	POOR
Attendance			
Scholarship			
Character			
Personality			
Appearance			
Intelligence			

Present number of credits _____
Required subjects to graduate _____
Date of interview _____
Teacher-Coordinator's rating: 1. _____ 2. _____ 3. _____ 4. _____
Faculty recommendations _____

Give references - only one of which may be a teacher

NAME	ADDRESS	PHONE	BUSINESS OR OCCUPATION
1.			
2.			
3.			

Student's Signature _____ Teacher-Coordinator _____

2717

OCCUPATIONAL PREFERENCE

1. List in order your preferences of the firm in which you would like to become a student trainee.

   First Choice _____ Second Choice _____ Third Choice _____

2. List your preferences of jobs within the firms mentioned above.

   First Choice _____ Second Choice _____

3. List any special skills or interests which you have.

   (1)
   (2)
   (3)

4. Write a few sentences telling why you want to enroll in this program.

PARENT'S APPROVAL

I understand the plan of the Cooperative Education Program, and it is with my consent and approval that my (son or daughter) _____ may be assigned to a work schedule with an employer and to related study classes as a part of his regular course of study.

Parents _____ Date _____

Address _____ Telephone _____

2718

APPENDIX 2

CHECK LIST OF DESIRABLE ATTRIBUTES FOR PROSPECTIVE COOPERATIVE STUDENTS

Teacher's Name _____

Your cooperation in checking the following list will be greatly appreciated. The following applicant for training will have to be employed at least 15 hours per week where he will be meeting the public and handling money or materials. Before the school can put its approval on this student, it will be necessary to know more about him. As one of his teachers, you will be able to give an honest evaluation. This information will be kept in strict confidence.

_____
Teacher-Coordinator

_____

Student's Name _____ Date _____

	Excellent	Good	Fair	Poor
Honesty				
Alertness				
Personality				
Punctuality				
Regularity				
Cooperation				
Application				
Enthusiasm				
Ability to learn				
Leadership				

2719

APPENDIX 3

INTERVIEW RATING SHEET

Name of Applicant_____ Date_____

Job applied for_____ Interviewed by_____

	YES	NO
Was he punctual?	____	____
Did he use good grammar?	____	____
Is he confident?	____	____
Is he qualified?	____	____
Was he neatly and appropriately dressed?	____	____
Was he at ease?	____	____
Would he fit into our organization?	____	____
Is he interested in the job?	____	____

Strong points _____

_____

_____

Weak points _____

_____

_____

On the basis of the application, qualifications, personal information and the interview, would you hire the applicant for the position?

_____

_____

_____

_____
Interviewer

APPENDIX 4

STATE DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION

MEMORANDUM OF TRAINING PLAN

TRAINING STATION _____ DATE _____

ADDRESS _____ TELEPHONE NUMBER _____

STUDENT TRAINEE _____ GRADE _____

GIVE SCHEDULE OF HOURS EMPLOYED _____

OCCUPATIONAL OBJECTIVE _____ TRAINING PERIOD _____ MONTHS OR WEEKS

DEPARTMENT IN WHICH EMPLOYED _____ TRAINING SPONSOR _____

PARENT OR GUARDIAN _____ TELEPHONE, RES. _____ FIRM _____

ADDRESS: RESIDENCE _____ FIRM _____

MEMORANDUM OF TRAINING PLAN

1. The training station will employ the above student trainee on a part-time basis, and provide training which will help him or her realize his or her occupational objective.
2. The school will provide organized vocational and related courses of study which will meet the needs of the student trainee.
3. The training station sponsor will assist the Teacher-Coordinator by giving pertinent information which will assure the successful progress of the student trainee.
4. The cooperative training program will extend over a period of _____ months or _____ weeks.
5. The student trainee in order to receive high school credits which will apply toward his or her graduation must be employed fifteen (15) hours per week for a minimum of thirty (30) weeks, and meet the requirements of the school as to class work.
6. The parents (or guardian) will be responsible for the personal conduct of the student trainee while participating in the cooperative part-time program.
7. The parents (or guardian) will assume full responsibility for any action or happenings pertaining to the student trainee for the time he leaves school until he reports to his or her training station.
8. The parents (or guardian) and student trainee understand that the cooperative part-time program is organized and maintained primarily for high school students, (Juniors and Seniors 16 years of age or over) to secure training that will better fit them as potential full-time employees in their chosen occupation.
9. The schedule of compensation whall be mutually agreed upon by the training station and the trainee.
10. The student trainee agrees to abide by all policies and regulations set forth by the Teacher-Coordinator and the training station sponsor.
11. The Teacher-Coordinator and training station sponsor will work closely together on all problems concerning the mutual welfare of all parties concerned and especially for the successful progress of the student trainee.
12. The Teacher-Coordinator will at regular intervals observe the student trainee while on the job, and check with the training sponsor in order to assure successful occupational progress.
13. We, the undersigned, indicate by the affixing of our signatures that we have read and understand the purpose and intent of this "Memorandum of Training Plan."

BY: _____ _____

TRAINING STATION SPONSOR — TEACHER-COORDINATOR

_____ _____

PARENT OR GUARDIAN — STUDENT TRAINEE

NOTE: This is a Memorandum of Training Plan, not a contract. It will be considered complete when the Teacher-Coordinator has outlined on the back the course of study and the schedule of processes which will be followed in training the student trainee.

Complete in duplicate - one copy to Training Station Sponsor and one copy in Teacher-Coordinator's files.

SCHEDULE OF WORK EXPERIENCES	RECORD OF WORK	COURSE OF STUDY	RECORD OF STUDIES

APPENDIX 5

SCHEDULE OF PROCESS (Example)

COIN MACHINE SERVICEMAN

I. Repairs or replaces mechanical parts:

(A) gears
(B) drive wheels friction
(C) replace shaft
(D) straighten arms
(E) adjust trip levers
(F) use hand tools
(G) use drills (hand and electric)
(H) lubricate drive mechanisms

II. Electrical:

(A) soldering
(B) splice wires
(C) lay out new wires
(D) make electrical connections
(E) trace electrical circuits
(F) lubricate relays
(G) burnish electrical contacts
(H) adjust spring tensions
(I) use test equipment
(J) follow electrical diagrams

III. Money:

(A) collect
(B) count
(C) settlement with concessionaires

IV. Reloads and programs machines:

(A) money
(B) music
(C) novelities
(D) sorts
(E) selects
(F) types

APPENDIX 6

No. 600

APPLICATION BLANK

FILL IN AND RETURN THIS BLANK TO ISSUING OFFICER TO SECURE EMPLOYMENT CERTIFICATE.

DEPARTMENT OF LABOR, STATE OF OKLAHOMA

County..... City.....

Date....., 19 ....

TO BE FILLED OUT BY APPLICANT

Name of applicant..... Resides at.....

Date of Birth, Month..... Day..... Year..... Birthplace.....

Grade in which enrolled..... School..... Last grade completed.....

Name of person with whom residing..... Relationship.....

Mailing Address..... Remarks.....

TO BE FILLED OUT BY EMPLOYER

Upon presentation of an Employment Certificate, the Minor Named above will be Employed by:

Name of Firm..... Address..... Telephone.....

At the following occupation.....Hours of work: From..... to.....

And from..... to.....for .....days per week.

Will attend..... Date.....

.....

SIGNATURE OF EMPLOYER.

(PERSONS UNDER 16 MAY NOT WORK MORE THAN 8 HOURS A DAY NOR MORE THAN 48 HOURS PER WEEK)

TO BE FILLED OUT BY PARENT OR GUARDIAN

This to certify that I am the.....of the above minor and that I hereby consent to his/her employment by the above employer provided said minor is first issued an employment certificate as required by law. I further certify that he or she was born on the date above written and that I have been requested by the issuing officer to submit to him one of the documentary proofs of the date of birth and in the order listed below and do submit the proof indicated. SCHOOL RECORDS CANNOT BE ACCEPTED: LEGAL PROOF OF AGE MUST BE ONE OF THE FOLLOWING: Birth Certificate..... Certificate of Baptism..... Bible Record.....

Certificate of Confirmation or other church ceremony at least one year old..... Certificate of arrival in the United States.....

Life Insurance Policy at least one year old..... A certificate signed by two Physicians, one of whom shall be a Public Health Officer or public school Medical Inspector.....

It is agreed that irregular attendance or unsatisfactory class work will be sufficient cause for cancellation of this program.

Date....., 19 ....

SIGNATURE OF PARENT OR GUARDIAN.

PRINCIPAL'S OR TEACHER'S RECOMMENDATION

I, the undersigned (recommend ☐, do not recommend ☐, have no recommendation to make ☐ that.....

be given an employment certificate, provided.....

.....

THIS FORM APPROVED JUNE 16TH, 1949.

.....

SIGNATURE OF PRINCIPAL OR TEACHER.

[redacted]
Commissioner of Labor

(OVER)

68/69 2724

1

PHYSICIAN'S CERTIFICATE OF AGE AND PHYSICAL FITNESS

THIS CERTIFICATE MAY BE ISSUED ONLY IF NO PROOF OF AGE IS AVAILABLE

Physical Development .....

Height in inches..... Weight in Pounds..... Teeth .....

Throat ..... Skin.....

Chest: Heart..... Lungs .....

Remarks: .....

.....

.....

On this date personally appeared before me the applicant named above, and, after examination, I am of the opinion he/she is at least fourteen years of age, and that he/she is physically able to perform the above specified work.

Date..... .....

SIGNATURE OF HEALTH OFFICER.

EXAMINATION BY OTHER PHYSICIAN

Name of applicant.....Date of Birth: Month..... Day..... Year.....

Height in inches..... Weight in pounds..... Condition of Teeth.....

Remarks: .....

On this date personally appeared before me the applicant named above, and, after examination, I am of the opinion he/she is at least fourteen years of age.

Date..... .....

SIGNATURE OF PHYSICIAN.

(DO NOT WRITE BELOW THIS LINE)

Date taken out..... Date returned..... interviewed by .....

Documentary Evidence Offered.....

.....

Examined by.....If not approved, reason.....

.....

Certificate No.....If not approved, reason.....

.....

.....

1ST CERTIFICATE ISSUED TO THIS PERSON FROM SEPTEMBER 1ST TO AUGUST 31

Orginal .....

ANY OTHER CERTIFICATE SUBSEQUENTLY ISSUED SEPTEMBER 1ST TO AUGUST 31

Reissue .....

Form V.E.D. 606

For child during part time school or has finished school.

EMPLOYMENT CERTIFICATE

STATE OF OKLAHOMA
DEPARTMENT OF LABOR
STATE CAPITOL

Date _____

No. _____

Original _____

Reissue _____

Date of Birth _____

_____ County _____ _____ Public School

Address _____ Phone _____

This is to certify that _____ Phone _____

Address _____ Age _____ Yrs. _____ Mo. _____ How Proven, SCHOOL RECORDS CANNOT BE ACCEPTED: LEGAL PROOF OF AGE MUST BE ONE OF THE FOLLOWING: Birth Certificate _____ Certificate of Baptism _____ Bible Record _____ Certificate of Confirmation or other church ceremony at least one year old _____ Certificate of arrival in the United States _____ Life Insurance Policy at least one year old _____ A Certificate signed by two Physicians, one of whom shall be a Public Health Officer or public school Medical Inspector _____

Ht. _____ Ins. Wt. _____ Lbs. Color of Eyes _____ Hair _____ Sex _____

is in regular attendance in the _____ grade of the _____ School

between the hours of _____ M., and _____ M., and may be employed, except at those hours

by _____ Phone _____

Address _____

At the following occupation _____

Hours of employment _____
(State Specifically)

under conditions which will permit attendance at a part time school when such school is established, as required by Oklahoma Statutes, provided that, except in Agriculture and Domestic Service no child under 16 years of age may be employed more than eight hours in any one day nor more than forty-eight hours in any one week, with one hour for noon meal and rest.

This certificate is not valid for any other employer or occupation than the one named above and is to be returned within 24 hours to the issuing officer of the public school at the above mentioned address whenever the person for whom it was issued leaves the service of the employer holding same. This certificate may be revoked by the issuing officer at any time for cause and expires _____, 19_____, at which time it must be returned to the issuing officer and the person for whom it was issued may not be legally employed after this date unless 18 years of age, until another certificate is issued.

Signed _____
Issuing Officer.

_____
Signature of Employee.

This certificate is to be issued only when persons applying for same have complied with compulsory School Laws, and have furnished legal proof of age as required by Title 40, Section 79, O. S. 1951. It must be filled out in triplicate, in three colors; the white one sent to the employer, the yellow one sent to the State Commissioner of Labor, Oklahoma City, and the pink one kept on file by the issuing officer.
Complies with State Compulsory School and Child Labor Laws.

Commissioner of Labor

APPENDIX 7B

Form 609

For person attending regular day school, working outside of school hours.

Employment Certificate

STATE OF OKLAHOMA
DEPARTMENT OF LABOR
STATE CAPITOL

Date _____

No. _____

Original _____

Reissue _____

Date of Birth_____

_____County _____Public School

Address _____Phone _____

This is to certify that_____Phone _____

Address _____Age: Yrs._____Mo. _____How Proven, SCHOOL RECORDS CANNOT BE ACCEPTED: LEGAL PROOF OF AGE MUST BE ONE OF THE FOLLOWING: Birth Certificate_____ Certificate of Baptism_____Bible Record_____Certificate of Confirmation or other church ceremony at least one year old _____Certificate of arrival in the United States_____Life Insurance Policy at least one year old _____ A certificate by two Physicians, one of whom shall be a Public Health Officer or public school Medical Inspector_____.

Ht. _____ Ins. Wt._____Lbs. Color of Eyes _____Hair_____Sex_____

is in regular attendance in the_____grade of the_____School

between the hours of _____M., and _____M., and may be employed, except at those hours

by _____Phone _____

Address _____

At the following occupation_____

Hours of employment_____
(State Specifically)

provided that, except in Agriculture and Domestic Service no child under 16 years of age may be employed more than eight hours in any one day nor more than forty-eight hours in any one week, with one hour for noon meal and rest.

This certificate is not valid for any other employer or occupation than the one named above and is to be returned within 24 hours to the issuing officer of the public school at the above mentioned address, whenever the person for whom it was issued leaves the service of the employer holding same. This certificate may be revoked by the issuing officer at any time for cause and expires_____, 19_____, at which time it must be returned to the issuing officer and the person for whom it was issued may not be legally employed after this date, unless 18 years of age, until another certificate is issued.

Signed _____
Issuing Officer.

_____
Signature of Employee.

This certificate is to be issued only when persons applying for same has complied with compulsory School Laws, Title 70-10-10 and has furnished legal proof of age as required by Title 40 Section 79 O. S. 1951. It must be filled out in triplicate, in three colors; the white one sent to the employer, the yellow one sent to the State Commissioner of Labor, Oklahoma City, and the pink one kept on file by the issuing officer.

Complies with State Compulsory School and Child Labor Laws.

1 72/73 W. T. Bill HUGHES State Commissioner of Labor.

2727

Form V. E. D. 612

APPENDIX 7C

For child during vacation period.

Employment Certificate

STATE OF OKLAHOMA
DEPARTMENT OF LABOR
STATE CAPITOL

Date _____

No. _____

Original _____

Reissue _____

Date of Birth _____

_____County _____ _____Public School

Address _____ Phone _____

This is to certify that _____ Phone _____

Address _____Age_____Yrs._____Mo._____ How Proven, SCHOOL RECORDS CANNOT BE ACCEPTED: LEGAL PROOF OF AGE MUST BE ONE OF THE FOLLOWING: Birth Certificate_____ Certificate of Baptism_____Bible Record_____Certificate of Confirmation or other church ceremony at least one year old_____Certificate of arrival in the United States_____Life Insurance Policy at least one year old_____A certificate signed by two Physicians, one of whom shall be a Public Health Officer or public school Medical Inspector_____.

Ht. _____Ins. Wt._____lbs. Color of Eyes _____Hair_____Sex_____

is in regular attendance in the_____grade to the _____School

and may be employed, by_____ Phone _____

Address _____

At the following occupation_____

Hours of employment_____
(State Specifically)

provided that, except in Agriculture and Domestic Service no child under 16 years of age may be employed more than eight hours in any one day nor more than forty-eight hours in any one week, with one hour for noon meal and rest.

This certificate is not valid for any other employer or occupation than the one named above and is to be returned within 24 hours to the issuing officer of the public school at the above mentioned address, whenever the person for whom it was issued leaves the service of the employer holding same. This certificate may be revoked by the issuing officer at any time for cause and expires_____, 19_____, at which time it must be returned to the issuing officer and the person for whom it was issued may not be legally employed after this date, unless 18 years of age, until another certificate is issued. If the child wishes to continue work during the school term, after school hours, in compliance with the child labor laws, Form V. E. D. 609, must be secured. If the child has completed the requirements of compulsory school laws and does not intend to enter school in September but wishes to continue at work, special application must be made by the child's parents in person, at the above address and Part Time School Form V. E. D. 606 secured. Unless the child has completed two years in high school or is 18 years old, attendance at a Part-Time school not less than four hours a week, is required by law.

_____ Signed _____
Signature of Employee. Issuing Officer.

This certificate is to be issued only when persons applying for same has complied with compulsory School Laws, Section 10 Page 559 Session Laws 1949, and has furnished legal proof of age as required by Title 40 Section 79 O. S. 1951. It must be filled out in triplicate, in three colors; the white one sent to the employer, the yellow one sent to the State Commissioner of Labor, Oklahoma City, and the pink one kept on file by the issuing officer.

Complies with State Compulsory School and Child Labor Laws.

6 - 60

[illegible] HUGHES, State Commissioner of Labor.

STATE DEPARTMENT OF
VOCATIONAL AND TECHNICAL EDUCATION

APPENDIX 8

COOPERATIVE TRAINING PROGRAM

JOB RECORD

NAME _____ TRAINING STATION _____

TYPE OF TRAINING _____ WEEK _____ DATE _____
*(1st, 2nd, etc.)

*Note: See back of this form for instructions

JOB EXPERIENCE	M	T	W	Th	F	S	S	Weeks Hours Per Job	Accumulated Hours Per Job	Total Hours Per Job

SALARY PER HOUR FOR WEEK $ _____ TOTAL HOURS FOR WEEK _____
TOTAL ACCUMULATED HOURS (ALL JOBS)

SALARY PER WEEK ------- $ _____ (Include withholdings, bonus and also commission)

ACCUMULATED SALARY --- $ _____

TOTAL SALARY TO DATE -- $ _____

NOTE: In the squares following each job experience complete the time as follows: Ex.- 1 1/4; 1 1/2; 1 3/4

INSTRUCTIONS

Each student should complete a Job Record, for each calendar week from the time school starts in the fall until school closes in the spring. This will involve more than 36 weeks. If for any reason the student is absent from a job he should still complete the form and indicate that he did not work and give the reason why upon his return to school.

PERSONAL RATING CHART

FOR COOPERATIVE PART TIME STUDENT TRAINEES

Student's Name _____ Date _____ Grade Period _____ Semester _____

Training Station _____ Student-trainee's Sponsor _____

In rating this student, please check (√) the column that is the most applicable after each trait listed.

AFFIRMATIVE TRAITS

	High Degree	Medium Degree	Low Degree
CO-OPERATION			
Shows sincerity and interest	☐	☐	☐
Observes rules	☐	☐	☐
Co-operates naturally and willingly	☐	☐	☐
Works harmoniously with employer or supervisor	☐	☐	☐
Works harmoniously with other employees	☐	☐	☐
DEPENDABILITY			
Sticks to the job through difficulties	☐	☐	☐
Assumes responsibility	☐	☐	☐
Gets to work on time	☐	☐	☐
Returns from lunch or relief on time	☐	☐	☐
Does a dependable job, though supervisor not at hand	☐	☐	☐
MANNERS AND APPEARANCE			
Wears clean, neat clothes	☐	☐	☐
Wears approppriate clothes for job	☐	☐	☐
Shows courtesy to customers	☐	☐	☐
Shows consideration for other employees	☐	☐	☐

	High Degree	Medium Degree	Low Degree
Speaks in a refined voice	☐	☐	☐
Maintains poise	☐	☐	☐
QUALITY OF WORK			
Shows skill and accuracy	☐	☐	☐
ATTITUDES			
Indicates enthusiasm for work	☐	☐	☐
Asks for constructive criticism and help	☐	☐	☐
Welcomes suggestions wholeheartedly	☐	☐	☐
Feels that it is important to do a job well	☐	☐	☐
Shows loyalty to firm	☐	☐	☐
Maintains cheerful disposition	☐	☐	☐
INDUSTRY AND INITIATIVE			
Takes pride in completing job	☐	☐	☐
Works continuously	☐	☐	☐

NEGATIVE TRAITS

Headstrong	☐
Talks too much	☐
Talks too loudly	☐
Requires tact in handling	☐
Alibis	☐
Indifferent to his work	☐
Has to be told things to do	☐
Wastes time while on the job	☐
Chews gum	☐
Complains about not feeling well	☐
Talks about personal life	☐

Remarks: _____

_____

_____

_____ Signature

2731

APPENDIX 10

Form Approved:
Budget Bureau No. 44-R0308

LEAVE THIS SPACE BLANK

U.S. DEPARTMENT OF LABOR
WAGE AND HOUR AND PUBLIC CONTRACTS DIVISIONS

APPLICATION FOR A CERTIFICATE TO EMPLOY A STUDENT-LEARNER

The certification of the appropriate school official on the reverse side of this application shall constitute a temporary authorization for the employment of the named student-learner at less than the statutory minimum wage applicable under section 6 of the Fair Labor Standards Act or at wages below the applicable Walsh-Healey Public Contracts Act or McNamara-O'Hara Service Contract Act wage determination, effective from the date this application is forwarded to the Divisions until a student-learner certificate is issued or denied by the Administrator or his authorized representative, provided the conditions specified in section 520.6(c)(2) of the Student-Learner Regulation (29 CFR 520) are satisfied.

PRINT OR TYPE ALL ANSWERS. PLEASE READ CAREFULLY THE INSTRUCTIONS FOR COMPLETING THIS FORM

1. NAME AND ADDRESS, INCLUDING ZIP CODE, OF ESTABLISHMENT MAKING APPLICATION:

3A. NAME AND ADDRESS OF STUDENT-LEARNER:

B: DATE OF BIRTH: *(Month, day, year)*

2. TYPE OF BUSINESS AND PRODUCTS MANUFACTURED, SOLD, OR SERVICES RENDERED:

4. NAME AND ADDRESS, INCLUDING ZIP CODE, OF SCHOOL IN WHICH STUDENT-LEARNER IS ENROLLED:

5. PROPOSED BEGINNING DATE OF EMPLOYMENT *(Month, day, year)*

6. PROPOSED ENDING DATE OF EMPLOYMENT *(Month, day, year)*

7. PROPOSED GRADUATION DATE *(Month, day, year)*

8. NUMBER OF WEEKS IN SCHOOL YEAR

9. TOTAL HOURS OF SCHOOL INSTRUCTION PER WEEK

10. NUMBER OF SCHOOL HOURS DIRECTLY RELATED TO EMPLOYMENT TRAINING

11. HOW IS EMPLOYMENT TRAINING SCHEDULED *(Weekly, alternate weeks, etc.)?*

12. NUMBER OF WEEKS OF EMPLOYMENT TRAINING AT SPECIAL MINIMUM WAGES

13. NUMBER OF HOURS OF EMPLOYMENT TRAINING A WEEK

14. ARE FEDERAL VOCATIONAL EDUCATION FUNDS BEING USED FOR THIS PROGRAM?

15. WAS THIS PROGRAM AUTHORIZED BY THE STATE BOARD OF VOCATIONAL EDUCATION?

16. IF THE ANSWER TO ITEM 15 IS "NO", GIVE THE NAME OF THE RECOGNIZED EDUCATIONAL BODY WHICH APPROVED THIS PROGRAM:

17. TITLE OF STUDENT-LEARNER OCCUPATION:

18. NUMBER OF EMPLOYEES IN THIS ESTABLISHMENT

19. NUMBER OF EXPERIENCED EMPLOYEES IN STUDENT-LEARNER'S OCCUPATION

20. MINIMUM HOURLY WAGE RATE OF EXPERIENCED WORKERS IN ITEM 19

21. SPECIAL MINIMUM WAGE(s) TO BE PAID STUDENT-LEARNER *(if a progressive wage schedule is proposed, enter each rate and specify the period during which it will be paid)*:

22. IS AN AGE OR EMPLOYMENT CERTIFICATE ON FILE IN THIS ESTABLISHMENT FOR THIS STUDENT-LEARNER? *(If not, see instructions)*

23. IS IT ANTICIPATED THAT THE STUDENT-LEARNER WILL BE EMPLOYED IN THE PERFORMANCE OF A GOVERNMENT CONTRACT SUBJECT TO THE WALSH-HEALEY PUBLIC CONTRACTS ACT OR THE MC NAMARA-O'HARA SERVICE CONTRACT ACT?

ATTACH SEPARATE PAGES IF NECESSARY

Form WH-205 (Rev. 4/68)

24. OUTLINE THE SCHOOL INSTRUCTION *directly* RELATED TO THE EMPLOYMENT TRAINING *(list courses, etc.)*.

25. OUTLINE TRAINING ON-THE-JOB *(describe briefly the work process in which the student-learner will be trained and list the types of any machines used)*.

26. SIGNATURE OF STUDENT-LEARNER:

I have read the statements made above and ask that the requested certificate, authorizing my employment training at special minimum wages and under the conditions stated, be granted by the Administrator or his authorized representative.

(Print or type name of student) *Signature of Student* *Date*

27. CERTIFICATION BY SCHOOL OFFICIAL:

I certify that the student named herein will be receiving instruction in an accredited school and will be employed pursuant to a bona fide vocational training program, as defined in section 520.2 of Student-Learner Regulations.

(Print or type name of official)

Signature of School Official *Date*

Title

28. CERTIFICATION BY EMPLOYER OR AUTHORIZED REPRESENTATIVE:

I certify, in applying for this certificate, that all of the foregoing statements are, to the best of my knowledge and belief, true and correct.

(Print or type name of employer or representative)

Signature of employer or representative *Date*

Title

ATTACH SEPARATE SHEETS IF NECESSARY

GPO 944-466

APPENDIX 11

RECORD OF OBSERVATION

Firm Name · Date						

Place an X for each conference with the supervisor and a / for each observation of the student trainee.

2734

VT 014 083
PETERSEN, DALE F.
IOWA HEALTH OCCUPATIONS EDUCATION; FOLLOW-UP STUDY.

IOWA UNIV., IOWA CITY. DIV. OF HEALTH AFFAIRS.
IOWA STATE DEPT. OF PUBLIC INSTRUCTION, DES MOINES. DIV. OF CAREER EDUCATION
OFFICE OF EDUCATION (DHEW), WASHINGTON, D.C.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - 31JUL71 149P.

DESCRIPTORS - *VOCATIONAL FOLLOWUP; *HEALTH OCCUPATIONS EDUCATION; *GRADUATE SURVEYS; EDUCATIONAL RESEARCH; *PROGRAM EVALUATION; PROGRAM PLANNING; PROGRAM DEVELOPMENT; OCCUPATIONAL CHOICE
IDENTIFIERS - IOWA

ABSTRACT - TO PROVIDE A MORE COMPREHENSIVE UNDERSTANDING OF HEALTH OCCUPATIONS EDUCATION IN IOWA, QUESTIONNAIRES WERE MAILED TO 3,207 GRADUATES OF HEALTH OCCUPATIONS EDUCATION PROGRAMS FOR THE YEARS 1956-1961. RESPONSES FROM 2,098 (65 PERCENT) REVEALED A DEFINITE DOWNWARD TREND IN THE MEDIAN AGE OF GRADUATES AND A GREATER NUMBER OF HIGH SCHOOL GRADUATES ENTERING PROGRAMS TO PREPARE FOR HEALTH CAREERS. THE MAJORITY OF THE GRADUATES ARE FEMALE WITH MALES COMPRISING ONLY ABOUT 2 PERCENT OF THE GRADUATES. MORE THAN HALF THE GRADUATES HAD HEALTH OCCUPATIONS EXPERIENCE PRIOR TO ENROLLMENT, WITH THE MOST COMMON EMPLOYMENT BEING A NURSES AIDE OR ORDERLY. MORE THAN 95 PERCENT OF THE RESPONDENTS HAVE BEEN EMPLOYED IN THE HEALTH OCCUPATION FOR WHICH THEY WERE TRAINED, AND 77 PERCENT WERE EMPLOYED AT THE TIME OF THE SURVEY, WITH MOST EMPLOYED AS PRACTICAL NURSES. ALTHOUGH GRADUATES EXPRESSED A HIGH LEVEL OF SATISFACTION WITH THE EDUCATION PROGRAM, THERE WAS AN EXPRESSED NEED FOR MORE CLINICAL EXPERIENCE. IT WAS RECOMMENDED THAT (1) MORE MALES BE ENCOURAGED TO ENROLL IN THE PROGRAM, (2) PROGRAM FACILITIES PLAN COOPERATIVELY WITH NURSING HOMES FOR A GREATER AMOUNT OF CLINICAL EXPERIENCES, AND (3) FACULTY EVALUATE THEIR CURRICULUM TO DETERMINE IF TOO LITTLE EMPHASIS IS BEING PLACED ON CLINICAL EXPERIENCE. (SB)

VT 014 083

Iowa Health Occupations Education Follow-up Study

Dale F. Petersen

THE UNIVERSITY OF IOWA
FOUNDED 1847

VT014083

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
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2736

IOWA HEALTH OCCUPATIONS EDUCATION

FOLLOW-UP STUDY

A Follow-Up of the Graduates of Health Occupations Education Programs in Iowa Which are Partially Supported by State and/or Federal Vocational-Technical Education Funds

Dale F. Petersen

Research reported herein was performed pursuant to a contract with the Career Education Division of the Iowa Department of Public Instruction. Contractors undertaking such projects under governmental sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated herein do not, therefore, necessarily represent official position or policy of the Iowa Department of Public Instruction.

Program in Health Occupations Education
Division of Health Affairs
The University of Iowa

in cooperation with

Career Education Division
Iowa Department of Public Instruction

Partially funded under the provisions of
The Vocational Education Amendments of 1968

July 31, 1971

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Many thanks to all of you and to those whom I may have overlooked mentioning here.

Dale F. Petersen, Director
Iowa H.O.E. Follow-Up Study
and
Administrative Assistant, and
Research Coordinator
Program in Health Occupations Education
Division of Health Affairs
The University of Iowa

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	i
LIST OF TABLES	v
CHAPTER	
1. BACKGROUND AND INTRODUCTION	1
THE HEALTH CARE INDUSTRY	1
TYPES OF HEALTH CARE PERSONNEL	3
SCOPE OF HEALTH OCCUPATIONS EDUCATION NATIONALLY	5
HEALTH OCCUPATIONS EDUCATION IN IOWA	6
ADMINISTRATION OF HEALTH OCCUPATIONS EDUCATION PROGRAMS IN IOWA	9
NEED FOR THIS STUDY	14
2. METHOD OF STUDY	17
IDENTIFICATION OF GRADUATES	17
SURVEY INSTRUMENTS	19
MAILING OF QUESTIONNAIRES	22
VALIDATION PROCEDURES	26
3. AN OVERVIEW OF THE PERSONAL CHARACTERISTICS OF IOWA'S HOE GRADUATES	35
AGE	35
SEX	38
MARITAL STATUS	38
NUMBER OF CHILDREN	40
PREVIOUS HEALTH EXPERIENCE	41
4. EMPLOYMENT CHARACTERISTICS OF THE GRADUATES	43
INITIAL EMPLOYMENT AFTER GRADUATION	44
MOST CURRENT EMPLOYMENT	66
CURRENT EMPLOYMENT STATUS	80
MOBILITY AMONG GRADUATES	84
5. GRADUATES' VIEWS OF THEIR HOE PROGRAMS	87
GENERAL EVALUATION OF PROGRAMS	87
SPECIFIC RECOMMENDATIONS FOR PROGRAM IMPROVEMENT	93

2740

Page

6. CONCLUSIONS AND RECOMMENDATIONS 109

PART ONE:

GRADUATES 109
EMPLOYMENT CHARACTERISTICS. 111
HEALTH OCCUPATIONS EDUCATION PROGRAMS 114

PART TWO:

PRACTICAL NURSING 116

LIST OF REFERENCES. 122

APPENDIX A. 123

APPENDIX B. 132

2741

TABLES

Chapter 1 Page

1.1 Number of One and Two Year Preparatory Programs, By Type - FY 1957-71 8

Chapter 2

2.1 Summary of Questionnaire Response. 25

2.2 Age. 28

2.3 Marital Status 28

2.4 Relevance of Initial Employment. 29

2.5 Level of Satisfaction with Initial Employment. . . . 29

2.6 Number of Jobs Since Graduation. 30

2.7 Moved Away from Iowa 30

2.8 Relevance of Most Current Employment 31

2.9 Level of Satisfaction with Current Employment. . . . 31

2.10 Non-Health Work Experience 32

2.11 Current Employment Status. 32

2.12 Level of Satisfaction with HOE Program 32

Chapter 3

3.1 Age of Graduates in 1970 36

3.2 Mean and Median Ages of All Graduates by Program Type and Year of Graduation 37

3.3 One and Two Year Preparatory Programs Enrollments FY 1959-71 39

2742

Chapter 3 (cont.) Page

3.4 Marital Status 38

3.5 Total Number of Children 40

3.6 Number of Children Under 6 Years 41

3.7 Type of Previous Health Occupations Experience by Program Type 42

Chapter 4

4.1 Relevance of Initial Employment by Program Type. . . 45

4.2 Time Lapse Between Graduation and Initial Employment 48

4.3 Type of Institution -- Initial Employment of Graduates Employed in the Occupation for Which They Were Prepared 51

4.4 Type of Institution by Size of Institution -- Initial Employment 52

4.5 Initial Employment Hospital Size Compared to the General Distribution of Hospital Size in Iowa. . . . 53

4.6 Location of Initial Employment in Relation Primary Clinical Agency for Graduates Employed in the Occupation for Which Prepared. 55

4.7 Location of Initial Employment in Relation to Primary Clinical Agency by Relevance of that Employment 56

4.8 Beginning Salaries of Graduates Who Are Employed Full Time in the Occupation for Which They Were Prepared 58

4.9 Beginning Salaries of All Graduates Employed Full Time by Relevance of Initial Employment. 58

4.10 Median Beginning Salaries of Graduates Working Full Time in the Occupation for Which They Were Prepared. 59

2743

Chapter 4 (cont.) Page

4.11 Tenure in Initial Employment. 60

4.12 Level of Satisfaction with Initial Employment 62

4.13 Satisfaction with Initial Employment by Age of the Graduates (1970). 64

4.14 Satisfaction with Initial Employment by Type of Institution 65

4.15 Satisfaction with Initial Employment by Relevance of that Job 66

4.16 Relevance of Most Current Employment by Program Type. 68

4.17 Type of Institution -- Most Current Employment of Graduates Employed in the Occupation for Which They Were Prepared, by Program Type. 69

4.18 Type of Institution by Bed Size -- Most Current Employment 70

4.19 Location of Most Current Employment in Relation to Primary Clinical Agency. 71

4.20 Location of Most Current Employment in Relation to Primary Clinical Agency by Program Type. 72

4.21 Location of Most Current Employment in Relation to Initial Employment 74

4.22 Most Current Salary of Graduates Who Are Employed Full Time in the Occupation for Which They Were Prepared. 75

4.23 Most Current Salaries of Graduates Employed Full Time by Relevance of Most Current Employment. 76

4.24 Tenure in Most Recent Employment. 77

4.25 Level of Satisfaction with Most Current Employment. . 78

4.26 Satisfaction with Most Current Employment by Age in 1970 79

2744

Chapter 4 (cont.) Page

4.27 Satisfaction with Most Current Employment by Type of Institution. 80

4.28 Current Employment Status 81

4.29 Reasons for Unemployment. 82

4.30 Plans to Return to Work 83

4.31 Type of Occupation Returning To 84

4.32 States to Which Graduates Have Moved. 86

Chapter 5

5.1 Prepared Adequately by Program. 88

5.2 General Satisfaction with HOE Program 89

5.3 Amount of Theory. 90

5.4 Amount of Clinical Experience 91

5.5 Did the Program Provide Economic Security? 92

5.6 Did the Program Provide Personal Satisfaction?. . . 92

5.7 Improvements Recommended for the Practical Nurse Program by the Practical Nurse Graduates. 95

5.8 Improvements Recommended for the Associate Degree Nurse Program by the ADN Graduates. 99

5.9 Improvements Recommended for the Operating Room Technician Program by the ORT Graduates 100

5.10 Improvements Recommended for the Medical Office Assistant Program by the MOA Graduates. 101

5.11 Improvements Recommended for the Medical Laboratory Assistant Program by the MLA Graduates. 104

5.12 Improvements Recommended for the Dental Assisting Program by the DA Graduates 105

5.13 Improvements Recommended for the Occupational Therapy Assistant Program by the OTA Graduates. 107

2745

CHAPTER I

BACKGROUND AND INTRODUCTION

THE HEALTH CARE INDUSTRY

The health care industry, one of the most dynamic and rapidly growing in our nation, is experiencing dramatic change. On one hand, rapid expansion in scientific and medical knowledge is stimulating the involvement of new types of health workers in the delivery of health care. On the other hand, charges of inequitable distribution of health services, population growth, expanded use of third party financing of health care, longer life expectancy, and many other similar factors demand an increasing number of better trained health personnel.

The dynamics of growth and change are implicit in the above factors. At the turn of the century, the "health care team" consisted primarily of the doctor and his nurse, and there were 123,000 and 121,000 respectively of these two categories of health workers. At the same time, there were some 30,000 dentists. Few "supportive health workers," other than nurses, existed at that time. In all, a total of only about 350,000 persons were employed in the "health field" in 1900.[1]

This picture has changed dramatically in the intervening years, most dramatically in the past 15-20. In 1968 there were approximately 3.7 million people employed in the health care industry. While this field experienced phenomenal growth during this period of time, the most dramatic

---

[1]U. S. Department of Health, Education and Welfare, Public Health Service, Health Manpower Source Book, Section 21, Allied Health Manpower, 1950-80. (Washington, D.C.: U. S. Government Printing Office, PHS Publication No. 263, 1970), page 3.

2746

change was in the occupational composition of the field. In 1969 there were 375 health occupations listed in the Health Resources Statistics Handbook. Among these were 125 primary occupational titles and 250 alternate or secondary titles.[2] Even then, some health occupations are not reflected in this listing. Many job categories and occupational titles are assigned on a localized basis, and in addition, specialization and reclassification of functions and responsibilities are continually creating new occupational titles in this field at a tremendously rapid rate.

With regard to this expanded occupational structure, it is interesting to note that the most impressive growth has been among those occupations other than the physician, dentist and others at their same level of preparation which Greenfield categorizes as "Autonomous Health Practitioners."[3] In 1900, physicians and dentists comprised approximately 45% of the total of health manpower, while in 1967, they made up less than 12% of all health manpower. Health workers other than "autonomous practitioners," including all classifications of nurses, grew in proportion of health manpower from 55% in 1900 to more than 88% in 1967.[4] Certain groups may not agree with these classifications. They serve, however, to show the important growth trend that is taking place in the supportive level health occupations.

---

[2] U. S. Department of Health, Education and Welfare, Public Health Service, Health Resources Statistics (Washington, D.C.: U.S. Government Printing Office, PHS Publication No. 1509, 1969), p. 273.

[3] Harry I. Greenfield and Carol A. Brown, Allied Health Manpower: Trends and Prospects (New York: Columbia University Press, 1969), page 18.

[4] Public Health Service, Health Manpower Source Book, Section 21, Loc. Cit.

TYPES OF HEALTH PERSONNEL

Within this greatly expanded health field, the various types of workers tend to meld into five rather distinct groups:

(1) The autonomous professional practitioner. In this group are the physician, the dentist and those who carry the burden of the legal responsibility for patient care.

(2) The professional practitioner. In this group are health workers such as the medical technologist, the physical therapist, the professional nurse, the medical social worker and others commonly prepared at the baccalaureate and masters degree level.

(3) The technician. This health worker is usually prepared in educational programs at less than baccalaureate degree level, most often in a two-year post-high school program. In part, this group includes the dental laboratory technician, the environmental technician, the inhalation therapy technician, and by definition of the profession, the diploma and associate degree registered nurses.

(4) The assistant. Most assistants, such as the medical office assistant, licensed practical nurse and the dental assistant are prepared in one year preparatory programs, usually post-high school. Some of these health workers, however, are prepared in secondary schools and on the job.

(5) The aide. Preparation for most of these workers has been on-the-job. However, short-term career education programs are becoming increasingly popular for preparing this type of health worker. Included in the aide category are the nurse aide-orderly, physical therapy aide, dietary aide and other similar health workers.

Various health fields attach different meanings to specific occupational titles. There appears, however, to be a great deal of similarity in categories of titles and preparation among the many fields. Most identify these five categories as appropriate to their thinking.

For the most part, when considered by level of responsibility or autonomy, the five levels tend to re-group into three: the autonomous health practitioner, the professional health practitioner, and supportive health personnel. Included in the latter category are the technician, the assistant and the aide. Autonomous practitioners are generally prepared in medical, dental and similar colleges located in public and private universities and in some major teaching hospitals. The professional level worker is increasingly being prepared at colleges and universities in health specialty departments and "allied health professions" schools. Supportive health workers; including the technician, the assistant, and the aide; are prepared in many different types of programs located in a variety of administrative settings. These range from on-the-job training in a health agency to a less-than-baccalaureate level program in a college or university. Most formal educational programs for this category of health worker range from a three- or four-week short-term program to a two-year associate degree program administered by a community college or area vocational-technical institute.

While the term "health occupations education" can be considered generic, popular usage in recent years tends to identify it with the latter or supportive personnel category. It is beyond the scope of this project to debate the merits involved, or to determine the proper usage of the term. However, because of familiarity and current usage, the term "health occupations

education," as used in this report will describe the supportive level health personnel category (technician, assistant, aide). Health occupations education will be abbreviated by the capital letters HOE.

SCOPE OF HEALTH OCCUPATIONS EDUCATION NATIONALLY

The rapidly expanding field of vocational-technical education, especially in the community college setting, is the largest single producer of prepared health workers whose preparation is less than a baccalaureate degree.[5] Recent figures showing the exact number of HOE programs which prepare supportive health personnel are not available. However, figures for the fiscal year ending June 30, 1969 from the Analysis and Reporting Section of the Bureau of Vocational-Technical Education, U.S. Office of Education, indicate there were more than 176,000 students enrolled in HOE programs conducted by some 2,000 schools across the nation. These figures reflect only those programs supported under the provisions of the Vocational Education Act of 1963, as amended in 1968. Among the 176,000 were approximately 30,000 students enrolled in secondary school HOE programs. The remaining students, which comprise a plurality of approximately 83% were enrolled in post-secondary level educational programs to prepare for employment in the health field. About 7,000 faculty members were employed in 1969 to teach in HOE programs supported in part by vocational education funds.

Under the provisions of this Act, according to the preliminary report of the Bureau of Vocational-Technical Education, U.S. Office of Education, a total of $13,106,000 was provided in the form of basic grants

[5]Helen K. Powers, "Some Facts About Vocational Education," paper published in National Conference for Health Occupations Education, (Champaign, Illinois: University of Illinois, June 1970), page D-22.

to states for the support of HOE programs. This amount reflects only the federal share of program support. Additional support, about double this amount, comes from state aid, student tuitions and local taxes.

The rate of growth in vocational education programming in the health field has been dramatic. Enrollment figures given above the FY 1969 represent approximately 23% growth over FY 1968 and nearly 500% growth over 1957. In addition to an expanding need for prepared health workers, growth in health occupations education is a long range result of the focus brought on the field by the passage of Public Law 911 which is known as the "Health Amendments Act of 1956." This Act, in essence, amended the Vocational Education Act of 1946 by including Title II, "Vocational Education in Practical Nurse Training."[6] Prior to this Act, there were comparatively few vocational-technical programs for the preparation of health workers. Among those that did exist in that period of time, the focus was heavily on practical nurse education. The most rapid growth, both in numbers and types of HOE programs has been since the passage of the 1956 Act.

HEALTH OCCUPATIONS EDUCATION IN IOWA

In Iowa, as well as nationally, practical nursing was the early focus of attention in HOE. Health Occupations Education, as a part of the public education system in this state, has emerged from the demonstration-pilot program in practical nurse education which was administered by the College of Nursing at the University of Iowa. This program was established in 1953, upon the recommendation of a state advisory committee, for the purpose of encouraging other institutions to develop similar programs and to provide a model to assist them in doing so.

---

[6] J. Chester Swanson, Development of Federal Legislation for Vocational Education, (Chicago: American Technical Society, 1962), page 95.

From the time this program was established in 1953 until 1956 when the Health Amendments Act was passed, only one more publicly administered practical nurse education program was organized in the state. This program opened its doors to students in 1955 at the Junior College in Clarinda, Iowa. It was after the 1956 Act and its related administrative guidelines were implemented that the noticeable expansion of practical nurse programs began. As can be seen in Table 1.1, page 8, there was a steady growth in the number of practical nurse programs from 1958 when there were three to 1971 when 22 publicly supported programs enrolled students.

It should be mentioned at this point that there were also three privately supported practical nurse programs in Iowa during this period of time. The first, and actually the first program in the state, was administered by St. Joseph's Mercy Hospital in Marshalltown and was organized in 1948. A second program, administered by St. Luke's Methodist Hospital in Cedar Rapids, began operation in 1953. The third private program originated in 1958 under the auspices of St. Anthony's Hospital in Carroll. One of the three, the St. Luke's Methodist Hospital program, continues to be privately operated. The other two have transferred administration of their programs to public educational institutions in their locality.

Table 1.1 also shows that it was not until 1964 that the scope of HOE programming in the state extended beyond practical nursing. In that year, the first program which encompassed a different health occupation was implemented by the Fort Dodge Community College, in Fort Dodge, to prepare medical office assistants for employment in physicians' offices. In the ensuing years, the scope of programming broadened until there were 54 regular preparatory programs one- and two-years in length in eleven

TABLE 1.1

HEALTH OCCUPATIONS EDUCATION IN IOWA

NUMBER OF ONE AND TWO YEAR PREPARATORY PROGRAMS, BY TYPE- FY 1957-71

PRACTICAL NURSING	2	3	4	4	5	5	8	11	11	13	19	19	19	20	23
MEDICAL ASSISTANT									1	1	1	5	5	5	5
MEDICAL LAB. ASSISTANT										1	1	3	4	4	4
DENTAL ASSISTANT												4	6	6	7
DENTAL LAB. TECHNICIAN													1	1	1
ASSOCIATE DEG. IN NURSING												2	2	5	8
OPERATING ROOM TECHNICIAN												1	3	3	3
ENVIRONMENTAL TECHNICIAN													1	1	1
OCCUPATIONAL THERAPY ASSIST.													1	1	1
ORTHOPAEDIC TECHNICIAN													1	1	1
LONG-TERM CARE FACILITIES ADMIN.															1
TOTAL NUMBER	2	3	4	4	5	5	8	11	12	15	21	34	43	47	55
FY(19)	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71

different health occupations. In the fiscal year ending June 30, 1971, 55 such programs were in existence. Table 1.1 delineates the development of HOE programs in the state by program type and year of implementation. For the description and location of each of these programs, please refer to Appendix A.

In addition to the regular one- and two-year preparatory programs, a variety of other types of HOE programs exis. in the state on a need determination basis. Among these are a four-week preparatory nurse aide program and a variety of supplemental or continuing education programs designed for currently employed health workers. In most cases, the need for these types of educational offerings is determined locally by the appropriate educational institution and health agency(ies). Because these programs are offered on a need determination basis, and are offered more or less intermittently, they are not included as a part of this follow-up study. Only the regular one- and two-year preparatory programs are included.

ADMINISTRATION OF HOE PROGRAMS IN IOWA

At the State Level

Federal guidelines developed for the administration of the Health Amendments Act of 1956 required that state departments of pbulic instruction provide for a professional nurse consultant to assist in the development of educational programs under that Act. Iowa was unique in the provision it made to meet these requirements. While most states employed professional nurses on their vocational education staffs; the Iowa Department of Public Instruction, with the approval of the U. S. Office of Education, chose to contract with The University of Iowa for these consultative services (as

mentioned earlier, the University had established the demonstration project and at that time was already providing leadership in program development). This arragnement has proven effective for many reasons. For example, having the consultant function for HOE based in close proximity to the health professions colleges and service functions found at the University, provides better opportunity for comprehensive planning in program development.

This cooperative arrangement evolved out of the pilot-demonstration project in practical nurse education administered within the University's College of Nursing. For several years, as long as practical nursing was the focus of HOE program development, the consultant service continued to be provided from within this College. When programs other than practical nursing were introduced the importance of basing the consultant function in a neutral area, not directly allied with any of the specific health colleges, was recognized. Upon this recognition, in 1965, the consultant function was transferred out of the College of Nursing and established as the Program in Health Occupations Education, a new department within what is now known as the Division of Health Affairs. This new Department, since its inauguration and under a continued agreement with the Iowa Department of Public Instruction, has provided consultation, teacher education, research, curriculum and instructional materials development, and other supportive services for HOE in the state.

Through this cooperative arrangement, the University of Iowa and the Iowa Department of Public Instruction have provided leadership to pave the way for sound and continual expansion of quality HOE programs. Each program is administered under the provisions of the State Plan for

Vocational Education and is partially supported with state and federal vocational education funds.

At the Local Level

In the early years, HOE programs in Iowa were generally administered by local secondary school districts. Many such districts organized their "post-secondary" HOE programs as a part of their adult education departments. Other secondary school districts developed their HOE programs as a part of the junior or community college which they administered. While a tremendous need existed for career education at the post-secondary level, there was no organized "over-all" plan for such a system. As these local school districts identified a need for prepared health workers, programs were planned and implemented.

In many cases it was necessary to utilize existing facilities that were available. All types of vacant structures such as bank buildings, supermarkets, commercial buildings, unused school buildings, and other similar structures which could be remodeled into suitable accommodations were used to house newly developed programs. Some institutions, however, were able to plan for space to house their HOE programs as new junior and community college buildings were constructed.

Even with the lack of an organized "over-all" state plan for the administration of post-secondary occupational education in the beginning, these institutions were proud of their contribution to students and to health care in Iowa through the preparation of quality health personnel. These new programs gave these school districts the opportunity to offer their citizenry a much needed program of occupational education.

This lack of over-all organization, and the administration of HOE programs in this state, changed dramatically after 1965, the year in which the Iowa Legislature passed the "Area School" law. This law, known then as Senate File 550, is the basis upon which an entirely new system of post-secondary educational institutions has emerged. The law contained provisions which allowed county school districts, or parts thereof, to merge for the mutual support of an area school offering two years of post-secondary education. These institutions could be organized as comprehensive community colleges or as vocational-technical institutes.

The system of two-year post secondary institutions provided for in this legislation proved to be extremely popular with the Iowa public and evolved rapidly in only a few short years. A total of 15 "area schools" have been organized and approved by the Iowa State Board of Public Instruction. Of the 15, eleven are community colleges which offer a variety of career education programs as well as two years of general education. The remaining four are vocational-technical institutes which primarily offer career education programs.

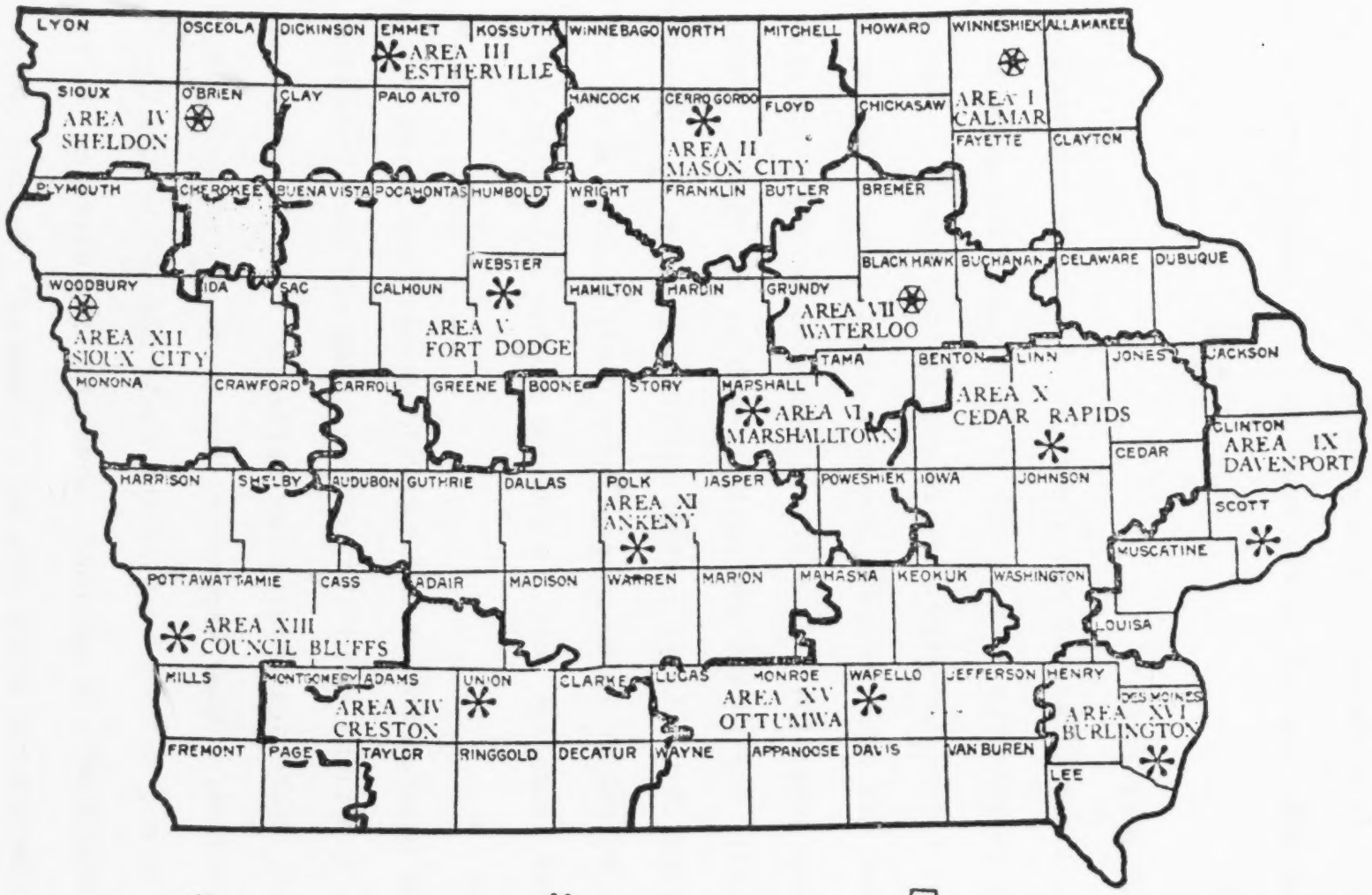
All these new institutions encompass multi-county districts, with some including parts of as many as twelve or more counties. Figure 1, on the following page , shows the boundaries and administrative centers of Iowa's 15 area schools.

As these new area post-secondary institutions emerged, more than half of their multi-county districts included existing junior or community colleges administered by local secondary systems. There were also many existing post-secondary occupational education programs administered by local districts. For the most part, one of the early steps in organization of the

MERGED AREA SCHOOLS AND ADMINISTRATIVE CENTERS FOR

AREA COMMUNITY COLLEGES (ACC) AND AREA VOCATIONAL SCHOOLS (AVS)

July 1, 1970



AREA VOCATIONAL SCHOOLS AREA COMMUNITY COLLEGES UNASSIGNED AREAS

Figure 1

2758

new area schools was to cooperatively plan with local districts for the orderly transfer of all formal post-secondary programs to the new institutions. As a result of this process, all the formally organized one- and two-year HOE programs in the state are now administered by the 15 area schools.

NEED FOR THIS STUDY

Health occupations education, in this state and nationally, has as its central purpose the preparation of well qualified supportive personnel for the health care industry. As an educational field, it has existed since 1918, but has only recently become a significant force in the overall field of career education. Statistics presented in the first part of this chapter confirm the recent and rapid growth in our state. These HOE programs are a part of the total career education program in this country supported in part by public funds appropriated under federal and state vocational-technical education acts. Local tax monies also partially support these programs.

The general public and specific groups have asked, and will continue to ask, questions about the results being realized from this investment of local, state and federal tax dollars. Examples of questions asked many times include: "What happens to the graduates of such programs? Do they work? If so, do they work in the field for which they were prepared? Are they unemployed? If so, why? What are they earning? Do they remain in the occupation for which they were prepared? Do they remain in Iowa? Answers to these types of questions have not been readily available.

To date, there has been no comprehensive state-wide follow-up study of the graduates of Iowa's health occupations education programs on which to base sound judgments leading to curriculum change. Graduates' attitudes, evaluation, and suggestions, as well as their occupational characteristics, can be extremely useful to administrators and faculty of health occupations education programs in implementing curriculum improvement. Placement data, combined with the employment characteristics of graduates can also be useful in planning for the development of new programs and expansion of existing ones. Reasons for unemployment among the graduates, if it exists, is an important factor in program evaluation.

This follow-up study was designed to provide a more comprehensive understanding of the field of health occupations education in Iowa. It was conceived as a "state-of-the-art" study, developing if you will, a profile of the total HOE program in the state. Its purpose was to assemble an information base useful to a variety of groups and individuals in planning new programs or evaluating and expanding existing ones. Evaluation of individual programs must take into account many differential factors which preclude the value of a single, massive evaluative study.

It is hoped that the information contained in this report will be useful to HOE program faculty, school administrators, state education and health agencies, employers of supportive health personnel, and the public and its legislative spokesmen.

CHAPTER 2

METHOD OF STUDY

IDENTIFICATION OF GRADUATES

Most basic to the conduct of this study was the identification of the graduates of Iowa's health occupations education programs which have used federal funds. This in itself posed a significant potential problem in that, according to the official annual reports of the HOE section of the Iowa Department of Public Instruction, federal funds were first utilized by the Clarinda and University of Iowa programs in 1956. This required that graduates from as many as 13 years back would have to be identified and a usable mailing address obtained for as many as possible.

Recognizing the possibility that records from some of the earlier classes may not be complete, and that changes in personnel may compound this problem, it was decided that the best available source of this information was the coordinators of the 47 HOE programs which existed in 1969. One hundred per cent cooperation of all institutions in Iowa having HOE programs was obtained through correspondence with the appropriate institutional administrators. In each case it was pledged by the school to help identify their graduates and provide other appropriate information.

A printed form was designed on which the graduates, by graduating class, could be listed with their last known mailing address and, if available, their telephone number (Appendix B). A supply of these

forms was sent to the coordinator of each program for use in identifying their graduates for the study. In many schools, the HOE program coordinator worked closely with the student personnel department in obtaining the addresses of graduates. The use of the prepared form, designed by the project staff, facilitated handling of the addresses and transforming them into usable mailing labels.

The success of the coordinators in finding their graduates was extremely gratifying. Most, through current correspondence or telephone calls, were able to establish a rather current mailing list of graduates. Once these had been obtained, and returned to the project staff, it was then necessary to prepare the graduate lists for processing. It had been planned that all address data be transferred to regular 80 column data processing cards.

To achieve this, the lists were edited for clarity and an identification number was assigned each graduate. The numbers were assigned in ascending order beginning with the first person listed in the first graduating class of each program. It was the intention of the project staff to provide as much feedback of data to the programs as financially and time-wise possible. Therefore, a coding system was designed which would allow classification of data by program type and school number. The latter code was designed to identify each individual program rather than an area school since some area schools have more than one program of a single type within their administrative structure. A good example is the Eastern Iowa Community College (Area IX) at Bettendorf, which has a practical nursing program at their Davenport campus as well as at their Clinton campus.

The program type and school codes were designed such that it was possible to compare data from any single program with data from any or all other programs.

After the address form had been designed a companion data card format (Appendix B) and computer program were also designed which, after the addresses had been edited and key-punched onto regular 80 column data cards, could be used to process the addresses into mailing labels by use of the computer. Each individual address required a single computer card. In all, 3703 graduates for the years 1956 through 1969 were identified by the 47 individual programs. It was possible to establish a usable address for 3611 of the 3703 graduates.

It was known by some program coordinators that a portion of the addresses they could not obtain were for graduates who were deceased, who had moved and left no forwarding address, and in several cases, for graduates who were out of the country accompanying their spouse in the military service. In all, of the 92 graduates for whom addresses were not available, 13 were known to be deceased. It seems fair to assume 13 to be minimal and that a greater number of those for whom addresses could not be established were deceased.

SURVEY INSTRUMENTS

At the same time that graduates and addresses were being identified, the survey instrument was being designed. Several factors were pertinent to the design of the questionnaire. First, there were four different types of data conceived as important to the purposes of this particular follow-up study: (1) basic personal data, (2) educational rxperience data, (3) employment experience data, and (4) program

evaluation data. Second, it was considered important that respondees have an opportunity to express their personal attitudes, concerns, ideas and questions in an open-ended response manner. Third, it was necessary to keep the questionnaire short and concise, so that graduates would complete and return it. This, in light of the scope of the desired outcome, seemed nearly an impossible task. Finally, the questionnaire, because of the number involved, had to lend itself to easy and economical handling. Several questionnaire formats, ranging from machine scored to written response type, were considered and evaluated. After much study, and based on the intended uses of the data, it was decided that a machine scored system would not allow the open-endedness needed to obtain the information desired. The decision was made to use a questionnaire format which could be completed in most cases by check marks, and at the same time, allow short written answers where necessary.

Multiple mailings were planned to increase the rate of return. With this in mind, and because of the large number of graduates being surveyed, it was decided that the questionnaire should be designed in the form of a single sheet 11" x 17" printed on both sides and folded to form a four page 8-1/2" x 11" booklet. This booklet, during the folding process, was further folded so that after a mailing label had been affixed it could easily be inserted in a #10 window envelope.

The cover letter was printed on the front page of the booklet with a space for a mailing label and a block for name and address corrections. The graduates' I.D. number, program type, and school number were coded directly on the mailing label, so they could not become separated from the questionnaire. The questionnaire was divided into four major sections

as follows:

I. Personal Information

II. Educational Experience

III. Employment Experience

IV. Health Occupations Program Evaluation

In addition to these four major sections, two additional response areas were provided.

The potential need for a comprehensive study of the employers of Iowa's health occupation graduates was recognized. Because of this, on a strictly voluntary basis, each graduate was asked to supply the name of his or her employer. These names will be helpful in establishing a large pool of employers names for later use in identifying a sample for such a study.

From prior experience, it was known that many respondees like to express themselves beyond the limitations of a formal questionnaire. For this reason it was decided to provide a single insert sheet on which they could make whatever comments they wished without signing their name. Approximately 28% of the graduates returned written comments. In many cases, these comments helped confirm questionable or missing responses. Many of the comments were in the form of questions; part of which have been answered by project staff.

A copy of the complete questionnaire is provided for your review in Appendix B.

MAILING OF THE QUESTIONNAIRES

At the outset, it was planned to include in the study only those who had graduated from 1956 up through 1968. Since this included a period of 13 years, a return rate of 50% was considered to be as high as could be expected. To achieve the 50% return, three mailings of the questionnaire had been planned. Surprisingly, after only two of the planned three mailings, the anticipated return rate had been comfortably surpassed.

Due to unexpected delays in implementing this study, enough time had elapsed that the 1969 HOE classes had been graduated for nearly a year. After much consideration and careful study, it was decided that the inclusion of the 1969 graduates was by far more valuable to the purposes of the study than increasing the return rate by a few percentage points through a third mailing. This was particularly true since a validation procedure had been initially planned as a part of the study methodology.

After this decision, similar mailing procedures were followed for the 1969 graduates of Iowa's HOE programs. The inclusion of the 1969 graduates improved the study in three ways:

1. It enlarged the total study population.
2. It made the study current.
3. It expanded the scope of the study by the inclusion of three new types of programs that graduated their first classes in 1969. These are the orthopaedic assistant, environmental technician, and occupational therapy programs.

Questionnaires were mailed to all 3611 persons for whom a mailing address had been established. As a result of initial mailings (those graduates through 1968 and later, the 1969 graduates) a total of 361 or 10% of the questionnaires were returned marked "undeliverable." Two procedures were utilized to reduce the size of this undeliverable group.

First, all the "undeliverables" were sorted by program and year of graduation and listed on new copies of the original name and address form. To this was attached a second copy of the same form to provide a space for a new address or a permanent address of a parent, relative or friend. These forms were then returned to each program coordinator in hopes that they could identify more current addresses. The coordinators were extremely helpful and were able to find new addresses for many of the non-deliverable group.

Second, after receiving the new addresses from the coordinators, the project staff separated those for whom new addresses had been obtained and those for whom a new address could not be found. For those with a new address, a new address card was punched to replace the original. Those for whom a new address could not be obtained were then again sorted by program type. More than 90% of this group were graduates of practical and associate degree nursing programs. Since both practical and registered nurses must be licensed, the assistance of the State Board of Nursing was sought. The executive staff of the Board was very helpful in finding current addresses. The annual license renewal procedure provided an address which was less than one year old.

Again, these new addresses were punched onto cards and replaced the originals in the address file.

Approximately three weeks after the initial mailings, a second questionnaire was sent to those who had not yet returned a completed one and whose questionnaire had not been returned as "undeliverable." The undeliverable group was mailed a second questionnaire as soon as new addresses were identified.

On the second mailing, a new smaller group of questionnaires were returned as undeliverable. It was decided at this point not to attempt to locate new addresses for the remaining 404 graduates whose questionnaires had been returned as undeliverable.

There were a variety of reasons why addresses for the 496 graduates (92 for whom addresses could not be obtained and 404 "not deliverable") could not be obtained, among them are:

1. the graduate had been deceased;
2. the graduate had possibly moved from the state or country leaving no forwarding address;
3. the graduate, in the case of nursing, had not renewed their license;
4. the graduate had married and the name change had not been recorded on school and other records; and,
5. a variety of other similar reasons.

For the purposes of this study, it was determined that the total population being considered was the actual number of graduates reported by the coordinators, or 3703. Because of an inability to find a way to get a questionnaire to part of the group, 496 in all, the remainder of 3207 were considered to be a sample actually representing 86.1% of the

total population.

Of this sample of 3207 graduates, 2098 returned their questionnaires, amounting to an overall return rate of 65.4%. The remainder of this report will be considered to be based on a sample of 3207 graduates (see Table 2.1).

TABLE 2.1

SUMMARY OF QUESTIONNAIRE RESPONSE

Program Type	# of Grads. Reported by Coordinators	# for whom Address not Available	# of Questionnaires Mailed	# of Questionnaires returned undeliverable	# of Questionnaires Delivered	# of Questionnaires Completed and Returned	Percentages Returned
Pract. Nurse *(LPN)	3122	91	3031	359	2672	1774	66.4
Assoc. Deg. Nse. (ADN)	115		115	13	102	71	69.6
Operat. Rm. Tech. (ORT)	38		38	1	37	20	54.1
Med. Off. Asst. (MOA)	200	1	199	12	187	104	55.6
Med. Lab. Asst. (MLA)	100		100	7	93	57	61.3
Dent. Asst. (DA)	108		108	12	96	56	58.3
Orth. Tech. (OT)	6		6		6	4	66.7
Environ. Tech (ET)	4		4		4	3	75.0
Occup. Ther. Asst. (OTA)	10		10		10	9	90.0
TOTAL	3703	92	3611	404	3207	2098	65.4

*Note: The abbreviations following the program titles in the above table will be used throughout this report.

VALIDATION PROCEDURE

Studies involving the use of a mail questionnaire technique, because they depend on an individual to return the questionnaire, rarely achieve or even approach the goal of 100% response. Because of this fact, and because the population to be studied included graduates from as many as 13 years back, it was planned to compare a group of graduates who did not respond to the questionnaire with those who did in an effort to determine if there were significant reasons why the results of the study should not be projected to the total population. After much thought, it was decided that the best approach in this case was to select a random sample of the non-respondees and obtain as many responses to the questionnaire as feasible through the use of a personal telephone interview technique.

In the eyes of the project staff, there were certain variables contained in the original questionnaire which could reveal major differences between the two groups. It was felt that attitudes toward the H.O.E. program, as well as toward employment experiences, would be prime areas to compare for differences between the respondents and non-respondents. In all, it was decided that the responses of the two groups to eleven different variables would be compared. The eleven variables are:

1. Age
2. Marital Status
3. Relevance of initial employment
4. Level of satisfaction with initial employment

5. Number of jobs since graduation

6. Moved from Iowa

7. Relevance of most current employment

8. Level of satisfaction with most current employment

9. Non-health related employment since graduation

10. Current employment status

11. Level of satisfaction with H.O.E. program

In all, there were 1109 graduates who did not return the original questionnaire. It was decided to select a sample of approximately five percent of these which would amount to 55 graduates. The names to be called were selected at random from the 1109 non-respondents.

A procedure for conducting the interview was established to provide a high degree of uniformity among the individual interviews. The same person made all calls, recording responses to the appropriate questions on a copy of the original questionnaire. In all, 45, or 81.8% of the validation sample were contacted by telephone. Some of the remaining ten had unlisted numbers, some were accompanying their husbands in a foreign country while in the service and some, while their phone rang, were not home on several attempts made to reach them.

After completing the calls, all responses for the 45 were transferred to data cards and submitted to the same frequency counting procedure as the original respondees. Tables 2.2 through 2.12, which follow, compare the responses of the respondee group with those of the validation sample.

TABLE 2.2

AGE

	Respondents (N=2083)	Validation Sample (N=42)
	%	%
19 years and under	.6	
20-24	42.8	45.2
25-29	13.7	9.5
30-34	6.1	2.4
35-39	7.6	9.5
40-44	7.3	11.9
45-49	8.0	4.8
50-54	6.4	9.5
55-59	5.1	7.1
60-64	1.8	
65 years and over	.5	
Mdn. Age	26.6	26.5

TABLE 2.3

MARITAL STATUS

	Respondents (N=2082)	Validation Sample (N=42)
	%	%
Single	18.9	23.8
Married	69.5	66.7
Widowed	4.6	2.4
Separated or Divorced	6.8	7.1
Religious Order	.1	

TABLE 2.4

RELEVANCE OF INITIAL EMPLOYMENT

	Respondents (N=2083)	Validation Sample (N=45)
	%	%
Occupation for Which Prepared	96.7	95.6
Related Health Occupation	1.6	2.2
Other	.6	2.2
Never Employed	1.0	

TABLE 2.5

LEVEL OF SATISFACTION WITH INITIAL EMPLOYMENT

	Respondents (N=2053)	Validation Sample (N=45)
Value	%	%
Extremely Satisfied (5)	28.8	26.7
Quite Satisfied (4)	36.8	44.4
Satisfied (3)	25.7	20.0
Dissatisfied (2)	6.6	2.2
Very Dissatisfied (1)	2.0	6.7
$\bar{X}$ Satisfaction Level (Theoretical Mean = 3)	3.8	3.8

TABLE 2.6

NUMBER OF JOBS SINCE GRADUATION

	Respondents (N=2031)	Validation Sample (N=44)
	%	%
One	51.5	50.0
Two	29.6	34.1
Three	12.2	4.5
Four	3.5	6.8
Five	1.3	4.5
Six	.6	
Seven	.1	
Eight	.1	
Never Employed	1.1	

TABLE 2.7

MOVED AWAY FROM IOWA

	Respondents (N=2066)	Validation Sample (N=45)
	%	%
Yes	13.4	4.6
No	86.6	95.4

2774

TABLE 2.8

RELEVANCE OF MOST CURRENT EMPLOYMENT

	Respondents (N=2055)	Validation Sample (N=43)
	%	%
Occupation for Which Prepared	45.4	44.2
Related Health Occupation	2.3	2.3
Other	1.5	4.7
Only One Job	51.9	48.8

TABLE 2.9

LEVEL OF SATISFACTION WITH CURRENT EMPLOYMENT

		Respondents (N=934)	Validation Sample (N=18)
	Value	%	%
Extremely Satisfied	(5)	33.4	38.9
Quite Satisfied	(4)	37.8	44.4
Satisfied	(3)	22.9	11.1
Dissatisfied	(2)	4.7	5.6
Very Dissatisfied	(1)	1.2	
$\bar{X}$ Satisfaction Level (Theoretical Mean=3)		4.0	4.2

TABLE 2.10

NON-HEALTH WORK EXPERIENCE

	Respondents (N=2037)	Validation Sample (N=32)
	%	%
Yes	3.8	9.4
No	96.2	90.6

TABLE 2.11

CURRENT EMPLOYMENT STATUS

	Respondents (N=2037)	Validation Sample (N=45)
	%	%
Employed	77.9	93.3
Not Employed	22.1	6.7

TABLE 2.12

LEVEL OF SATISFACTION WITH HOE PROGRAM

		Respondents (N=2026	Validation Sample (N=45)
	Value	%	%
Extremely Satisfied	(5)	29.6	44.4
Quite Satisfied	(4)	44.3	40.0
Satisfied	(3)	23.5	13.3
Dissatisfied	(2)	2.2	2.2
Very Dissatisfied	(1)	.4	
$\bar{X}$ Satisfaction Level (Theoretical Mean=3)		4.0	4.3

2776

The purpose of the validation sample was to determine if the non-respondent group differed enough from the respondent group to preclude the projection of the findings of the study to the total population. It was recognized that even on two small samples of the respondent group there would be minor, or in some cases even major, differences in their responses. For this reason, only major differences and trends can be considered meaningful.

As can be seen from a close review of Tables 2.2 through 2.12, there is a great deal of similarity between the respondent and non-respondent groups. For the most part, the age and marital status of the two groups differs very little. The validation sample of non-respondents appears to have a few more younger and single members than the respondent group. This difference appears not to represent a major difference or trend.

With respect to employment, both groups again show much similarity with only two differences which deserve mention here. First, a slightly higher percent of the non-respondents have had non-health employment experience since graduation. Second, a higher percentage of the non-respondent group were currently employed. A third difference which can be noted is the higher percentage of the non-respondent group which has remained in Iowa.

Since the validation procedure was intended to identify major differences which might exist between the two groups, and percentage comparisons of the eleven variables were highly similar, it appeared that further statistical procedures were not necessary. For the purposes of this study, it seems sufficient to bear two factors in mind when reading this report:

1. The data regarding current employment status is probably under-representative of the actual employment status among the entire population of graduates and, for all practical purposes, can be considered minimal with respect to those who are currently employed.
2. The data regarding those graduates who have remained in the state is also probably under-representative of the actual situation which exists in the entire population of graduates, and also, for all practical purposes can be considered minimal with respect to the number of graduates who have remained in Iowa.

To satisfy the curiosity of the project staff, and to help determine a reason why some graduates did not return the questionnaire, each member of the validation sample was asked at the end of the interview if there was a particular reason why they did not return the questionnaire. Approximately 75% indicated they just did not take the time. Others misplaced it or simply forgot about it. No one indicated negative reasons why the questionnaire was not returned.

There seems to be no characteristic of the validation sample which is sufficiently different from the respondee group to preclude the projection of the findings of this study to its intended population; the graduates of Iowa's HOE programs. The reader, however, is reminded to bear in mind the two qualifications mentioned above as he reads this report.

CHAPTER 3

AN OVERVIEW OF THE PERSONAL CHARACTERISTICS OF IOWA'S HOE GRADUATES

Questions regarding certain personal characteristics possessed by the graduates of Iowa's HOE programs were included in the questionnaire for two purposes: (1) to provide an overview of their age, sex, marital status, and number of children; and, (2) for use in making comparisons with other data such as employment status. Chapter 3 contains the overview of personal characteristics determined by the study.

AGE

As of 1970, graduates ranged in age from 19 to 75 years, with a median age of 26.6 years and a mean of 32.3 years. This difference in median and mean is the result of a concentration of graduates in the younger age categories. Approximately 43% of all graduates since 1956 are 24 years of age or younger with 57.3% being 29 years of age or less. The age distribution of all graduates for each type of program is shown in Table 3.1 on the next page.

Comparison of age in 1970 with program type and year of graduation reveals a definite trend in practical nurse program enrollments. The 1970 median age of those who graduated in 1956 was 62.5 years. Subtracting the difference between 1970 and 1956, or 14 years, results in a median age at graduation for this group of about 49 years. The group that graduated in 1969 had a median age of 25.1 years; a difference of 23.9 years. In the early years, practical nurses were stereotyped as middle aged, and practical nurse programs attracted a large proportion of women who were

middle aged and older. This may have been true in the past, but the situation has changed steadily until many more young people just out of high school are entering this field. This same trend has been experienced, to a lesser degree, in the medical office assistant and associate degree nursing programs as well. Table 3.2 on the next page, shows the median and mean ages of the graduates in 1970, by year of graduation for each type of program.

TABLE 3.1

AGE OF GRADUATES IN 1970

N=	LPN (1771)	ADN (71)	ORT (20)	MOA (103)	MLA (57)	DA (56)	OT (4)	ET (3)	OTA (9)	ALL GRADS (N)
	%	%	%	%	%	%	%	%	%	%
19 & under	.2		5.0	3.9	3.5	3.6				.6 (13)
20 - 24	36.9	56.3	70.0	79.6	84.2	92.9	25.0	66.7	44.4	42.9 (897)
25 - 29	14.7	21.1	5.0	2.9	5.3	1.8	750.0	333.0	11.1	13.8 (289)
30 - 34	6.6	7.0	10.0	1.9	1.8				11.1	6.1 (128)
35 - 39	8.3	8.5		3.9		1.8				7.6 (158)
40 - 44	8.2	4.2	5.0	1.0						7.2 (151)
45 - 49	8.9	2.8	5.0	2.9	5.3				11.1	8.0 (167)
50 - 54	7.3			2.9					22.2	6.4 (135)
55 - 59	6.0			1.0						5.1 (107)
60 - 64	2.1									1.8 (38)
65 & over	.6									.5 (11)
Mdn. Age	29.4	24.4	23.2	22.9	22.8	22.5	25.0	20.5	28.5	26.6(2094)
$\bar{X}$ Age	34.4	27.1	25.8	25.4	24.4	22.7	27.0	22.3	32.6	32.3

TABLE 3.2

MEAN AND MEDIAN AGES OF ALL GRADUATES
BY PROGRAM TYPE AND YEAR OF GRADUATION

	LPN		ADN		ORT		MOA		MLA		DA		OT		ET		OTA	
	$\bar{X}$	Mdn	$\bar{X}$	Mdn	$\bar{X}$	Mdn	$\bar{X}$	Mdn	$\bar{X}$	Mdn	$\bar{X}$	Mdn	$\bar{X}$	Mdn	$\bar{X}$	Mdn	$\bar{X}$	Mdn
1956	62.5	62.5																
1957	42.5	40.0																
1958	54.7	56.5																
1959	49.2	51.9																
1960	45.6	46.9																
1961	44.4	47.5																
1962	39.8	36.3																
1963	39.1	37.9																
1964	38.4	32.1																
1965	36.7	28.9	30.6	28.4			36.7	35.0										
1966	32.7	28.6	28.1	27.0			22.5	22.5	22.5	22.5								
1967	34.4	26.2	27.5	26.3			30.0	23.8	23.0	23.1	22.5	22.5						
1968	31.7	24.7	26.3	23.3	25.0	22.9	25.1	23.0	25.3	23.0	22.6	22.6						
1969	31.1	25.1	26.2	23.4	26.3	23.6	23.2	22.4	23.7	22.3	22.4	22.4	27.0	25.0	22.3	20.5	32.6	28.5
All Grads.	34.4	29.4	27.1	24.4	25.8	23.2	25.4	22.9	24.4	22.8	22.7	22.5	27.0	25.0	22.3	20.5	32.6	28.5

2781

SEX

Few men appear to be attracted to HOE programs in Iowa. One could speculate several reasons why this is true. Salary, status and job security may all be factors. Health occupations, at least those for which educational programs exist in our state, remain to be predominantly women's occupations. Only two percent of the respondees were males. This is very much in keeping with enrollment data taken from official records of the Iowa Department of Public Instruction which show that the first male students were enrolled in 1962 and since that time, have comprised slightly less than three percent of all HOE enrollments. The number of male enrollments has shown a very small expansion trend over the years to where in 1970, 3.9% of the enrollment in HOE programs in the state were males. See Table 3.3 on the next page.

MARITAL STATUS

More than 69% of the graduates were currently married at the time of the survey. Another 11.6% had been widowed, separated, or divorced. Nineteen percent of the group were single. Table 3.4 shows the marital status for each type of program.

TABLE 3.4

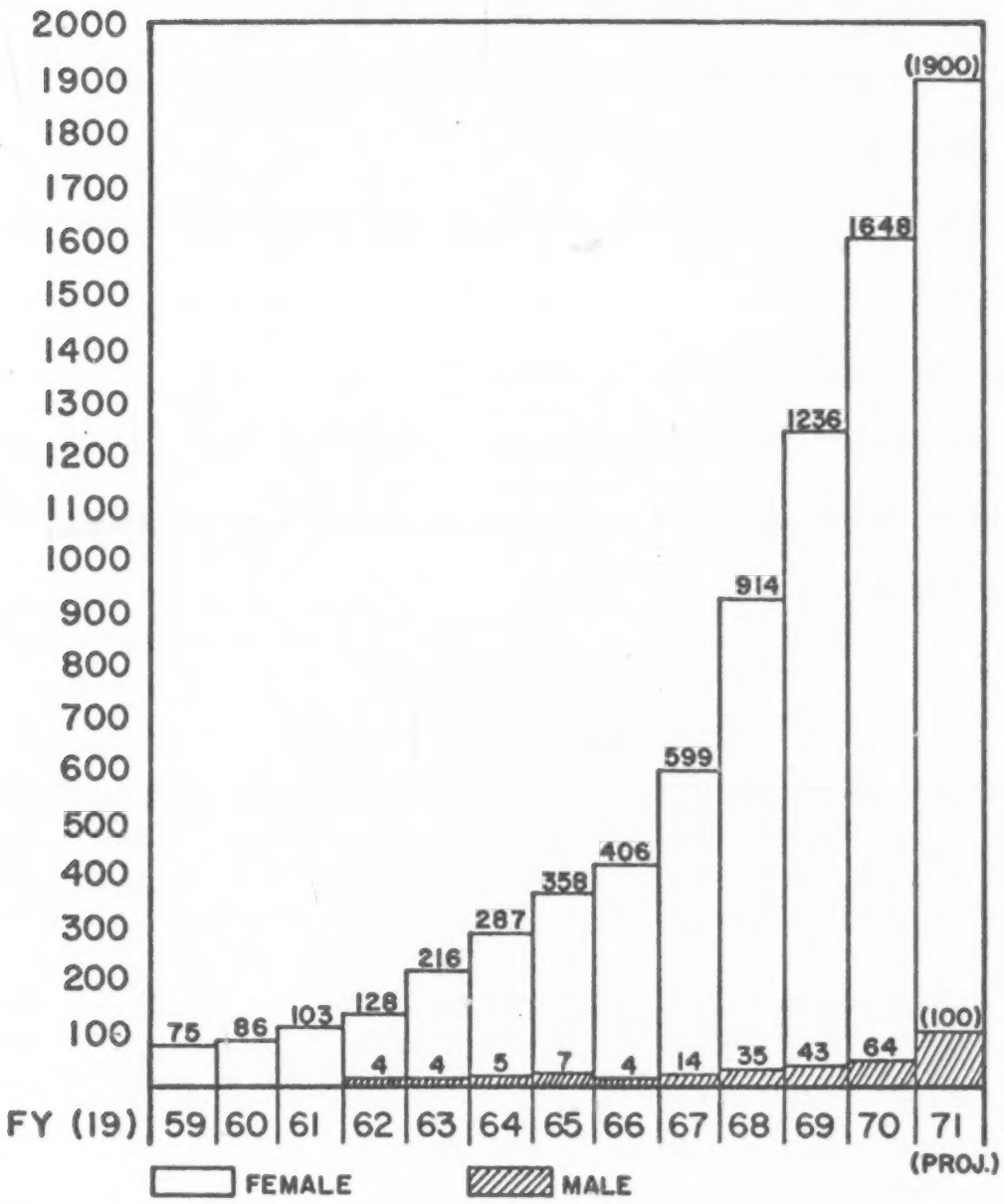
MARITAL STATUS

N=	LPN (1771)	ADN (71)	ORT (20)	MOA (102)	MLA (57)	DA (56)	OT (4)	ET (3)	OTA (9)	ALL GRADS. (2093)
	%	%	%	%	%	%	%	%	%	%
Single	15.4	26.8	55.0	46.1	40.4	42.9	25.0		11.1	19.0 (398)
Married	71.7	69.0	40.0	52.9	56.1	57.1	25.0	100.0	55.6	69.4(1453)
Widowed	5.4				1.8					4.6 (96)
Sep. or Div.	7.6	4.5	5.0	1.0	1.8		50.0		33.3	7.0 (146)

TABLE 3.3

HEALTH OCCUPATIONS EDUCATION IN IOWA

ONE AND TWO YEAR PREPARATORY PROGRAMS
ENROLLMENTS FY 1959-71



CHILDREN

Because the health occupations have generally remained women's occupations, it was felt that family responsibilities and young children in the home might be major factors among those graduates who were unemployed at the time of the survey. For this reason, two different items relating to family size were included in the questionnaire. The first elicited the total number of children and the second sought the number of children under six years of age.

The number of children reported by the graduates ranged from one to more than eight. In all, more than 63% of the graduates had at least one child, over 15% had four or more.

Approximately 29% of all graduates reported that one or more of their children were under six years of age. A few had as many as four under six. See Tables 3.5 and 3.6.

TABLE 3.5

TOTAL NUMBER OF CHILDREN

N=	LPN (1706)	ADN (70)	ORT (20)	MOA (102)	MLA (55)	DA (52)	OT (3)	ET (3)	OTA (8)	ALL GRADS. (2019)
	%	%	%	%	%	%	%	%	%	%
One	19.2	22.9	10.0	12.7	14.5	9.6		33.3	25.0	18.6 (375)
Two	19.3	7.1	5.0	5.9	5.5				12.5	17.1 (345)
Three	13.7	8.6	5.0	6.9	1.8	1.9	33.3		12.5	12.4 (251)
Four	9.4	2.9	5.0	2.9						8.3 (167)
Five	3.9	4.3	5.0							3.5 (70)
Six	2.2									1.8 (37)
Seven	1.0									.8 (17)
Eight or more	1.2	1.4	5.0							1.1 (22)
None	30.2	52.9	65.0	71.6	78.2	88.5	66.7	66.7	50.0	36.4 (735)

TABLE 3.6

NUMBER OF CHILDREN UNDER 6 YEARS

N =	LPN (1647)	ADN (66)	ORT (20)	MOA (100)	MLA (54)	DA (51)	OT (3)	ET (3)	OTA (7)	ALL GRADS
	%	%	%	%	%	%	%	%	%	%
One	20.2	25.8	25.0	13.0	14.8	9.8		33.3	14.3	19.6 (382)
Two	8.3	3.0		1.0	1.9					7.2 (140)
Three	1.8	1.5		1.0			33.3			1.6 (32)
Four	.3									.3 (5)
None	69.5	69.7	75.0	85.0	83.3	90.2	66.7	66.7	85.7	71.4(1392)

PREVIOUS HEALTH EXPERIENCE

As might be expected, more than half the graduates had been associated in some way with the health occupations prior to enrollment in an HOE program. For most, this was through employment in a health occupation which did not require licensure; or, for that matter, formal preparation. For others, this previous health experience was in the form of volunteer work and student clubs.

The greatest proportion of graduates having previous health experience are found in the practical nurse (61.2%), the associate degree nurse (52.9%), and the occupational therapy assistant (66.7%) programs. The remainder of the programs ranged from 25% to 50% of their graduates having prior health experience.

More than 45% of all graduates had been employed as a nurse aide or orderly, which is by far the most common type of previous health experience. This is true to even a greater degree in practical nursing where 50% of the graduates have been nurse aides. Other than this, no distinct discernable pattern exists revealing the type of health experience which

might lead to choosing specific health occupations education programs. As can be seen from Table 3.7, persons with specific types of background went into a variety of HOE programs.

TABLE 3.7

TYPE OF PREVIOUS HEALTH OCCUPATIONS EXPERIENCE BY PROGRAM TYPE

	LPN	ADN	ORT	MOA	MLA	DA	OT	ET	OTA	ALL GRADS
N =	(1760)	(70)	(20)	(102)	(57)	(56)	(4)	(3)	(9)	(2081)
	%	%	%	%	%	%	%	%	%	%
Nse.Aide-Orderly	50.1	37.1	30.0	14.7	5.3	8.9			33.3	45.2 (940)
Vol. Worker	5.6	5.7	15.0	7.8	3.5	5.4			22.2	5.8 (121)
Dietary Serv.	.2	1.4		1.0		1.8				3.0 (7)
Cler.-Secretary	1.3	2.9		2.9	3.5	1.8				1.5 (31)
Home-Health-Child	.8								11.1	.7 (15)
Nsg.Home Operator	1.0									.9 (18)
Stud.-Other Prog.	.3	1.4								.3 (6)
Oper. Room Tech.	.3	1.4	5.0							.3 (7)
Med. Assist.	.1									.1 (2)
EKG Technician	.05									.05(1)
Dental Assist.	.5		5.0		1.8	5.4				.7 (14)
X-ray Tech.	.2									.1 (3)
Med. Lab. Aide	.05	2.9			7.0			33.3		.4 (8)
O.B. Tech.	.05									.05(1)
Phys.Therapy Aide	.2									.1 (3)
Blood Bank	.05									.05(1)
Mil. Corpsman	.1						25.0			.1 (3)
Orthoped. Asst.							25.0			.05(1)
None	38.8	47.1	45.0	73.5	78.9	76.8	50.0	67.7	33.3	43.2 (899)

CHAPTER 4

EMPLOYMENT CHARACTERISTICS OF THE GRADUATES

One purpose of this follow-up study was to determine basic employment habits and successes of the graduates of Iowa's HOE programs. These programs, have as their central purpose the preparation of well qualified persons for employment in the health care industry. Their success, in part, can be measured by the success their students have in obtaining and retaining employment. Information of this nature is extremely valuable for several purposes. First, it can be valuable to program faculties in program evaluation. Second, it is valuable to both the preparer and the user of health personnel in attempting to assess supply-demand factors in the health occupations. Third, it is extremely valuable to educational policy makers who find themselves faced with making important decisions regarding educational program and budgeting priorities. And finally, this information should be made available to the public, who in fact support our educational programs, so that they may be better informed of what their tax dollars are producing in terms of prepared health workers.

This study is the first over-all follow-up of Iowa's HOE graduates since the first program began in 1953. Therefore, it was determined that an attempt should be made to gather longitudinal employment data as well as placement success. Much insight regarding employment trends, etc. can be gained from basically identical information about the graduates' initial employment situation and their current or most current

2787

one. Of primary interest were: the relevance of each job to the graduates' educational program; salary; type of institution in which the employment was secured and as appropriate, the size; the geographic location of the employment in relation to their educational program; their tenure; and, the level of satisfaction with employment experiences. These variables reveal much about the employment patterns of the graduates and success of the program in preparing health practitioners.

It is recognized that a questionnaire survey of graduates provides only a partial picture of the success of the graduates in their employment experiences. A second, and extremely important measure of success is employer satisfaction, or their evaluation of graduate performance in their institution. This type of study requires a more complicated technique than this follow-up and for that reason is envisioned as a separate but important phase of over-all evaluation. These two forms of follow-up are complementary and necessary to provide over-all insight into the success of educational programs.

INITIAL EMPLOYMENT AFTER GRADUATION

Relevance of First Employment

A very high percentage of the graduates obtained their initial employment after graduation in the occupation for which they were prepared. This was true for 96.9% of all graduates since 1956. Another 1.6% obtained their first employment in an occupation related to their field of training. Less than one-half per cent were initially employed in a non-health occupation after graduation.

Only one per cent of the graduates have never been employed since graduation. This is such a small percentage of the graduates that it can be considered negligible. A change in family situation, personal health or other similar factor could easily account for this samll group of the graduates which have never been employed. See Table 4.1.

TABLE 4.1

RELEVANCE OF INITIAL EMPLOYMENT
BY PROGRAM TYPE

	(N)	Occupation For Which Prepared	Related Occupation	Non-Health Occupation	Never Employed
		%	%	%	%
LPN	(1771)	97.9	1.0	.2	1.0
ADN	(71)	98.6	1.4		
ORT	(20)	95.0			5.0
MOA	(103)	85.4	11.7	1.9	1.0
MLA	(57)	96.5	1.8		1.8
DA	(56)	91.1	3.6	5.4	
OT	(4)	100.0			
ET	(3)	33.3	33.3		33.3
OTA	(9)	44.4	11.1	44.4	
All Grads.	(2094)	96.7	1.6	.6	1.0

The situation with regard to initial employment varies somewhat among the various program types. The practical nursing, associate degree nursing, operating room technician and medical laboratory assistant programs all had more than 95% of their graduates employed in the occupations for which they were prepared. The 85% for the medical office assistant graduates is somewhat misleading since the content of the medical assistant program could easily be applied to a variety of other

closely realted health occupations. A review of the MOA graduates working in related health occupations revealed that among this group, one was working as a medical laboratory assistant, five were working as ward secretaries, one as a medical secretary and one as a veterinarian's assistant. These occupations are all very closely related and for all practical purposes, the graduate would apply a significant portion of the knowledge and skills learned in the HOE program attended. In this sense, the 85% would appear to be somewhat under-representative of the percentage of MOA graduates actually employed in the "occupation for which they were prepared."

Of the more established programs, the dental assistant program had the highest level of non-health related initial employment among its graduates, 5.4%. Another 3.6% were working in health related occupations. The data are not conclusive as to what factors may have been at work in this situation. However, it is revealed in the data that slightly over 10% of the dental assistant graduates have entered a college in a non-health field since graduation. While for some, this may simply be a desire to pursue general education in addition to their dental assistant preparation, it may also indicate that a portion of the graduates were dissatisfied with their occupational choice, the program they attended or the employment opportunities that existed.

Because of the newness of the orthopaedic technician, environmental technician and occupational therapy assistant programs, only one class had been graduated from each prior to the survey. While the number of graduates from these programs was small, they <u>were</u> included in the survey to gain some insight into their initial experience, however limited.

There were six graduates of the environmental technician program in 1969. Each was sent a questionnaire, with four or 75% returning them. All four of the respondees were working as orthopaedic technicians in their initial employment after graduation.

The environmental program graduated only four students in the first class. Three or 75% returned their questionnaires. Placement was not as good at least at the time the survey was conducted, in this program. Of the three respondees, only one had obtained employment in the environmental field. One was not able to find employment in his immediate area and the third, had enrolled in a university for further preparation in the field of Industrial, Traffic and Safety Education.

The occupational therapy assistant program also experienced a lower level of success in placement of its graduates. Of the 10 who graduated in 1969,nine or 90% returned their questionnaires. As can be seen in Table 4.1, only four or 44.4%, were placed as occupational therapy assistants at the time of the survey. One person obtained initial employment in a social services position which she felt closely related to her training. Four of the respondees had taken positions outside the health field. These included the following: one telephone operator; one teacher's associate; and two sales clerks, one each in jewelry and women's apparel. Concern was expressed on the part of some of the graduates who were not able to find employment as OTA's for the lack of recognition of the assistant role shown by employers.

Of all those entering employment after graduation, 93.2% entered full-time positions. By program type, this figure ranged from 92.2% to 100%. Only 6.8% of those entering employment entered on a part-time

basis. This latter figure was somewhat higher (between 7-8%) for practical nursing and associate degree nursing programs than for others. This is probably due to the size, greater staffing needs and staffing patterns inherent in the hospital setting where most of the nursing graduates are employed.

Time Lapse Between Graduation and Employment

In general, HOE graduates spend very little time securing initial employment. Eighty-five per cent of all graduates from 1956 through 1969 entered their initial employment within one month after graduation. The one month figure ranged from the low of 55.5% for the occupational therapy assistants graduates to 100% for the orthopaedic technician and environmental technician programs as shown in Table 4.2.

TABLE 4.2

TIME LAPSE BETWEEN GRADUATION
AND INITIAL EMPLOYMENT

	LPN	ADN	ORT	MOA	MLA	DA	OT	ET	OTA	ALL GRADS	
	%	%	%	%	%	%	%	%	%	%	(N)
1 mo. or less	85.8	91.0	76.2	77.2	85.7	90.7	100.0	100.0	55.5	85.1	(1723)
1 - 2 mo.	8.2	1.5	9.5	7.9	3.6	5.6				7.7	(156)
2 - 3 mo.	2.3	3.0	4.8	8.9	3.6					2.7	(54)
3 - 6 mo.	2.1	1.5		3.0	7.1	3.7			11.1	2.3	(46)
6 - 12 mo.	1.2	1.5	9.5	2.0						1.2	(25)
12 - 24 mo.	.5	1.5		1.0					33.3	.7	(14)
2 - 5 yrs.	.3									.3	(5)
5 yrs. or more	.1									.05	(1)
N=	(1710)	(67)	(21)	(101)	(56)	(54)	(4)	(2)	(9)		(2024)

272

As can be seen from the table, virtually all of the graduates (97.8%) who entered employment did so within a six month period of time. Reasons for delays in entering employment were not elicited in the survey. So few graduates let more than six months lapse between graduation and beginning their initial employment, that it would seem reasonable to assume for the most part, that such factors as pregnancy, marital plans, illness and other similar factors were involved in the few delays in employment.

Where Graduates Were Employed -- Initial Employment

General hospitals have been the primary employers of the graduates, and in this sense, they and the patients they serve have been the primary benefactors of the over-all HOE program in the state. These institutions have employed graduates of the practical nursing, associate degree nursing, medical assisting, medical labaoratory assisting, operating room technician, orthopaedic technician, and occupational therapy assistant programs. The only programs from which general hospitals have not employed graduates are the dental assisting and environmental technician programs; fields for which employment opportunities rarely exist in the general hospital. Over the past 14 years, more than 70% of all HOE graduates obtained their initial employment in general hospitals.

The next most common resource utilized by graduates for employment are nursing homes and other extended care facilities (ECF's). Just under fifteen percent of the graduates obtained their initial employment in this type of institution. Where one might, on first thought, expect

a greater percentage of the graduates to be employed in these institutions, it would be in order to consider the available opportunities there. The primary opportunity would be for graduates of the two nursing programs. Opportunities on a more limited basis exist for rehabilitation personnel. Few ECF's have their own laboratories and hence the opportunity for employment of lab personnel.

With this in mind, looking only at the figures for the two nursing programs in Table 4.3, it can be seen that only 16.3% of these graduates have been employed in nursing homes and ECF's. Percentage-wise more practical nurse (16.5%) than associate degree nurse graduates (10%) were employed in ECF's. Within this group are several persons who previously were proprietors, or spouses of proprietors, of nursing homes who for reasons related to legal approval, chose to complete nurse training for the purpose of meeting approval criteria. Because of this, it is fair to say that even fewer graduates than is revealed in the data, chose to work in nursing homesand ECF's. This is an important finding in that Iowa has a large "senior-citizen" population and the number of ECF beds has increased tremendously during recent years. At this time, the need for more LPNs has continuously been expressed by nursing home managers. Serious consideration should be given to the development of programs to encourage LPN and ADN graduates to seek employment in these institutions.

The remaining 14.6% of the graduates obtained their initial employment in a variety of other settings as shown in Table 4.3.

TABLE 4.3

TYPE OF INSTITUTION -- INITIAL EMPLOYMENT
OF GRADUATES EMPLOYED IN THE OCCUPATION
FOR WHICH THEY WERE PREPARED

N =	LPN	ADN	ORT	MOA	MLA	DA	OT	ET	OTA	ALL GRADS
	%	%	%	%	%	%	%	%	%	%
General Hosp.	74.9	84.3	100.0	17.0	75.0		50.0		20.0	70.6
Spec. Hosp.	5.1	1.4		4.0					20.0	4.7
Nsg.Home-ECF	16.5	10.0		6.0		2.0			20.0	14.8
Pub. Health	.3			1.0				100.0		.5
Private Duty	.9	1.4								1.0
Dent.Off.& Clin.	.1					94.0				1.7
Dent. Lab.					1.8	4.0				.2
Med.Off.& Clin.	1.7	2.9		72.0	17.9		50.0			6.0
Armed Forces					1.8					.05
Sch. Nursing	.4									.3
Comm. Med. Lab.					3.5					.05
Rehab. Center	.1								20.0	.1

Of interest to health occupations education program planners is the size of institutions which employed the graduates, particularly hospitals and nursing homes where the majority were employed. To determine this, a question eliciting the bed size (number of patient beds, excluding bassinettes) was included in the questionnaire. A review of the data showed that those responding to this question, while responses came from all programs but the environmental technician program, were primarily graduates whose initial employment was either in general hospitals, specialized hospitals or in nursing homes and ECF's. See Table 4.4.

TABLE 4.4

TYPE OF INSTITUTION BY SIZE OF INSTITUTION --
INITIAL EMPLOYMENT

N =	0-25	26-49	50-99	100-149	150-199	200-299	300-399	400-499	500 & over	(N)
	%	%	%	%	%	%	%	%	%	
Gen.Hosp.	.8	7.5	11.7	15.1	11.2	17.9	16.2	5.2	14.4	(1332)
Spec.Hosp.		2.7	12.0	8.0	4.0	5.3	10.7	4.0	53.3	(75)
Nsg.Homes & ECFs	16.3	23.1	38.4	10.5	7.5	3.1	.3		.7	(294)
Other	42.8	14.3	14.3				14.3		14.3	(7)
All	3.7 (62)	10.2 (171)	16.7 (279)	14.2 (238)	10.4 (174)	15.0 (251)	13.4 (226)	4.3 (72)	11.9 (235)	100 (1708)

The bed size of general hospitals ranged from less than 25 beds to more than 500; specialized hospitals from 26 beds to more than 500; and, nursing homes, like general hospitals, also ranged from less than 25 to more than 500 beds. The other category includes three persons who indicated they do private duty nursing on a regular basis in specific institutions, three persons employed in state children's homes or schools and one person employed in a rehabilitation center which evidently has provision for infirm care.

Iowa has a large number of small hospitals. According to the Iowa Hospital Association (IHA) approximately 70% of the 142 general acute care hospitals in the state are less than 100 patient beds in size. As shown in Table 4.4, the distribution of the size hospitals in which HOE graduates obtain their initial employment is not proportionate to the distribution of hospital sizes existing in the state. See Table 4.5.

TABLE 4.5

INITIAL EMPLOYMENT HOSPITAL SIZE COMPARED TO THE GENERAL DISTRIBUTION OF HOSPITAL SIZE IN IOWA

Bed Size of General Hospitals	% of Graduates Employed In Each	Hospitals in Iowa By Bed Size
0-50	13.9	47.2
51-100	16.7	22.5
101-200	24.6	13.4
201-400	28.4	13.4
401 & over	16.2	3.5

These data indicate that most graduates are initially employed in larger hospitals. In fact, while 70% of the hospitals in Iowa are less than 100 beds in size, only 30% of thegraduates are initially employed in these institutions. Several factors, such as geographic proximity of certain size clinical facilities to the HOE programs, less flexibility in scheduling in smaller hospitals and other similar factors too numerous to mention here, can influence these facts. Even though fewer employment opportunities exist in small institutions, program faculties may need to evaluate their placement statistics to determine if reasons why graduates do not seek employment in the smaller hospitals exist when, in fact, employment opportunities may exist there. If this is the case, it may be wise to plan clinical experiences in smaller institutions to familiarize students with them.

Approximately eleven hospitals, more appropriately considered as long-term care facilities, were not included in the above figures by the IHA, and therefore, are not reflected in Table 4.5. These institutions include for example, the state mental institutions and state children's

schools. Any influence on the statistics in this table caused by their omission should be minor.

Location of Initial Employment

To identify how far students travel for their initial employment, it was decided to use the institution where they received the major portion of their clinical experience as a point of reference. This reference was chosen since it has been commonly accepted by health career educators that many students remain at their primary clinical agency for their initial employment.

Much discussion has been given the mobility of HOE graduates. It has been said that students should be prepared for regional and even national labor market demands, not on a local and state basis. Data resultant from this follow-up study is not sufficient in depth to lend credence to any particular aspect of this type of discussion. However, it does provide insight into the mobility of past graduates between graduation and their employment experiences.

It is obvious that graduates of HOE programs, whatever the reason , have not strayed very far from the institution in which they had the greatest portion of their clinical experience while in training. While Table 4.5 shows that a smaller portion (20.9%) stay in their primary clinical location for initial employment than previously believed to be true, it reveals that almost 72% take employment within 25 miles of that institution. Over 82% take their initial employment within 50 miles. See Table 4.6.

TABLE 4.6

LOCATION OF INITIAL EMPLOYMENT IN RELATION
PRIMARY CLINICAL AGENCY FOR GRADUATES EMPLOYED
IN THE OCCUPATION FOR WHICH PREPARED

N=	LPN (1729)	ADN (70)	ORT (19)	MOA (88)	MLA (55)	DA (50)	ORT (4)	ET (1)	OTA (5)	All Grads.	N (2021)
	%	%	%	%	%	%	%	%	%	%	
Same Cl.Agcy.	20.5	35.7	26.3	23.9	10.9	20.0	25.0			20.9	(422)
Same City	42.9	27.1	36.8	46.6	25.5	48.0				41.9	(846)
Less than 25 mi.	9.3	4.3		8.0	3.6	8.0			25.0	8.7	(176)
25 - 49 mi.	11.0	5.7		9.1	14.5	8.0			50.0	10.7	(216)
50 - 99 mi.	9.4	5.7		5.7	18.2	6.0		100.0		9.3	(188)
100-199 mi.	3.4	7.1	10.5	2.3	12.7	8.0	25.0		25.0	4.0	(81)
200-299 mi.	1.9	5.7	10.5	2.3	3.6					2.1	(43)
300 mi. or more	1.7	8.6	15.8	2.3	10.9	2.0	50.0			2.4	(49)

Table 4.6 is categorized by program type simply to give the reader an opportunity to study the geographic distance between the primary clinical agency and initial employment for each type of program. Because many of the factors influencing employment of graduates vary by program type, comparison between programs would be meaningless.

Table 4.6 deals only with those students who obtained their initial employment in the occupation for which they were prepared. For purposes of comparison, Table 4.7 shows the same distance statistics for three different groups: 1) those who obtained initial employment in the occupation for which they were prepared, 2) those who entered a related occupation, and 3) those who entered a non-health occupation.

It can be seen that a slightly greater tendency exists for those entering related occupations to travel further from their clinical agency. This is true, to even a greater degree, of those entering

non-related occupations.

These data simply point out that HOE graduates take their initial employment relatively close to the location of their primary clinical agency. The data provide no sound reason for this fact. Health occupations educators and educational administrators should however, take this into consideration as they plan for new and expanding programs. See Table 4.7.

TABLE 4.7

LOCATION OF INITIAL EMPLOYMENT IN RELATION TO PRIMARY CLINICAL AGENCY BY RELEVANCE OF THAT EMPLOYMENT

Proximity N=	Occupation For Which Prepared (2021)	Related Occupation (33)	Non-Health Occupation (10)
	%	%	%
Same Clin. Agcy.	20.9	6.1	
Same City	41.9	39.4	40.0
Less than 25 mi.	8.7	24.2	10.0
25 - 49 mi.	10.7	6.1	10.0
100 - 199 mi.	4.0		10.0
200 - 299 mi.	2.1		
300 mi. or more	2.4	9.1	20.0

Beginning Salaries

Salary level expectancy is of primary importance to prospective health occupations students and program faculty and administrators alike. The purpose of this section is not to compare salaries in the health occupations with other occupational fields, but rather to report descriptively the beginning salaries of past graduates.

To provide a reasonable index, salary data were based on the equivalent of the gross monthly check before deductions were taken out.

This approach eliminates such factors as number of dependents and other deductions which would alter "take home" unequally among the respondees, and provides a meaningful measure applicable to all graduates. Monthly salary ranges were provided on the questionnaire as follows: 1) less than $240, 2) $240-319, 3) $320-399, 4) $400-470, 5) $480-559, 6) $560-640, and 7) $640 and over.

Since salary expectancy is important to those who are entering a health occupation, salary figures included in this section are based on those graduates who actually entered initial employment in the field for which they were prepared. Also, because there were so few working part-time and such a variance in the number of hours worked, all data are based on those employed full time. Table 4.8 is provided to show an overview of the salary level of all graduates meeting the above criteria included in the follow-up study. One must bear in mind that these data include graduates from 1956 through 1969, and therefore, do not take into account growth trends in beginning salaries. See Table 4.8.

In Table 4.9 the salary distribution of all HOE graduates employed in the field for which they were prepared is compared to those who were employed in a health related occupation and those who were employed in a non-health related occupation.

As can be seen from this table, there was a tendency toward lower salaries for those graduates employed initially in related and non-health occupations. See Table 4.9

TABLE 4.8

BEGINNING SALARIES OF GRADUATES WHO ARE EMPLOYED FULL TIME IN THE OCCUPATION FOR WHICH THEY WERE PREPARED

Beginning Salary N=	LPN (1542)	ADN (63)	ORT (19)	MOA (81)	MLA (54)	DA (51)	ORT (4)	ET (1)	OTA (4)	ALL GRADS (1819)	
	%	%	%	%	%	%	%	%	%	%	(N)
Under $240	15.0	1.6		9.9	1.9	7.8			25.0	13.5	(246)
$240 - 319	37.6	11.1	15.8	58.0	11.1	66.7				37.2	(677)
$320 - 399	33.5	15.9	52.6	30.9	46.3	25.5			50.0	33.1	(602)
$400 - 479	12.7	12.7	31.6	1.2	35.2				25.0	12.7	(231)
$480 - 559	.6	36.5			5.6		75.0	100.0		2.2	(40)
$560 - 639	.1	22.2					25.0			.9	(17)
Self-Employed	.4									.3	(6)
Mdn.Salary	$314	$499	$372	$296	$384	$291	$533	$520	$360	$318	

TABLE 4.9

BEGINNING SALARIES OF ALL GRADUATES EMPLOYED FULL TIME BY RELEVANCE OF INITIAL EMPLOYMENT

N =	Occupation For Which Prepared (1819)	Related Occupation (34)	Non-Related Occupation (11)
	%	%	%
Less than $240	13.5	23.5	36.4
$240 - 319	37.2	29.4	36.4
$320 - 399	33.1	8.8	27.3
$400 - 479	12.7	8.8	
$480 - 559	2.2		
$560 - 639	.9		
$640 or more		2.9	
Self Employed	.3	26.5	
Mdn. Salary	$318	$312	$270

To provide a clearer picture of how beginning salaries have changed over the years, Table 4.10 shows the median salary for each type of program and each year's graduates. It was not until 1967 that the median salary reached the $300 to $400 per month range. The 1969 medians ranged from $299 for dental assistants to $553 for ADN nurses. Only the dental assistant median was below the $300 level. See Table 4.10.

TABLE 4.10

MEDIAN BEGINNING SALARIES OF GRADUATES WORKING FULLTIME IN THE OCCUPATION FOR WHICH THEY WERE PREPARED

Year of Graduation	LPN	ADN	ORT	MOA	MLA	DA	ORT	ET	OTA
1969	$378	$553	$384	$316	$420	$299	$533	$520	$360
1968	355	511	360	284	382	282			
1967	330	440		280	370	280			
1966		320		-240	294				
1965	278	320		253					
1964	267								
1963	252								
1962	268								
1961	243								
1960	269								
1956-59	-240								

Tenure in Initial Employment

The mean length of tenure in the initial employment situation for all graduates is approximately 2.8 years. More than a third of the HOE graduates left their initial employment within one year. Another 56% left their job within five years. Only 6.1% of all graduates remained in their initial employment setting for more than five years.

There are many reasons why this relatively low tenure on initial employment exists. Appropriate data were not collected to determine the reasons, but one could speculate that marriage, pregnancy, husband transferred and illness would be among those given by graduates. As will be noted in later sections of this report, this relatively short tenure seems not to have much relationship to current employment status. See Table 4.11 for the distribution of tenure scores for each type of program.

TABLE 4.11

TENURE IN INITIAL EMPLOYMENT

N=	LPN (1699)	ADN (69)	ORT (19)	MOA (96)	MLA (55)	DA (54)	OT (4)	ET (2)	OTA (7)	ALL GRADS (2005)	
	%	%	%	%	%	%	%	%	%	%	N
Less than 1 year	1.1	2.9	5.3	3.1	5.5	7.4			14.3	1.7	(33)
1-6 mo.	14.7	24.6	5.3	18.8	16.4	11.1		50.0	14.3	15.1	(302)
6-12 mo.	21.3	15.9	15.8	19.8	23.6	18.5			14.3	20.9	(419)
1-2 yrs.	31.9	39.1	73.7	50.0	45.5	59.3	100.0	50.0	57.1	34.8	(697)
2-3 yrs.	14.1	8.7		4.2	7.3	3.7				12.7	(255)
3-5 yrs.	9.8	7.2		3.1	1.8					8.7	(175)
5-7 yrs.	3.7	1.4		1.0						3.2	(65)
7-9 yrs.	1.8									1.5	(30)
9-11 yrs.	1.2									1.0	(20)
11 yrs. and over	.5									.4	(9)

Satisfaction with Initial Employment

An important index of success for a program which prepares people for employment is the level of satisfaction those people feel for the program they complete and the work they obtain after graduation. To provide this index, questions asking the graduate how satisfied they

were with their first job, their current or most recent job, and their educational program were included in the questionnaire. Foils to these questions were arranged on a continuum and weighted as follows: 5 - extremely satisfied, 4 - quite satisfied, 3 - satisfied, 2 - dissatisfied, 1 - very dissatisfied.

The respondee was expected to make a judgment as to how satisfied he was with his initial employment situation. The theoretical mean, or the expected mean value if there were an equal number of responses to all five choices is three (3). The actual mean satisfaction level for all graduates was 3.84. By program type, the mean satisfaction level ranged from the lowest at 3.22 to the highest at 4.50. The distribution of the satisfaction values for the initial job of these graduates is shown in Table 4.12 on the next page.

The data reveal a high level of satisfaction with initial employment. In no instance is the satisfaction mean for a particular program less than three, the theoretical mean. From a proportion standpoint, only 8.6% of all graduates even indicated any dissatisfaction with their initial employment while 28.8% indicated they were "extremely satisfied." Only two percent were "very dissatisfied."

Reasons for dissatisfaction were not sought. However, it seems within reason to assume that among the 8.6% who expressed dissatisfaction, some did so for reasons such as: unsatisfactory hours, weekend work requirements, personality problems, and other similar reasons. It is impossible from the data to speculate the proportion who expressed dissatisfaction because they were unhappy with their career choice, they felt inadequately prepared or other similar causes.

TABLE 4.12

LEVEL OF SATISFACTION WITH INITIAL EMPLOYMENT

	N =	LPN (1726)	RN (71)	ORT (19)	MOA (101)	MLA (56)	DA (54)	ORTH. TECH. (4)	ENV. TECH. (2)	OTA (8)	ALL	GRADS (2041)
		%	%	%	%	%	%	%	%	%	%	
Extremely Satisfied	(5)	27.5	25.4	36.8	40.6	35.7	42.6	25.0	50.0	37.5	28.8	(588)
Quite Satisfied	(4)	37.9	39.4	36.8	24.8	39.3	20.4	50.0	50.0	12.5	36.8	(752)
Satisfied	(3)	26.2	32.4	15.8	20.8	19.6	22.2	25.0		25.0	25.7	(525)
Dissatisfied	(2)	6.5	1.4	10.5	8.9	3.6	13.0			25.0	6.6	(135)
Very Dissatisfied	(1)	1.9	1.4		5.0	1.8	1.9				2.0	(41)
$\overline{X}$ Satisfaction Level		3.85	3.63	4.00	3.87	4.04	3.89	4.00	4.50	3.22	3.84	

2806 9082

Table 4.12 simply shows, for each type of program, how satisfied graduates were with their initial employment. There are several factors which can influence the level of satisfaction graduates show for their employment. Among these are age, type of institution, and relevance of the job. Each of these three factors will be examined briefly.

There was a tendency for those 19 and under and those 55 and older to show a slightly higher level of satisfaction with their first employment than those in the years ranging from 20-54. This difference is very small, however, with the lowest mean satisfaction level (3.77) being expressed by the 25-29 age group. The highest mean satisfaction level (4.31) was expressed by those 19 and under. This is a difference of only .54, spread almost evenly on both sides of the value 4, quite satisfied. The small amount of variance in the mean values would seem to indicate that age has little affect on the level of satisfaction with initial employment for HOE graduates in general. See Table 4.13.

Type of institution seems to have a greater affect on satisfaction with initial employment. The mean satisfaction scores on this comparison ranged from 3.50 to 5.00, which is a spread of 1.5. The 3.5 is still well above the theoretical mean of 3. The comparison of satisfaction scores with type of institution is shown in Table 4.14.

2807

TABLE 4.13

SATISFACTION WITH INITIAL EMPLOYMENT
BY AGE OF THE GRADUATES (1970)

Age in Years		Extremely Satisfied	Quite Satisfied	Satisfied	Dissatisfied	Quite Dissatisfied		Mean Statistical Level
N	=	(586)	(748)	(524)	(133)	(41)	(N)	
Unknown	%	25.0	50.0	25.0			(4)	4.00
19 and Under	%	46.1	38.5	15.4			(13)	4.31
20 - 24	%	28.2	37.4	25.3	6.7	2.4	(869)	3.82
25 - 29	%	25.3	37.4	28.1	7.5	1.8	(281)	3.77
30 - 34	%	27.4	37.1	29.8	3.2	2.4	(124)	3.84
35 - 39	%	25.0	41.0	23.1	10.3	.6	(156)	3.79
40 - 44	%	27.0	38.5	27.0	4.7	2.7	(148)	3.82
45 - 49	%	34.4	33.1	25.6	5.0	1.9	(160)	3.93
50 - 54	%	30.7	34.7	25.0	9.7		(124)	3.86
55 - 59	%	36.2	34.3	22.9	3.8	2.9	(105)	3.97
60 - 64	%	37.8	32.4	18.9	8.1	2.7	(37)	3.95
65 and Over	%	45.5		54.5			(11)	3.91
All Graduates		28.8	36.8	25.8	6.5	2.0	(2032)	3.84

Type of institution seems to have a greater affect on satisfaction with initial employment. The mean satisfaction scores on this comparison ranged from 3.50 to 5.00, which is a spread of 1.5. The 3.5 is still well above the theoretical mean of 3. The comparison of satisfaction scores with type of institution is shown in Table 4.14.

TABLE 4.14

SATISFACTION WITH INITIAL EMPLOYMENT
BY TYPE OF INSTITUTION

		Extremely Satisfied	Quite Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	(N)	Mean Satisfaction Level
	N =	(585)	(748)	(523)	(130)	(41)	(2027)	
Gen.Hosp.	%	28.4	39.3	24.9	5.8	1.6	(1428)	3.87
Spec. Hosp.	%	20.8	39.6	34.4	2.1	3.1	(96)	3.73
Nsg.Home-ECF	%	22.0	33.5	30.7	10.8	3.0	(296)	3.60
Public Health	%	33.3	3.3	16.7		16.7	(6)	3.67
Priv.Duty	%	50.0	20.0	20.0	10.0		(20)	4.10
Dent.Off & Cl	%	35.1	24.3	24.3	13.5	2.7	(37)	3.76
Dental Lab.	%	50.0	50.0				(2)	4.50
Med.Off.& Cl	%	49.2	24.2	20.8	5.0	.8	(120)	4.16
Sch. Nursing	%	33.3	16.7	33.3		16.7	(6)	3.50
Comm.Med.Lab.	%	100.0					(2)	5.00
Rehab. Center	%	50.0		50.2			(2)	4.00
Armed Forces	%	100.0					(1)	5.00
Non-Health Inst.	%	27.3	36.4	18.2		18.2	(11)	3.55

To a lesser degree, relevance of occupation also had some affect on the level of satisfaction with initial employment expressed by the graduates. In this case, the mean satisfaction scores ranged from 3.00 to 3.85. The 3.00, expressed by those taking initial employment in non-health fields, is the lowest satisfaction level expressed by any group. It is not possible to determine reasons for this lower satisfaction level from the data collected, but it could possibly be related to the inability to obtain employment in the health field soon after graduation due to geographic location of family, lack of desirable job vacancies

in a particular occupation and other similar reasons. Dissatisfaction with career choice may also be a factor. See Table 4.15.

TABLE 4.15

SATISFACTION WITH INITIAL EMPLOYMENT
BY RELEVANCE OF THAT JOB

N =	Extremely Satisfied (587)	Quite Satisfied (750)	Satisfied (524)	Dissatisfied (134)	Very Dissatisfied (41)	(N) (2036)	Mean Satis-faction Level
Occup. For Which Prepared	%28.9	37.1	25.6	6.5	2.0	(1995)	3.85
Related Occupation	%27.3	24.2	30.3	9.1	9.1	(33)	3.79
Non- Health Occupation	%12.5	25.0	37.5	12.5	12.5	(8)	3.00

MOST CURRENT EMPLOYMENT

As mentioned in the early part of this chapter, one purpose of this follow-up study was to establish a longitudinal overview of the employment trends of Iowa's HOE graduates. The initial employment experience was discussed in the previous section of this chapter. This section will discuss the "current" or most current employment experience of the graduates.

The results of this study reveal that 51.4% of all graduates have held only one job since graduation from their HOE program. Another one percent, as noted in Table 4.1 have never been employed. Of the

graduates who have held more than one employment position, 62.5% have held three and only 1.5% have held more than three. The data indicate a highly stable employment pattern among HOE graduates.

The remainder of this section will be based on only those graduates who have held more than one job.

Relevance of Most Current Employment

The most current employment for 92% of those graduates who have held two or more jobs since graduation is in the occupation for which they were prepared. Data shown in Table 4.15 indicates a slight tendency for the graduates of the medical office assistant programs to leave the field. In this program, 13.6% took their second or later jobs in a non-health field. Basing this statistic on all MOA graduates, it would be about 5.8%, or approximately four percentage points higher than the portion who took initial employment in a non-health occupation.

In the remaining programs, a very high proportion of the graduates reported their most current employment in the health field for which they were prepared. Generally this proportion ranged at 90% and up. See Table 4.16 for the relevance distribution of most current employment for all programs.

There was a noticeable drop in the number of graduates working full-time in their most current employment situation. Of those who reported more than one job, 76% were full-time positions while 24% were part-time. Relating this figure to initial employment reveals approximately a six percent reduction in full-time employment.

TABLE 4.16

RELEVANCE OF MOST CURRENT EMPLOYMENT
BY PROGRAM TYPE

		Occupation for Which Prepared	Related Occupation	Non-Health Occupation	
N =		(933)	(49)	(32)	(N)
LPN	%	93.7	4.0	2.4	(884)
ADN	%	94.4		5.6	(36)
ORT	%	100.0			(4)
MOA	%	61.4	25.0	13.6	(44)
MLA	%	100.0			(22)
DA	%	94.4		5.6	(18)
OT	%		100.0		(1)
OTA	%	20.0	40.0	40.0	(5)
All Grads		92.0	4.8	3.2	(1014)

Where Graduates Were Employed -- Most Current Employment

As in initial employment, the general hospital category continues to rank highest (50.2% of those who have had more than one job) as the type of institution where HOE graduates are employed. However, compared with the initial employment figure of 70.6%, the 50.2% figure would seem to indicate a tendency for graduates to move away from the general hospital. The increase in the nursing home category, may indicate that graduates, in some cases, move from the general hospital to nursing homes for continued employment. These data do not indicate a major

shift and probably no more than 20% of all graduates have been employed in extended care facilities. This trend is most obvious among practical nurse and medical assistant graduates and is actually reversed among graduates of the ADN programs.

Three new institution types appeared on an analysis of most current employment patterns: ambulance service, industrial and "hotel" nursing, and blood banks. Although these categories are small, they are included in Table 4.17 to show the additional scope of employment opportunities.

TABLE 4.17

TYPE OF INSTITUTION--MOST CURRENT EMPLOYMENT OF GRADUATES EMPLOYED IN THE OCCUPATION FOR WHICH THEY WERE PREPARED, BY PROGRAM TYPE

	LPN	ADN	ORT	MOA	MLA	DA	OT	OTA	All Graduates	
N =	(860)	(33)	(4)	(38)	(21)	(16)	(1)	(4))		(977)
	%	%	%	%	%	%	%	%	%	
Gen. Hosp.	51.0	75.7	100.0	18.4	71.4			25.0	50.2	(490)
Spec. Hosp.	3.4	12.1		2.6	4.8	6.3	100.0	25.0	3.9	(38)
Nsg.Home-ECF	24.5	6.1		10.5					22.2	(217)
Public Health	1.6							25.0	1.5	(15)
Private Duty	1.7								1.5	(15)
Dent.Off. & Cl.	.5			7.9		81.2			2.0	(20)
Dental Lab.						6.3			.1	(1)
Med.Off. & Cl.	14.8	6.1		57.9	19.0	6.3			16.0	(156)
Child.Hm-St. Sch.	.8								.7	(7)
Sch. Nursing	.6								.5	(5)
Comm.Med.Lab.					4.8				.1	(1)
Rehab. Center	.1							25.0	.2	(2)
Armed Forces	.1								.1	(1)
Amb. Service	.1								.1	(1)
Ind. & Other Nsg	.7								.6	(6)
Blood Bank	.1			2.6					.2	(2)

There is little variation between sizes of institutions in which graduates reported their most current employment and sizes of institutions in which they reported their initial employment as shown in Table 4.4. Noticeable, however, is a slight increase in the number of smaller institutions reported under most current employment. This may be explained in part, by younger graduates taking initial employment in the city where their HOE program was located and later returning to their home area. This shift can be most readily seen in the specialized hospital category. See Table 4.18

TABLE 4.18

TYPE OF INSTITUTION BY BED SIZE—
MOST CURRENT EMPLOYMENT

		Number of Beds									
		0-25	26-49	50-99	100-149	150-199	200-299	300-399	400-499	500-over	
N =		(42)	(86)	(134)	(104)	(62)	(64)	(86)	(34)	(80)	(692)
Gen. Hosp.	%	1.5	8.1	10.5	14.0	13.3	12.9	17.9	7.4	14.4	(458)
Spec. Hosp.	%	7.1	10.7	10.7	7.1		7.1	10.7		46.4	(28)
Nsg. Homes-ECF's	%	15.3	22.4	40.8	18.9	.5	1.5	.5			(196)
Other Instit	%	30.0	20.0	30.0	10.0					10.0	(10)
All Institutions		6.1	12.4	19.4	15.0	9.0	9.2	12.4	4.9	11.6	

2814

Location of Most Current Employment

A greater geographic range can be noted in the location of most current employment among those graduates who reported having more than one job. More than 70% of the graduates took initial employment within 25 miles of the health agency where they received most of their clinical experience. For most current employment, this was true for only 50% of those who reported having more than one job. Several factors may be involved in this increased mobility. For example, some graduates will marry and move to where their new spouses are employed. Other graduates may work for a period of time and later join their spouse in a different state or country while in the military service. The study did not attempt to reveal specific reasons; it does show, however, a definite trend for second and later employment situations to be a greater distance from the primary clinical agency than initial employment. See Table 4.19.

TABLE 4.19

LOCATION OF MOST CURRENT EMPLOYMENT
IN RELATION TO PRIMARY CLINICAL AGENCY

Proximity	LPN	ADN	ORT	MOA	MLA	DA	OT	OTA	All Graduates
N =	(878)	(36)	(4)	(44)	(22)	(18)	(1)	(3)	(1006)
	%	%	%	%	%	%	%	%	%
Same Agency	6.6	5.6	25.0	2.3	4.5	11.1			6.5 (65)
Same City	32.5	8.3	75.0	52.3	22.7	55.6		66.7	32.9 (331)
Less t/25 mi.	11.8	2.8		9.1	13.6	11.1			11.3 (114)
25-49 mi.	10.3	5.6		9.1	4.5				9.6 (97)
50-99 mi.	11.2	22.2		11.4	22.7			33.3	11.6 (117)
100-199 mi.	7.6	11.1		2.3		5.6			7.3 (73)
200-299 mi.	3.9	16.7		9.1	4.5	5.6			4.6 (46)
300 mi. or more	16.2	27.8		4.5	27.3	11.1	100.0		16.2 (163)

Comparing the location of most current employment with the relevance of that employment, it appears that the distribution of geographic distances is quite similar to the initial employment shown in Table 4.7, with one exception. Graduates in all three relevance categories appear to have taken their most current employment greater geographic distances from their primary clinical agency than their initial employment. See Table 4.20

TABLE 4.20

LOCATION OF MOST CURRENT EMPLOYMENT IN
RELATION TO PRIMARY CLINICAL AGENCY
BY PROGRAM TYPE

Proximity N =	Occupation for Which Prepared (928)	Related Occupation (49)	Non-Health Occupation (29)
	%	%	%
Same Agency	6.9	2.0	
Same City	32.9	36.7	31.0
Less t/25 mi.	11.4	8.2	13.8
25-49 mi.	9.1	4.1	10.3
50-100 mi.	11.4	14.3	10.3
100-199 mi.	7.0	12.2	7.0
200-299 mi.	4.5	6.1	3.5
300 mi. & over	16.0	16.3	24.1

In analyzing the location of most current employment, a second reference was incorporated. This second reference was the institution where initially employed. This reference was used to determine if graduates, after a period away, returned to employment in the same health agency where they were employed initially. Only about 10% of those graduates who have had more than one job reported their most

current employment in the same health agency as their initial employment. As can be seen in the following table, the distribution of distance scores is very similar in relation to both primary clinical agency and location of initial employment. See Table 4.21 on following page.

Most Current Salaries

Graduates who have held more than one job show an increase of approximately $102 in median most current salary over the median initial salary of all graduates. The range in median most current salaries is from $335 for the medical assistant graduates to $587 for the ADN graduates.

Because of the design of the questionnaire, it is not possible to compare initial salary with most current salary for all graduates to determine change trends. It seems fair, however, to assume that a somewhat similar increase trend exists among all graduates as exists among those that have held more than one job. Table 4.22 on page 75 shows the distribution of most current salaries for each type of program.

TABLE 4.21

LOCATION OF MOST CURRENT EMPLOYMENT
IN RELATION TO INITIAL EMPLOYMENT

	LPN	ADN	ORT	MOA	MLA	DA	OT	OTA	All Graduates
N =	(892)	(36)	(4)	(44)	(22)	(17)	(1)	(3)	(1000)
	%	%	%	%	%	%	%	%	
Same Health Agency	9.7	11.1		9.2	4.6				9.4 (94)
Same City	34.8	16.7	75.0	47.7	13.6	58.8		33.3	34.8 (348)
Less t/25 mi.	13.2			4.6	13.6	11.7			12.2 (122)
24 - 49 mi.	7.8	5.6		9.2	9.1			33.3	7.7 (77)
50 - 99 mi.	9.4	16.7		11.4	27.1	5.9			10.0 (100)
100-199 mi.	5.6	11.1		2.3	4.6	5.9			5.6 (56)
200-299 mi.	3.9	13.9		6.9	4.6	5.9		33.3	4.5 (45)
300 mi. or more	15.6	25.0	25.0	9.2	22.7	11.7	100.0		15.8 (158)

TABLE 4.22

MOST CURRENT SALARY OF GRADUATES
WHO ARE EMPLOYED FULLTIME IN THE
OCCUPATION FOR WHICH THEY WERE PREPARED

	LPN	ADN	ORT	MOA	MLA	DA	OTA	All Graduates	
N =	(598)	(25)	(4)	(24)	(16)	(15)	(1)		(683)
	%	%	%	%	%	%	%		
Less than $240	1.2			4.2		6.7		1.3	(9)
$240 - $319.99	7.9			37.5		20.0		8.6	(59)
$320 - $399.99	30.4		50.0	45.8	18.8	40.0	100	30.0	(205)
$400 - $479.99	42.3	12.0	25.0	12.5	43.8	33.3		39.8	(272)
$480 - $559.99	12.2	12.0	25.0		31.3			12.0	(82)
$560 - $639.99	4.5	76.0			6.3			6.9	(47)
$640 and over	1.0							.9	(6)
Self Employed	.5							.9	(3)
Mdn Salary	421.67	587.35	399.99	334.55	357.11	359.99	360.00	420.09	

2819

Graduates reporting their most current employment in health-related occupations experienced about a $76 increase in median salary. Those with most current employment in non-health occupations experienced an increase of about $118 in median salary. This is about $17 more than the increase recorded for graduates reporting their most current employment in the occupation for which they were prepared. Higher salary may, in part, explain why some graduates take second or later jobs in a non-health occupation. See Table 4.23.

TABLE 4.23

MOST CURRENT SALARIES OF GRADUATES EMPLOYED FULLTIME
BY RELEVANCE OF MOST CURRENT EMPLOYMENT

	Occupation for Which Prepared	Related Occupation	Non-Health Occupation
N =	(683)	(44)	(22)
	%	%	%
Less than $240	1.3	4.6	9.1
$240 - 319.99	8.6	15.9	13.6
$320 - 399.99	30.0	31.8	31.8
$400 - 479.99	39.8	18.2	13.6
$480 - 559.99	12.0	9.1	9.1
$560 - 639.99	6.9	11.4	9.1
$640 or more	.9	4.6	13.6
Self Employed	.4	4.6	
Mdn Salarv	420.09	388.55	388.55

Tenure in Most Recent Employment

The mean length of tenure in the most current employment situation, reported by those who have had more than one job, was 1.6 years. There are too many variable factors involved to make a comparison between tenure in initial employment and tenure in most current employment; such a comparison would be meaningless. For example, a graduate who had been employed ten years in his initial employment may have just recently changed positions for any of a variety of legitimate reasons. This person's tenure in current employment will appear very short, while in all reality it will be much longer. The distribution of most current tenure scores is presented in Table 4.24.

TABLE 4.24

TENURE IN MOST RECENT EMPLOYMENT

N =	LPN (838)	ADN (32)	ORT (4)	MOA (43)	MLA (21)	DA (17)	OT (1)	OTA (3)	ALL	GRADS (959)
	%	%	%	%	%	%	%	%	%	
Less than 1 mo	3.7	12.5		9.3	4.8	35.3			4.2	(40)
1 - 6 months	22.2	18.8	50.0	25.6	33.3	41.2	100.0		22.8	(219)
6 - 12 months	24.1	37.5	50.0	39.5	33.3	23.5		33.3	25.9	(248)
1 - 2 years	25.1	15.6		20.9	23.8			66.7	24.5	(235)
2 - 3 years	10.4	9.4		4.7	4.8				9.7	(93)
3 - 5 years	10.0	6.3							9.0	(86)
5 - 7 years	3.3								2.9	(28)
7 - 9 years	1.1								1.0	(9)
11 yrs. & over	.1								.1	(1)

Satisfaction with Most Current Employment

Generally speaking, the level of satisfaction with most current employment was higher than for initial employment. Mean satisfaction with current employment was 3.97 while the mean satisfaction with initial employment was 3.84. This increase in satisfaction level may be the result of a portion of the graduates taking whatever employment was available at the time of graduation and later, moving to a new position which better suits their desires or needs. Table 4.25 shows the distribution of satisfaction scores for most current employment for the various program types. See Table 4.25.

TABLE 4.25

LEVEL OF SATISFACTION WITH MOST CURRENT EMPLOYMENT

N =	LPN (819)	ADN (32)	ORT (4)	MOA (41)	MLA (21)	DA (17)	OT (1)	OTA (1)	ALL GRADS (936)	
Value	%	%	%	%	%	%	%	%	%	
Ext. Satis. (5)	33.0	25.0	75.0	43.9	28.6	41.2		100	33.4	(313)
Quite Satis. (4)	38.7	46.9	25.0	14.6	42.9	29.4			37.7	(353)
Satisfied (3)	22.8	21.9		26.8	23.8	23.5			22.9	(214)
Dissatisfied (2)	4.4	3.1		12.2	4.8	5.9	100		4.8	(45)
Very Dissatis.(1)	1.1	3.1		2.4					1.2	(11)
Mean Satis. Level	3.98	3.88	4.75	3.85	3.95	4.06	2.00	4.67	3.97	

Age seems not to have much affect on either the satisfaction with initial employment or with most current employment as expressed by the graduates. For initial employment the range of mean satisfaction scores was from 3.77 to 4.31, a spread of .54. For most current employment

this range was from 3.86 to 4.32, a spread of .45. Graduates over 55 years continued to express a slightly higher level of satisfaction than most other age groups. See Table 4.26.

TABLE 4.26

SATISFACTION WITH MOST CURRENT EMPLOYMENT
BY AGE IN 1970

N =		Ext. Satis. (313)	Quite Satis. (353)	Satis. (214)	Dissatis. (45)	Quite Dissatis. (1)	(N)	Mean Satis. Level
Value =		(5)	(4)	(3)	(2)	(1)		
20 - 24 years	%	31.5	38.0	22.6	5.8	2.2	(416)	3.91
25 - 29 years	%	30.3	44.2	22.4	3.0		(165)	4.02
30 - 34 years	%	43.1	29.4	21.6	5.9		(51)	4.10
35 - 39 years	%	38.6	24.6	31.6	5.3		(57)	3.96
40 - 44 years	%	26.4	45.3	26.4	1.9		(53)	3.96
45 - 49 years	%	33.8	39.4	19.7	5.6	1.4	(71)	3.97
50 - 54 years	%	28.6	37.5	25.0	8.9		(56)	3.86
55 - 59 years	%	52.4	31.0	14.3		2.4	(42)	4.31
60 - 64 years	%	52.6	26.3	21.1			(19)	4.05
65 years & over	%	50.0		50.0			(4)	4.00
All Graduates		33.4	37.7	22.9	4.8	1.2	(936)	3.97

Relevance of job seems to have the greatest affect on level of satisfaction with most current employment expressed by those who have held two or more jobs. Mean satisfaction with most current employment ranged from 3.60 to 4.80, a spread of 1.20. The range for initial employment was from 3.00 to 3.85, a spread of .85. Only four categories

of institutions had mean satisfaction levels of less than 4. They were: 1) general hospitals, 2) specialized hospitals, 3) nursing homes and ECF's, and 4) industrial and other nursing. See Table 4.27.

TABLE 4.27

SATISFACTION WITH MOST CURRENT EMPLOYMENT
BY TYPE OF INSTITUTION

N=		Ext. Satis. (308)	Quite Satis. (339)	Satis. (209)	Dissatis. (45)	Quite Dissatis. (9)	(N)	Mean Satis. Level
Gen. Hosp.	%	30.7	38.5	24.2	5.6	1.8	(462)	3.93
Spec. Hosp.	%	25.8	38.7	25.8	3.2	6.4	(31)	3.74
Nsg. Home ECF	%	27.7	39.6	26.2	5.4	.9	(202)	3.88
Pub. Hlth. Agcy.	%	57.1	21.4	21.4			(14)	4.36
Private Duty	%	46.2	30.8	23.1			(13)	4.23
Dental Office & Clinic	%	47.4	26.3	10.5	15.8		(19)	4.05
Med. Office & Clinic	%	46.9	34.0	17.0	2.0		(147)	4.26
Child Home - St. School	%	42.9	42.9	14.2			(7)	4.29
Sch. Nsg.	%	60.0	20.0	20.0			(5)	4.40
Ind. & Other Nsg.	%	20.0	40.0	20.0	20.0		(5)	3.60
Other Inst.	%	80.0	20.0				(5)	4.80

CURRENT EMPLOYMENT STATUS

Nearly 78% of all graduates of Iowa's HOE programs, from 1956 through 1969, were currently employed at the time of the survey. It should be recalled at this point that one of the two major factors revealed by the

validation procedure reported in Chapter II is that current employment status data may be somewhat under-representative. Because of this, it seems reasonable to assume that 77.8% is actually a minimal figure, and probably a higher percentage of all graduates are employed. The proportion of graduates currently employed ranged from 33.3% for the environmental technician program to 100% in the orthopaedic technician program. See Table 4.28.

TABLE 4.28

CURRENT EMPLOYMENT STATUS

N =	LPN (1734)	ADN (70)	ORT (19)	MOA (99)	MLA (55)	DA (55)	OT (4)	ET (3)	OTA (9)	ALL GRADS (2048)	
	%	%	%	%	%	%	%	%	%	%	
Employed	77.3	84.3	89.5	80.8	80.0	74.5	100	33.3	77.8	77.8	(1594)
Not Employed	22.7	15.7	10.5	19.2	20.0	25.5		66.7	22.2	22.2	(454)

A variety of reasons why some graduates were not currently employed were expressed. By far, the most commonly expressed reasons centered around young children and other family responsibilities. Among the reasons expressed were: pregnancy, young children, with spouse in the military, and other family-connected responsibilities in general. The major single reason expressed for current non-employment was young children in the home (46.4% of the graduates).

An important fact to note is that only 6.2% expressed reasons for non-employment related to job availability. A portion of these indicate only that satisfactory hours were not available. In numbers,

this represents a total of 24 graduates which comprise only three-fourths of one percent of the total sample. See Table 4.29.

TABLE 4.29

REASONS FOR UNEMPLOYMENT

N =	LPN (333)	ADN (9)	ORT (2)	MOA (16)	MLA (10)	DA (12)	ET (2)	OTA (2)	ALL GRADS (386)
	%	%	%	%	%	%	%	%	%
Retirement	2.7								2.3 (9)
Family Resp.,Gen.	12.9	11.1		12.5					11.9 (46)
Yng. Child - Home	49.5	44.4	50.0	25.0	30.0	16.7			46.4 (179)
Pregnancy	12.0	33.3		12.5	10.0	16.7		50.0	12.7 (49)
Spouse in Mil.	1.5				20.0	8.3			2.1 (8)
Illness	6.0								5.2 (20)
Pers. Reasons	4.8	11.1			10.0	25.0			5.4 (21)
Attdng. Schl.	2.4		50.0		20.0		50.0	50.0	3.4 (13)
Job Not Avail.	2.1			18.8	10.0	25.0	50.0		3.9 (15)
Job Term.	.6			12.5					1.0 (4)
Satis. Hrs. N/A	1.5								1.3 (5)
Recently or About to Move	3.9			18.8		8.3			4.4 (17)

As mentioned earlier, the health occupations continue to be, for the most part, women's occupations. Because of this, as well as the greater number of younger graduates in recent years, it can be speculated that 20-25% of the workers in the health occupations will be out of the labor force at any given time. Most of this group will leave their occupational

role to bear and rear their families to school age and then return to work. This speculation is supported to a degree in that 65% of those who were currently not employed indicated they planned to return to work at various times in the near future as displayed in Table 4.30.

TABLE 4.30

PLANS TO RETURN TO WORK

N =	LPN (250)	ADN (9)	ORT (2)	MOA (13)	MLA (8)	DA (9)	ET (1)	OTA (2)	ALL GRADS (294)	
	%	%	%	%	%	%	%	%	%	
1 Month	10.8	33.3		23.1	12.5	11.1			11.9	(35)
3 Months	10.0					11.1			8.8	(26)
6 Months	11.6	22.2			25.0			50.0	11.6	(34)
1 Year	11.2	22.2		15.4	12.5	11.1		50.0	11.9	(35)
2 Years	2.4		50.0	7.7			100.0		3.1	(9)
5 Years	12.0					11.1			10.5	(31)
7 Years	1.6			7.7					1.7	(5)
Not Sure	37.6	22.2	50.0	15.4	37.5	33.3			35.7	(105)
As Soon as Poss.	2.8			30.8	12.5	22.2			4.8	(14)

Most graduates (97.5%) also indicated they plan to return to the same occupation in which they were previously employed. This indicates that these graduates are probably not out of the labor force because they were unhappy with their jobs. See Table 4.31.

TABLE 4.31

TYPE OF OCCUPATION RETURNING TO

N =	LPN (244)	ADN (9)	ORT (2)	MOA (10)	MLA (9)	DA (6)	ET (1)	OTA (1)	ALL GRADS (282)
	%	%	%	%	%	%	%	%	%
Same Occup.	97.9	77.8	50.0	100	100	100		100	97.5 (275)
Diff. Occup.	2.1	22.2	50.0				100		2.5 (7)

In this table, a total of six LPNs who plan to return to work as RNs are categorized in the "same occupation" group. Among the six are four who plan to return as RNs, one who plans to return as a BSN degree and one who will return with an MSN degree.

MOBILITY AMONG GRADUATES

A very high level of all graduates of Iowa's HOE programs have remained in the state. More precisely, 86.5% of all graduates, from 1956 through 1969, were residents of the state at the time of the survey. Only 13.5% have moved permanently from Iowa.

The reader again is reminded that the second factor revealed by the validation procedure, reported in Chapter II, is that figures with regard to remaining in the state are probably under-representative. Actually, more than 86.5% have probably remained in the state.

The graduates who indicated they had moved permanently from the state reported a total of 39 states to which they had moved. In addition, two graduates had moved to foreign countries.

For the most part, the states bordering Iowa were the most common to which graduates moved. This may be accounted for, in part, in that there are several HOE programs located in border cities such as Davenport, Dubuque, Sioux City, Council Bluffs and several near both the north and south borders of Iowa. Graduates of programs in these localities who move within their metropolitan area may very well be actually moving from the state. It is not known how many might be living in border cities of other states and working in Iowa. Table 4.32 on the next page lists in rank order the states to which graduates have moved.

TABLE 4.32

STATES TO WHICH GRADUATES
HAVE MOVED

STATE	NUMBER	STATE	NUMBER
1. Illinois	53	21. North Carolina	3
2. Minnesota	28	22. Pennsylvania	3
3. California	25	23. Virginia	3
4. Nebraska	25	24. Washington State	3
5. Missouri	24	25. Alaska	2
6. Colorado	19	26. Arkansas	2
7. South Dakota	10	27. New Jersey	2
8. Wisconsin	9	28. Oklahoma	2
9. Kansas	6	29. Alabama	1
10. Texas	6	30. Connecticut	1
11. Michigan	5	31. Kentucky	1
12. Ohio	5	32. Louisiana	1
13. Arizona	4	33. Mississippi	1
14. Florida	4	34. Nevada	1
15. Massachusetts	4	35. New York	1
16. Georgia	3	36. North Dakota	1
17. Hawaii	3	37. Oregon	1
18. Indiana	3	38. South Carolina	1
19. Montana	3	39. Tennessee	1
20. New Mexico	3	Foreign Country	2
		TOTAL	275

CHAPTER 5

GRADUATES' VIEWS OF THEIR HOE PROGRAMS

To reiterate, the purpose of this study is to provide a broad base of data useable by a variety of groups and individuals as they are faced with evaluation and program planning. Data contained in this chapter represent viewpoints, opinions and attitudes expressed by graduates about the HOE programs from which they graduated. Questions posed to the graduates were intended to elicit feelings and comments which, when put in context with other local factors, would help program faculties evaluate their programs in terms of effectiveness and needed curriculum changes.

Two types of program evaluation information were obtained, (1) general evaluation, (2) specific recommendations for improvement. Both will be reported in this chapter.

GENERAL EVALUATION OF PROGRAMS

Adequacy of Preparation

When asked, in terms of their experience since graduation, if the program they graduated from prepared them adequately for their occupational role, 89% of the graduates felt it did. There was quite a large range among the various programs in this response. The program whose graduates had the least tendency to feel adequately prepared was the occupational therapy assistant program which had been in operation only one year. Fifty seven percent of the graduates of the OTA program

felt adequately prepared. All graduates of the operating room technician, orthopaedic technician and environmental technician programs felt adequately prepared. See Table 5.1.

TABLE 5.1

PREPARED ADEQUATELY BY PROGRAM

N =	LPN (1699)	ADN (68)	ORT (20)	MOA (101)	MLA (53)	DA (55)	OT (3)	ET (3)	OTA (7)	ALL GRADS (2009)
	%	%	%	%	%	%	%	%	%	%
Yes	88.8	94.1	100.0	83.2	94.3	92.7	100.0	100.0	57.1	89.0 (1788)
No	11.2	5.9		16.8	5.7	7.3			42.9	11.0 (221)

Level of General Satisfaction With HOE Program

In keeping with the general feeling of adequacy with their preparation, the graduates expressed a high level of overall satisfaction with the programs from which they graduated. The same procedure was used in determining satisfaction with HOE programs as was used in determining satisfaction with employment. The responses to this question were again arranged on a continuum and weighted as follows: Extremely Satisfied (5), Quite Satisfied (4), Satisfied (3), Dissatisfied (2), and Very Dissatisfied (1). The theoretical mean, or the mean expected if there were an equal number of responses to each of the five foils, is 3.0.

The mean level of satisfaction expressed by all graduates was 4.05, slightly more than quite satisfied. Mean satisfaction for individual programs ranged from 2.1, which is below the theoretical mean, for the occupational therapy assistant program to 4.33 for the environmental

technician program. See Table 5.2 for the distribution of satisfaction scores for each type of program.

TABLE 5.2

GENERAL SATISFACTION WITH HOE PROGRAM

N =	LPN (1724)	ADN (70)	ORT (19)	MOA (100)	MLA (54)	DA (55)	OT (4)	ET (3)	OTA (8)	ALL GRADS (2037)
Value	%	%	%	%	%	%	%	%	%	%	
E. Sat.(5)	29.7	18.6	52.6	33.0	25.9	29.1	25.0	66.7		29.6	(601)
Q. Sat.(4)	44.4	57.1	31.6	34.0	51.9	41.8	50.0		25.0	43.9	(900)
Satis. (3)	23.8	22.9	15.8	22.0	20.4	23.6	25.0	33.3	12.5	23.8	(479)
Dissa. (2)	1.7	1.4		11.0	1.9	1.8			37.5	2.3	(47)
V. Dis.(1)	.3					3.6			25.0	.5	(10)
Mean Satis. Level	4.01	3.93	4.15	3.89	4.03	3.98	4.00	4.33	2.11	4.05	

Balance of Theoretical Content and Clinical Experience

A very important and integral part of curriculum design in health occupations education is an appropriate balance between theoretical content and clinical experience. It is conceived by most health occupations educators that it is extremely important for the student to have sufficient and appropriately timed clinical experience to enable him to apply the concepts, principles and general knowledge he has learned in real patient care experiences under the supervision of the faculty. In many cases, because of a press for time caused by expanding knowledge and changing occupational roles, this important balance becomes too oriented to either the theory or clinical sides. Most often, programs become too theoretical oriented in terms of their stated objectives and goals.

For this reason, two questions were included in the questionnaire to determine in a general way how the graduates perceived the balance between theoretical content and clinical experience. Their responses indicate there may have been some minor shift in emphasis to theoretical content.

Eighty two percent of the graduates felt the theory was "about right." However, 11.6% felt there was too little theory while 6.4% felt there was too much. Graduates of the associate degree nurse, dental assistant and occupational therapy assistant programs expressed a greater feeling that there was too much theory in the programs they attended. See Table 5.3.

TABLE 5.3

AMOUNT OF THEORY

N =	LPN (1707)	ADN (70)	ORT (20)	MOA (103)	MLA (54)	DA (55)	OT (4)	ET (3)	OTA (8)	ALL GRADS (2024)
	%	%	%	%	%	%	%	%	%	%
Too Much	5.0	2.9	35.0	12.6	3.7	23.6			62.5	6.4 (128)
Too Little	11.9	5.7		6.8	24.1	12.7	25.0			11.6 (235)
Right Amt.	83.1	91.4	65.0	80.6	72.2	63.6	75.0	100	37.5	81.9 (1661)

On the other hand, 41.6% of the graduates felt there was too little clinical experience in their programs. Only 0.6% felt they had too much clinical experience. Among the programs, those who thought there was too little clinical experience ranged from 35.9% in the medical office assistant program to 100% in the occupational therapy assistant program.

See Table 5.4.

TABLE 5.4

AMOUNT OF CLINICAL EXPERIENCE

N =	LPN (1719)	ADN (70)	ORT (20)	MOA (103)	MLA (54)	DA (55)	OT (4)	ET (3)	OTA (8)	ALL GRADS (2036)
	%	%	%	%	%	%	%	%	%	
Too Much	.5			2.9	1.9					.6 (13)
Too Little	40.4	58.6	40.0	35.9	40.7	61.8	50.0		100	41.6 (847)
Right Amt.	59.0	41.4	60.0	61.2	57.4	38.2	50.0	100		57.8 (1176)

Personal Rewards

There are many reasons why people achieve an education leading to a role in the occupational world. Among them are financial security and personal satisfaction. Recent inflationary trends and increased desires for a higher standard of living are leading many women to the labor force. In addition, many women find themselves in the position of having to support a family because of a broken home or disable husband.

Ninety-five percent of the graduates indicated that completing an HOE program and preparing themselves for a role in the health care industry have definitely provided them a greater degree of economic security. Only 50.0% of the occupational therapy assistant and 66.7% of the environmental technician graduates expressed this feeling while 100% of the associate degree nurse and orthopaedic technician graduates felt their HOE program increased their financial security. See Table 5.5 on following page.

TABLE 5.5

DID THE PROGRAM PROVIDE ECONOMIC SECURITY?

N =	LPN (1684)	ADN (69)	ORT (18)	MOA (98)	MLA (54)	DA (53)	OT (3)	ET (3)	OTA (8)	ALL GRADS (1990)
	%	%	%	%	%	%	%	%	%	%
Yes	96.6	100.0	88.9	83.7	98.1	83.0	100.0	66.7	50.0	94.9 (1899)
No	3.4		11.1	16.3	1.9	17.0		33.3	50.0	5.1 (91)

Many people choose an occupational role in the health care fields because they gain personal satisfaction from helping others. This satisfaction factor can be very significant in performance and tenure patterns of health workers.

Almost all of the graduates (98.8%) responded that completing an HOE program, or employment as a health worker, has provided them with a personal satisfaction they would not have achieved had they not done so. In only the environmental technician and occupational therapy assistant program didless than 90% indicate this to be true. See Table 5.6.

TABLE 5.6

DID THE PROGRAM PROVIDE PERSONAL SATISFACTION?

N =	LPN (1717)	ADN (69)	ORT (20)	MOA (99)	MLA (53)	DA (51)	OT (3)	ET (3)	OTA (5)	ALL GRADS (2000)
	%	%	%	%	%	%	%	%	%	%
Yes	98.7	97.1	95.0	93.9	100.0	94.1	100.0	66.7	60.0	98.8 (1983)
No	1.3	2.9	5.0	6.1		5.9		33.3	40.0	1.2 (37)

SPECIFIC RECOMMENDATIONS FOR PROGRAM IMPROVEMENT

Each graduate was given the opportunity to recommend improvements in as many as four specific areas or parts of the program he attended. This part of the questionnaire was designed to allow the graduate to write in the area or areas of the program he felt could be improved and indicate by check marks how it could be improved. Five options for improvement were given on the questionnaire as follows: (1) more time, (2) more theory, (3) more clinical practice, (4) better equipment, and (5) better instruction. It was decided not to restrict responses regarding the method of improvement since it was anticipated that some graduates may wish to express two or more of the options allowed. A graduate could indicate a single option, or any combination of two, three, four, or five of the options stated.

Upon preliminary analysis of these data two significant factors were obvious. First, while many recommendations for improvement were made, most of the individual recommendations accounted for only one or two persons each. This led the project staff to believe that recommendations made by so few graduates probably were related to specific or unusual job requirements not generally common to their occupational field. To remove this factor, it was decided that a recommendation, to be a valid consideration, had to be made by the equivalent of one percent of all respondees for each type of program.

The second factor revealed was that suggested improvements came from persons who had graduated as many as 14 years prior to the survey. With the continual change that has taken place in educational programs

preparing health workers, the validity of these particular suggestions was questioned. After much consideration, it was decided to report the recommendations for improvement made by the 1967, 1968 and 1969 graduates, the three most recent years of graduation included in the survey.

Since recommendations for improvement by graduates are meaningful to only their specific type of program, data in this section will be reported by individual type of program. The tables will show two types of information. First, they will show the percentage of graduates, from the three years included, who made each of the specific recommendations. Second, they will show, based on the number of students in a specific area recommended for improvement, the percentage recommending each option for how the area should be improved.

Practical Nursing

A total of 998 of the respondees were graduated from practical nurse programs in 1967, 1968 and 1969. Of these, 652 or 65.3%, had no suggestions for improvements in the programs they attended. The remaining graduates felt that some sort of improvement was needed in a total of 52 different areas. Of these, only eight areas were recommended by more than one percent of the practical nurse respondees. They were: (1) laboratory techniques, (2) administration of medications, (3) obstetrics, (4) operating room procedures, (5) office techniques, (6) mental health care, (7) pediatrics, and (8) the program in general. Table 5.7 on the following page shows the ways in which the graduates felt these eight areas should be improved.

TABLE 5.7

IMPROVEMENTS RECOMMENDED FOR THE PRACTICAL NURSE PROGRAM BY THE PRACTICAL NURSE GRADUATES

	Laboratory Techniques	Administration of Medications	Obstetrics	Operating Room	Office Techniques	Mental Health	Pediatrics	Program in General	Improvement Not Needed
N =	(174)	(463)	(150)	(40)	(100)	(32)	(29)	(138)	(652)
*% of PN Grads	17.4	46.3	15.0	4.0	10.0	3.2	2.9	13.8	65.2
	%	%	%	%	%	%	%	%	
0 Not sure*	6.9	4.3	2.7	2.5	4.0	3.1	3.4	4.3	
1	9.2	8.0	4.7	10.0	9.0	6.2	3.4	3.6	
2	13.8	2.6	.7	2.5	4.0	3.1		5.8	
3	10.3	17.5	30.7	17.5	22.0	3.1	20.7	29.0	
4	1.1	.4	.7					2.2	
5	4.0	3.2	2.7	2.5	13.0	3.1	20.7	7.2	
6	5.2	3.9	8.7		3.0			2.2	
7	5.7	17.5	20.0	20.0	12.0	3.1	17.2	11.6	
8	1.1	.4						.7	
9	2.3	1.9	1.3		5.0		3.4		
10	6.3	4.3	.7	2.5	5.0		3.4	2.2	
11	.6								
12	1.7						3.4	1.5	
13	.6	.2						5.1	
14	4.0	2.6	3.3	5.0	3.0	6.2	3.4	5.1	
15	.6							.7	
16	5.7	14.9	8.0	12.5	10.0	25.0	6.9	4.3	
18	1.7	.9		2.5				2.2	
19	2.3	.6	.7					1.5	
20	3.4	5.8	8.0	5.0	2.0	6.2	3.4	2.9	
22	.6							.7	
23	.6	.6	2.7	7.5			3.4	1.5	
24	.6	.4				3.1			
25	2.3	.6			1.0			1.5	
26	4.0	5.4	2.7	7.5	3.0	21.9	3.4	2.9	
28		.9	1.3		1.0				
30	5.7	2.7	.7	2.5	3.0	15.6	3.4	1.5	
No Imp. Needed									100.0

*Use improvement option code classifications on next page for Tables 5.7 - 5.13.

IOWA HOE FOLLOW-UP STUDY

Code 22: Ways to Improve Program

0 Unknown
1 More time
2 More theory
3 More clinical practice
4 Better equipment
5 Better instruction

6 More time and more theory
7 More time and more clinical practice
8 More time and better equipment
9 More time and better instruction
10 More theory and more clinical practice
11 More theory and better equipment
12 More theory and better instruction
13 More clinical practice and better equipment
14 More clinical practice and better instruction
15 Better equipment and better instruction

16 More time, more theory and more clinical practice
17 More time, more theory and better equipment
18 More time, more theory and better instruction
19 More time, more clinical practice and better equipment
20 More time, more clinical practice and better instruction
21 More time, better equipment and better instruction
22 More theory, more clinical practice and better equipment
23 More theory, more clinical practice and better instruction
24 More clinical practice, better equipment and better instruction

25 More time,more theory, more clin. practice & better equipment
26 More time, more theory, more clin. practice & better instruction
27 More time, more theory, better equipment and better instruction
28 More time, more clin. practice, better equipment & better instruction
29 More theory, more clin. pract., better equipment & better instruction

30 Improve all five ways
31 Theory equipment instruction

The most significant recommendation, made by 46.3% of the criterion group, was administration of medications. Administration of medications is a changing role for the LPN, since in years past, they did not pass medications. This has changed in current practice, however, and it is now quite common for licensed practical nurses to administer medications. Programs may have not yet put the emphasis on this area of instruction that these students feel is necessary to them. Twenty four percent of those who felt a need for improvement in medications expressed a need for both more theory and clinical experience.

Another 13.8% felt that the program in general should be improved. The largest portion of this group (29%) expressed a need for more clinical experience in all areas of the program. This is quite in keeping with Table 5.4 which shows that 42% of all graduates thought there was too little clinical experience in the programs from which they graduated.

Of the other areas recommended for improvement by more than 10% of the criterion group, two seem to be quite closely related: laboratory techniques and office procedures. It would seem reasonable to assume that these recommendations were made, for the most part, by practical nurse graduates who are employed in medical offices and clinics. This assumption is supported to a great degree by Table 4.17 which shows that about 15% of all practical nurse graduates reported their most recent employment in medical offices and clinics. While much of the knowledge in the practical nurse program is easily transferable to the medical office, these recommendations appear to stem from needs of a different occupational field than the practical nursing program was intended to prepare personnel for. For this reason, it would seem appropriate to

place less value on them. However, they may indicate the need for continuing education programs to assist in the transition from one field to another.

The final area recommended for improvement to be discussed is the obstetrics area, mentioned by 15% of the criterion group. Again the largest group (30.7%) felt they needed more clinical experience in obstetrics. This particular area has been increasingly more difficult to schedule for clinical experiences, especially in smaller hospitals, because of fewer births in recent years. Faculties may need to study new ways to obtain adequate clinical experience in the OB area.

Associate Degree Nursing

Of the 71 associate degree nurse graduates who responded to the survey, 55 graduated during 1967, 1968 and 1969. Of the 55, 38 or 69.1% made no suggestions for improvement. The remainder had few recommendations for improving the programs from which they graduated. While recommendations were made in eighteen different areas, only three were mentioned by more than one percent of the graduates. They are: (1) obstetrics, (2) operating room, and (3) the program in general.

For the ADN's, OB seemed to be the major problem area. Over 68%, who expressed a need for improvement, felt they needed more time and/or clinical practice in this area.

Another 14.5% of the criterion group expressed a need for more exposure to operating room nursing. Of this group, 62.5% said they needed more time and/or clinical practice while an additional 25% specified

more time, more theory, and more clinical practice.

The third item, program in general, was mentioned by 12.7% of the criterion group. Here, as was true for practical nurses, the major need expressed was for additional clinical experience throughout the entire program. See Table 5.8.

TABLE 5.8

IMPROVEMENTS RECOMMENDED FOR THE ASSOCIATE DEGREE NURSE PROGRAM BY THE ADN GRADUATES

	Obstetrics	Operating Room	Program in General	Improvement Not Needed
N =	(16)	(8)	(7)	(38)
% of RN Grads (67, 68, 69)	29.1	14.5	12.7	69.1
	%	%	%	%
0 *			14.3	
3	31.3	12.5	57.1	
5	6.3			
7	37.5	50.0	28.6	
10	6.3			
16	6.3	25.0		
20	6.3	12.5		
28	6.3			
No Improv. needed				100.0

*See explanation of code on page 96.

2843

Operating Room Technician Program

There were a total of 20 respondees graduating from operating room technician programs in Iowa in 1968, 1969. 1968 was the first year this program was offered in the state.

Of the 20, 14 or 70% felt no improvements were needed. The remaining respondees recommended changes in two areas. They are: (1) obstetrics, and (2) anatomy. Each was recommended by 15% of the graduates.

Those who recommended the OB area felt about equally the need for more time, theory and clinical practice. Those recommending anatomy expressed the need for more time, theory and better instruction. See Table 5.9.

TABLE 5.9

IMPROVEMENTS RECOMMENDED FOR THE OPERATING ROOM TECHNICIAN PROGRAM BY THE ORT GRADUATES

	Obstetrics	Anatomy	No Improvement Needed
N =	(3)	(3)	(14)
% of 67, 68, 69 Grads	15.0	15.0	70.0
	%	%	%
3 *	33.3		
6	33.3	33.3	
7	33.3		
18		33.3	
20		33.3	
No Improvement Needed			100.0

* See explanation of code on page 96.

TABLE 5.10

IMPROVEMENTS RECOMMENDED FOR THE MEDICAL OFFICE ASSISTANT PROGRAM BY THE MOA GRADUATES

	Laboratory Techniques	Administration of Medications	Office Techniques	Program in General	No Improvement Needed
N =	(36)	(13)	(13)	(12)	(69)
% of 67, 68, 69 Grads	37.9	13.7	13.7	12.6	72.6
	%	%	%	%	%
0 *	5.6		15.4	8.3	
1	16.7	15.4		16.7	
2		7.7	7.7	8.3	
3	11.1	23.1	23.1	16.7	
5	2.8	7.7	23.1		
6	5.6	7.7	7.7		
7	22.2			8.3	
9	5.6	7.7		8.3	
10	2.8		7.7		
11	2.8				
13	2.8				
14	2.8				
16	2.8	7.7		8.3	
20	2.8	15.4	7.7	16.7	
22			7.7		
23				8.3	
25	2.8	7.7			
26	2.8				
28	2.8				
29	2.8				
30	2.8				
No Improvement Needed					100.0

* See explanation of code on page 96.

Medical Office Assistant Program

Ninety five of the 104 medical office assistant respondees graduated during 1967, 1968, 1969. Sixty nine, or 72.6% of this group did not suggest program improvements. The remainder of the criterion group suggested improvements in a total of 17 program areas. Only four of the suggestions, however, were made by more than one percent of the medical office assistant respondees. They were: (1) laboratory techniques, (2) administration of medications, (3) office techniques, and (4) the program in general.

Most commonly mentioned by MOA graduates was the laboratory area. Almost 38% of the criterion group thought some improvement was needed in this content area. Eleven percent of this group indicated the need for more clinical practice in the laboratory while another 22.2% indicated more time as well as clinical practice.

The remaining three areas, medications, office techniques, and program in general were each mentioned by approximately 13% of the criterion group. It is more distinct in these three areas that a portion of the students are asking for more time and clinical experience. Some also indicate that better instruction is needed, primarily in the office practice part of the program. See Table 5.10 on the following page.

Medical Lab Assistant Program

Fifty three of the 57 medical laboratory assistants who responded to the questionnaire graduated during the criterion years of 1967, 1968 and 1969. Thirty eight of the 53, or 71.7%, had no improvements to recommend for the programs they attended.

The remainder of the graduates suggested needed improvements in a total of 12 program areas. Only two of these, however, were mentioned by more than one percent of the graduates. They are: (1) laboratory techniques, and (2) bacteriology.

It would appear that these graduates, by mentioning laboratory techniques, were expressing the need for some type of change in the program in general. The 13 who mentioned laboratory techniques were split about in half as to how they felt the program should be improved. Approximately 46% expressed a need for more clinical experience while the balance of those who made suggested improvements expressed the need for more theory and better instruction.

The group that mentioned bacteriology were primarily interested in more theory, more clinical experience and better instruction in this curricular area. See Table 5.11 on the following page.

Dental Assistant Program

The dental assistant programs had a total of 56 graduates responding to the survey, all of whom graduated during the criterion years. Forty three of the 56, or 76.8%, had no suggestions for program improvement. The remaining graduates suggested changes in eleven program areas, of which three were mentioned by at least one percent of the respondees. The three areas mentioned were: (1) laboratory techniques, (2) X-ray procedures, and (3) the program in general.

The largest group (25%) of those who mentioned laboratory techniques expressed a desire for more time in this area. Another 25% expressed the need for more time, clinical practice and better instruction. The

TABLE 5.11

IMPROVEMENTS RECOMMENDED FOR THE MEDICAL LABORATORY ASSISTANT PROGRAM BY THE MLA GRADUATES

	Laboratory Techniques	Bacteriology	No Improvement Needed
N =	(13)	(10)	(38)
% of 67, 68, 69 Grads	24.6	18.9	71.7
	%	%	%
1 *	7.7		
2	7.7		
3	46.1	10.0	
5		20.0	
7		10.0	
8	7.7		
9	7.7		
10		30.0	
12	7.7	10.0	
14		10.0	
17	7.7		
20		10.0	
23	7.7		
No Improvement Needed			100.0

*See explanation of code on page 96.

remaining 50% of the group mentioning laboratory techniques suggest a variety of different improvements.

In the X-ray area, the largest group (22.2%) wanted more time and clinical practice. The remainder of this group was divided evenly among seven different suggested options for improvement as shown in Table 5.12.

TABLE 5.12

IMPROVEMENTS RECOMMENDED FOR THE DENTAL ASSISTING PROGRAM BY THE DA GRADUATES

	Laboratory Techniques	X-ray Procedures	Program in General	Improvement Not Needed
N =	(16)	(9)	(9)	(43)
% of 67, 68, 69 Grads	28.6	16.1	16.1	76.8
	%	%	%	%
0 *	6.3			
1	25.0	11.1		
3	6.3		77.7	
5	6.3		11.1	
6	6.3			
7		22.2		
9		11.1		
13	6.3			
14	12.5			
15		11.1		
16	6.3	11.1		
18		11.1		
20	12.5	11.1		
21		11.1		
24			11.1	
28	6.3			
30	6.3			
No Improvement Needed				100.0

*See explanation of code on page 96.

Orthopaedic Technician Program

The orthopaedic technician program, like the environmental technician and occupational therapy programs, had graduated only one class prior to the survey. Of the four graduates of this program, only one mentioned a suggested improvement. This individual felt the need for additional

theory and clinical practice in the administration of medications. The remainder of the respondees did not suggest improvements in their programs.

Environmental Technician Program

In this new program, as with the orthopaedic program, only one of the respondees suggested possible program improvements. This individual suggested that more time and better equipment was needed in the laboratory area and that more clinical practice and better instruction was needed in the sewage disposal systems area of the program. The remaining two respondees did not make suggestions for program improvements.

Occupational Therapy Assistant Program

Four of the nine occupational therapy assistant graduates who responded suggested three types of improvements. The three mentioned were: (1) patient contact, (2) crafts, and (3) the program in general.

Two of the four who made suggestions mentioned the need for more clinical practice and better instruction in working with actual patients. One person suggested more practice and better instruction in the crafts area. Three people mentioned the program in general should be improved. Two of these three suggested the need for better instruction while one suggested more clinical practice, better equipment and better instruction. See Table 5.13 on the following page.

TABLE 5.13

IMPROVEMENTS RECOMMENDED FOR THE OCCUPATIONAL THERAPY ASSISTANT PROGRAM BY THE OTA GRADUATES

	Patient Contact	Crafts	Program in General	Improvement Not Needed
N =	(2)	(1)	(3)	(5)
% of Grads	20.0	10.0	10.0	50.0
	%	%	%	%
3 *				
5			66.7	
14	50.0			
20	50.0	100.0		
24			33.3	
No Improvement Needed				100.0

*See explanation of code on page 96.

2851

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

Part One

Rather than summarizing each of the variables reported in earlier chapters, this chapter will attempt to focus on some of the main points brought out by the study. Where appropriate, recommendations for improving health occupations education programs will be made.

GRADUATES

A very definite downward trend in median age of graduates has been experienced in the past 12-14 years. While practical nurse graduates, who comprise the majority of HOE graduates, at one time were stereotyped as middle-aged, this is no longer true for this group, or graduates of other HOE programs either. A greater number of young people, just out of high school, are entering programs to prepare for health careers. In the future, this may have some effect on placement, mobility and tenure patterns of HOE graduates.

The health occupations continue to be women's occupations. Only about two percent of all graduates of Iowa's HOE programs are male. One factor which may have to be improved before more males can be attracted to health fields is the salaries which are paid supportive level health workers. Other reasons why more males do not enter health occupations should be studied.

Recommendation:

1. Program faculties, working with health agencies, should design ways to encourage male students to enroll in existing HOE programs.

2. Where needs exist, new programs such as the orthopaedic technician program, which are more attractive to male students, should be considered for implementation.

More than half the HOE graduates had health occupations experience prior to enrolling in an HOE program. Most common was employment as a nurse aide or orderly. Student clubs and volunteer programs also provided previous experience for many graduates. Only one-tenth of one percent of Iowa's HOE graduates were military corpsmen prior to entering their HOE program.

A national effort is currently underway to encourage military corpsmen to enter health care fields upon returning to civilian life. Many will need specific additional preparation for employment in health careers. Health occupations education programs offer returning Iowa veterans a prime opportunity for gaining this preparation.

Recommendation:

1. HOE program faculties should cooperate closely with state and national programs which seek to assist returning military corpsmen in entering health careers. To achieve this goal,

it will be necessary to further develop procedures for evaluating individual applicants for enrollment in HOE programs on an advanced standing basis. Corpsmen will already have gained a portion of the knowledge required for program completion.

EMPLOYMENT

The central objective of health occupations education programs is the preparation of qualified supportive level health personnel for the health care industry. Data resultant from the survey reveal a high level of success in achieving this objective. More than 95% of all graduates of Iowa's HOE programs, from 1956 through 1969, have been employed in the health occupation for which they were prepared. They also have continued a high rate of employment with more than 77% employed at the time of the survey.

Tenure in employment is shorter than expected. However, the fact that most (98%) of the graduates are women has great bearing on length of employment. In addition, 80% were or had been married. In many cases, graduates leave employment for a period of time to rear families, then later they return. A second major factor which undoubtedly has affected tenure rate is that many graduates have moved with their husband when his employment has been transferred or he accepts employment in a new location. With 77% of all the graduates employed, the short tenure seems to have very little affect on overall employment continuum.

Graduates show a high level of satisfaction with their employment experienced. Mean satisfaction scores of approximately four on a five-point continuum show they were "quite satisfied". Five was the highest possible satisfaction which could be expressed. Satisfaction was slightly higher on most current employment, for those who reported having more than one job, than for initial employment reported by all graduates.

The majority of graduates are employed in general hospitals. Initially, more are employed in larger hospitals. In Iowa, more than 70% of the general hospitals are under 100 beds in size. Only 30% of the graduates were initially employed in these smaller institutions. Employment opportunities for a greater proportion of graduates may very well exist in these smaller institutions.

Recommendation:

Program faculties, especially in nursing programs, should plan cooperatively with small hospitals in their area to determine if there is a need for planning clinical experiences in smaller hospitals as a method of attracting graduates to these institutions.

Nursing homes, and other extended care facilities, employ only about 16% of the graduates. This percentage is less than might be expected since Iowa has such a high "senior-citizen" census. There are also a large number of good extended care institutions in the state. Here again, employment opportunities for a greater proportion of the graduates may exist.

Recommendation:

Program faculties should plan cooperatively with nursing homes in their area for a greater amount of clinical experience which will better orient students to these institutions, and encourage graduates to seek employment there.

Questions are asked time and time again by the public regarding the large numbers of graduates, of educational programs supported by state tax funds, who leave the state for employment. This has been especially true in the various health career fields.

A very high percentage (86%) of Iowa's HOE graduates, from 1956 through 1969, have remained in the state, most are currently employed. The data reveal that even within the state, HOE graduates tend not to be a mobile group. Most gain employment relatively close to the geographic location of the HOE program they attended.

Less than 25% of the graduates were not employed at the time of the survey. Major reasons given for non-employment were highly related to young children in the home and other family connected responsibilities. Very few, about 6-7% of those not employed, gave reasons related to availability of employment. Of those who did, about one-third reported that satisfactory hours were not available rather than a lack of job opening as a reason for non-employment.

Most who were not working at the time of the survey plan to return to work in the same occupation sometime in the future. Very few indicate they have left the occupational role permanently.

HEALTH OCCUPATIONS EDUCATION PROGRAMS

Graduates generally indicated a very high level of satisfaction with the HOE programs they attended. The majority felt they were adequately prepared for their occupational role as a result of having attended the HOE program.

When querried about two important factors that motivate people to seek specific preparation for employment, a high percentage gave positive responses. Almost 95% of the graduates indicated they gained a greater degree of financial security by graduating from the HOE program. More than 98% also indicated that they had realized a personal satisfaction through completion of an HOE program and employment in a health career that they would probably not have experienced had they not done so.

Although graduates expressed a high level of satisfaction, there was a very firm attitude expressed in the survey that more clinical experience would have been helpful to them. More than 40% of the graduates expressed this need.

Recommendation:

Faculty members should implement procedures to evaluate the theory-clinical experience balance in individual programs to determine if too little emphasis is being placed on clinical experience.

When given the opportunity to suggest needed program improvements, approximately two-thirds of the graduates did not suggest changes. The remaining one-third suggested a variety of improvements in their individual programs. The major suggestions made are summarized in the following paragraphs.

Practical nursing graduates expressed the need for more content and experience in "administration of medications," and "obstetrics". The first suggestion regarding the administration of medications is a result of the changing role of practical nursing. While at one time this function was not common to this field, it is very much a part of the practical nurse's daily responsibility today. Some practical nursing programs may have not yet put the emphasis on this curricular area that graduates feel necessary.

Recommendation:

> Practical nurse faculties should evaluate their curriculum to determine if sufficient emphasis is being placed on the administration of medications to adequately prepare their graduates to function in this area in the employment situation.

The second area expressed by practical nurse graduates, and in addition associate degree nurse graduates, was the "obstetrics area". Obstetrics has become an increasingly difficulty area in which to schedule clinical experiences. Declining birth rates have reduced the availability of maternity patients which may make necessary the use of evening and night shifts for gaining adequate clinical experience in this area.

Some of the smaller programs may find it necessary to send students to large city hospitals for adequate OB experience.

Medical office assistants and medical laboratory assistant graduates both expressed a need for improvement in the "laboratory techniques" area. A sizeable group of the medical laboratory graduates also expressed a need for more content in "bacteriology". Dental assistant graduates also expressed the need for improvement in "laboratory techniques" as well as in X-ray procedures.

Faculty members are urged to study carefully the suggestions made by graduates in their particular type of program. Although only about one-third expressed the need for improvement, their attitudes in this respect are valuable guides to possible weaknesses in curriculum content and design.

Part Two

PRACTICAL NURSING

More than 85% of all graduates surveyed were practical nurses. This field has grown very rapidly and has become an important and viable part of patient care in our state. Because of this growth, the number of practical nurse programs in the state has also increased rapidly.

Concern has been expressed by some groups and individuals as to whether or not too many practical nurses are being prepared in the state. Data from this follow-up study were assembled in a paper which addressed itself to this concern. The paper is included on the following pages for the reader's information.

REGARDING THE POSSIBILITY OF AN
OVER-PRODUCTION OF PRACTICAL NURSES
IN IOWA

Compiled by Dale F. Petersen

Recent concern has been expressed regarding the possibility of over-production of practical nurses in Iowa. In practical nursing, as in most employment fields, actual manpower needs are extremely difficult to determine with any degree of accuracy. Due to many factors, job vacancy surveys are quite often not only inaccurate, but generally outdated by the time they are compiled. Therefore, it is also extremely difficult to determine actual over-production of personnel for specific employment categories on the basis of job vacancy data.

After careful consideration and much discussion, the professional staff of the Program in Health Occupations Education has determined that the best single indicator of over-production of practical nurses would be a significant reduction in the placement of graduates in employment situations. Placement data is readily available since the State Department of Public Instruction routinely submits to the U.S. Office of Education an annual follow-up of the graduates of all vocational-technical education programs. Traditionally, data compiled through this annual follow-up have shown that about 95% of the graduates of practical nurse programs are employed as LPN's almost immediately upon graduation each year. There appears to be no major variance in this placement rate up through 1969.

Data from a longitudinal follow-up of all H.O.E. graduates from 1956 through 1969, conducted recently by the Program in Health Occupations Education, University of Iowa, supports the above statement.

The findings of this questionnaire study are based on approximately a two-thirds return. A telephone survey of a sample of the non-respondents revealed no major characteristics in the non-respondent group which would preclude the generalization of the findings to the total population of graduates of Iowa's PN programs.

This study revealed that:

1. Ninety-seven percent of Iowa's PN graduates have been employed as LPN's. Only one percent have not been employed since graduation.
2. Eighty-five percent obtained their initial employment within one month after graduation; another 13% within six months. The one month figure has declined slightly since 1966, but the six month figure has remained almost constant, at about 97-98%.
3. Of all practical nurses graduated since 1956, 77% are currently employed. Of this currently employed group, 96.5% are employed as LPN's, 2.5% in related health occupations and only 1% in non-health occupations.
4. Eighty-seven percent of the state's PN graduates are currently living in Iowa. By year of graduation, the proportion of graduates remaining in Iowa has increased from 80% in 1965 to 91% in 1969.

These figures would seem to indicate that practical nurse graduates have not encountered any major difficulty in obtaining employment as LPN's in this state through 1969. Because concern for potential over-production of practical nurses had been expressed, and data from the follow-up study included graduates only through 1969, a telephone survey of the

22 public practical nursing programs (there is also one private program) was conducted to determine the placement status of their 1970 graduates. In each case, the coordinator of the program was contacted by telephone and asked three questions: (1) How many students did your program graduate in 1970?; (2) How many of those graduates are not currently employed as practical nurses?; and (3) Of those not employed, how many are actively seeking employment? The survey revealed the following:

1. Excluding the Des Moines and Carroll programs, for which figures were not immediately available, there were 751 persons graduated from Iowa's PN programs in 1970.

2. As of April, 1971, or about seven months after the graduation date of the majority of the 751 persons, 696 or 92.7% of them were employed as practical nurses. Only 55 or 7.3% were not then employed.

3. Of the 55 who were not employed, only 16, which represents 2.1% of the graduates were actively seeking employment.

It must be pointed out at this point, on the basis of comments by the various coordinators, that many of those looking for employment have certain conditions which they consider essential prerequisites to satisfactory employment. Among these conditions are: (1) no weekend hours; (2) no evening or night shift work; and (3) other similar conditions which may make employment acceptable to them.

In addition, among those who are not employed, and not actively looking, are several in the midst of wedding plans, several who are not

interested in immediate employment and several others who for similar reasons were delaying the employment-seeking process.

The results of this survey would indicate, that even through 1970, the graduates of Iowa's practical nurse programs have not experienced difficulty in securing employment. Based on the results of these two follow-up activities, it would appear that the concern expressed recently that too many practical nurses are being prepared in Iowa is, at this time, premature and with no sound supporting evidence.

From another point of view, however, these figures indicate an extremely stable group with little turnover, low incidence of leaving the state, and long tenure. Together with the increased enrollments in PN programs in recent years, these three factors could potentially lead to a reduced job market for PN graduates. This, in itself, however, is misleading because it does not take into consideration the expansion of health care facilities, extension of services to new segments of the population and other growth factors. The recent and current growth in the number of nursing homes serves as a good example. To date, 74% of Iowa's PN graduates obtained their first employment in general hospitals; another 5% in specialized hospitals and medical facilities. Only 16% obtained their first employment in nursing homes and other kinds of extended care facilities. The rapid expansion of these health care units could provide an existing source of employment situations to which LPN's have not yet been attracted.

It remains that the most valid indicator of over-supply is a reduction in the placement rate. In the event there is a significant

reduction in the number of graduates obtaining jobs as LPN's, it would be incumbent upon each program, as well as the Program in Health Occupations Education, to re-evaluate the numbers of practical nurses being prepared annually and attempt to balance output with need.

LIST OF REFERENCES

1. U. S. Department of Health, Education and Welfare, Public Health Service, Health Manpower Source Book, Section 21, Allied Health Manpower, 1950-80. (Washington, D.C.: U. S. Government Printing Office, PHS Publication No. 263, 1970).

2. U. S. Department of Health, Education and Welfare, Public Health Service, Health Resources Statistics (Washington, D.C.: U. S. Government Printing Office, PHS Publication No. 1509, 1969).

3. Harry I. Greenfield and Carol A. Brown, Allied Health Manpower: Trends and Prospects (New York: Columbia University Press, 1969).

4. Helen K. Powers, "Some Facts About Vocational Education," paper published in National Conference for Health Occupations Education (Champaign, Illinois: University of Illinois, June 1970).

5. J. Chester Swanson, Development of Federal Legislation for Vocational Education (Chicago: American Technical Society, 1962).

6. Fred N. Kerlinger, Foundations of Behavioral Research, (New York: Holt, Rinehart and Winston, 1966).

A P P E N D I X A

1. Description of Iowa HOE Programs

2. Location of Programs by Institution

3. Names and Addresses of Institutions

BRIEF DESCRIPTION OF EACH TYPE OF
VOCATIONAL-TECHNICAL HEALTH OCCUPATIONS EDUCATION
PROGRAM PRESENTLY OFFERED IN IOWA

1. Associate Degree Nurse (Associate Degree in Applied Science)

This two-year program prepares students to carry out nursing care measures and medically delegated techniques, using principles derived from the social, physical, and biological sciences. Classroom instruction is closely correlated and concurrent with selected learning experiences in hospitals and other health-care areas.

After successfully completing an approved program, upon passing a State Board Examination the graduate becomes a Registered Nurse (R.N.).

2. Dental Assistant

This one-year program offers classroom and laboratory activities correlated with clinical practice. The graduate is prepared to assist the dentist at the chair, perform secretarial duties and do those laboratory procedures which are done in the dental office.

Certification (C.D.A.) is granted following graduation from an approved educational program, passing qualifying examinations and completing a specified amount of work experience.

3. Dental Laboratory Technician (Associate Degree in Applied Science)

Graduates of this two-year program are skilled craftsmen who make dentures crowns, bridges, and other dental and orthodontal appliances according to prescriptions provided by dentists. This member of the dental health team develops a high degree of skill in his chosen occupation through theoretical and laboratory studies which are well correlated throughout the program. Career opportunities are available in dental laboratories, individual dentist's office and in some hospitals.

Certification (C.D.T.) is gained through graduation from an approved program, passing an examination and completing a specified amount of satisfactory work experience.

4. Environmental Health Assistant

Following completion of this one-year program, the environmental health assistant is prepared to work with sanitary engineers, sanitarians and other public health officials in safeguarding the health and welfare of both urban and rural communities by inspecting housing conditions, milk,

water, sewage disposal facilities, air, food, and other potential health hazards. The curriculum is composed of correlated classroom, laboratory and field experiences.

5. Medical Office Assistant

This one-year program prepares the student to be employed in a private physician's office, clinic, hospital, or research laboratory. Through correlated classroom, laboratory and clinical experiences, the student learns to prepare patients for examination, perform routine laboratory tests and assist in office and medical record keeping activities.

Upon completion of an approved program and satisfactory work experience, the graduate is eligible to take the certification examination.

6. Medical Laboratory Assistant

This one-year program is designed to prepare qualified men and women to work in a medical laboratory under the supervision of a medical technologist or pathologist and/or other qualified physician. They perform routine laboratory procedures and tasks in the areas of bacteriology, blood banking, chemistry, parasitology, serology, and urinalysis.

Upon completion of an approved program, the student is eligible to take the certification examination (C.L.A.).

7. Nurse Aide-Orderly

This four-week program is designed to prepare the worker to perform simple and routine nursing care procedures to assist the patient in meeting his basic physical needs. The program consists of formal classroom teaching correlated with supervised clinical experience.

8. Occupational Therapy Assistant

This one-year program of classroom studies, laboratory experiences and clinical practice, prepares workers to give assistance to Registered Occupational Therapists in rehabilitative and therapeutic activities. The assistant becomes proficient in guiding and encouraging the patient in activities involving a variety of manual and creative areas for the attainment of specific treatment goals.

9. Operating Room Technician

Through this one-year program of classroom study, laboratory activities and clinical experience, the student learns to function under the direct supervision of the professional nurse or surgeon in the operating room. The activities of the operating room technician include preparation of surgical environment and serving as a "scrub" or "circulating" assistant during surgical procedures.

10. Orthopaedic Assistant (Associate Degree in Applied Science)

This two-year program prepares graduates to work with the orthopaedic surgeon in the emergency room, cast room, operating room, and other hospital areas as well as in clinics and private offices. Through correlated classroom, laboratory and supervised clinical experiences, the assistant is trained to prepare and maintain surgical equipment, assist in surgery, apply plaster casts and set up traction and suspension equipment.

11. Practical Nurse

This one-year program of concurrent classroom, laboratory, and clinical experiences prepares persons for employment in hospitals, nursing homes, doctors' offices and a variety of other health care facilities. The practical nurse gives nursing care to patients in situations relatively free of complexity and, in a close working relationship, assists registered nurses in giving nursing care to patients in more complex situations.

Following successful completion of the program, graduates are eligible to write the licensure examination to become a Licensed Practical Nurse (L.P.N.).

LOCATION OF PREPARATORY VOCATIONAL-TECHNICAL HEALTH OCCUPATIONS EDUCATION PROGRAMS OFFERED IN IOWA

PROGRAMS	AREA SCHOOL	ADMIN. CENTER	NUMBER
Associate Degree Nurse	Northeast Iowa Area One Vocational School	CALMAR	I
Dental Assistant	Dubuque		
Dental Laboratory Technician	Northern Iowa Area Community College	MASON CITY	II
Environmental Health Assistant	Iowa Lakes Community College	ESTHERVILLE	III
Medical Assistant	Northwest Iowa Vocational School	SHELDON	IV
Medical Laboratory Assistant	Iowa Central Community College	FORT DODGE	V
Nurse Aide-Orderly	Area VI Community College	MARSHALLTOWN	VI
Occupational Therapy Assistant	Hawkeye Institute of Technology	WATERLOO	VII
Operating Room Technician	Eastern Iowa Community College	BETTENDORF	IX
Orthopedic Assistant	Clinton		
Practical Nurse	Kirkwood Community College	CEDAR RAPIDS	X
Long-Term Care Fac. Adm.	Des Moines Area Community College	ANKENY	XI
	Boone		
	Des Moines		
	Carroll		
	Western Iowa Tech	SIOUX CITY	XII
	Cherokee		
	Iowa Western Community College	COUNCIL BLUFFS	XIII
	Harlan		
	Clarinda		
	Atlantic		
	Southwestern Community College	CRESTON	XIV
	Iowa Tech	OTTUMWA	XV
	Centerville		
	Southeastern Iowa Community College	BURLINGTON	XVI
	Mt. Pleasant		
	Keokuk		

PROGRAMS	Northeast Iowa Area One Vocational School	Dubuque	Northern Iowa Area Community College	Iowa Lakes Community College	Northwest Iowa Vocational School	Iowa Central Community College	Area VI Community College	Hawkeye Institute of Technology	Eastern Iowa Community College	Clinton	Kirkwood Community College	Des Moines Area Community College	Boone	Des Moines	Carroll	Western Iowa Tech	Cherokee	Iowa Western Community College	Harlan	Clarinda	Atlantic	Southwestern Community College	Iowa Tech	Centerville	Southeastern Iowa Community College	Mt. Pleasant	Keokuk
Associate Degree Nurse	X		X			X			X		X							X					X				X
Dental Assistant						X	X	X			X	X				X		X									
Dental Laboratory Technician											X																
Environmental Health Assistant											X																
Medical Assistant						X					X	X						X								X	
Medical Laboratory Assistant								X	X			X														X	
Nurse Aide-Orderly	X	X	X	X	X	X	X	X	X		X	X				X		X					X		X		
Occupational Therapy Assistant											X																
Operating Room Technician									X			X						X									
Orthopedic Assistant											X																
Practical Nurse	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X		
Long-Term Care Fac. Adm.												X															

NOTES: 1. Administrative Center of area schools in capital letters.
2. X indicates an existing program.

8/3/70

HEALTH OCCUPATIONS CURRICULA IN IOWA AREA COMMUNITY COLLEGES AND VOCATIONAL-TECHNICAL INSTITUTES

Occupation	Location of Program	Name of Administrative Agency	Coordinator's Name	Telephone
Dental Assistant	Ankeny (50021), 2006 Ankeny Blvd.	Des Moines Area Comm. College	Mrs. Sharon Moore	(515) 964-0651
	Cedar Rapids (52406), 6301 Bowling Street SW	Kirkwood Community College	Miss Vivian Klaus	(319) 398-5560
	Council Bluffs (51501), 225 Harmony	Iowa Western Community College	Mrs. Carol Lange	(712) 328-3831
	Fort Dodge (50501), 330 Avenue M	Iowa Central Community College	Mrs. Judy Sheets	(515) 576-7201
	Marshalltown (50158), 113 North First Ave.	Area VI Community College	Miss Betty Sovey	(515) 752-1767
	Sioux City (51105), 3075 Floyd Blvd.	Western Iowa Technical School	Mrs. Norma Kimbell	(712) 239-2622
	Waterloo (50701), 2800 Falls Avenue	Hawkeye Institute of Technology	Mrs. Kitti Hammer	(319) 234-7926
Medical Office Assistant	Ankeny (50021), 2006 Ankeny Blvd.	Des Moines Area Community Coll.	Mrs. Shirley Muenlenthaler	(515) 964-0651
	Cedar Rapids (52406), 6301 Bowling St. SW	Kirkwood Community College	Mrs. Mary Bard	(319) 398-5530
	Council Bluffs (51501), 225 Harmony	Iowa Western Community College	Mrs. Beverly McAtee	(712) 328-3821
	Fort Dodge (50501), 330 Avenue M	Iowa Central Community College	Mrs. Joan Natte	(515) 576-7201
	Mt. Pleasant (52642), 1200 East Washington	Southeastern Iowa Comm. College	Mrs. Marylee Dickson	(319) 385-8114
Medical Laboratory Ass't	Ankeny (50021), 2006 Ankeny Blvd.	Des Moines Area Comm. College	Mrs. Margaret Rowe	(515) 964-0651
	Davenport (52801), 627 West 2nd	Eastern Iowa Community College	Mr. Richard Heiman	(319) 326-0136
	Mt. Pleasant (52641), 1200 East Washington	Southeastern Iowa Comm. College	Mr. Howell Colbert	(319) 385-8114
	Waterloo (50701), 2800 Falls Avenue	Hawkeye Institute of Technology	Mrs. Joyce Timson	(319) 234-7526
Operating Room Technician	Ankeny (50021), 2006 Ankeny Blvd.	Des Moines Area Comm. College	Miss Deloris Benning	(515) 964-0651
	Council Bluffs (51501), 225 Harmony	Iowa Western Community College	Mrs. Cecelia Cronk	(712) 328-3831
	Davenport (52801), 627 West 2nd	Eastern Iowa Community College	Mrs. Aurelia Willers	(319) 326-0136
Occupational Therapy Ass't	Cedar Rapids (52406), 6301 Bowling St. SW	Kirkwood Community College	Mr. Frank Lydic	(319) 398-5520
Orthopedic Assistant	Cedar Rapids (52406), 6301 Bowling St. SW	Kirkwood Community College	Mrs. Noel Bishop	(319) 398-5400

NOTE: Zip code in parentheses
Address change after October 1: Council Bluffs (51505) 2700 College Road

HEALTH OCCUPATIONS CURRICULA IN IOWA AREA COMMUNITY COLLEGES AND VOCATIONAL-TECHNICAL INSTITUTES (Cont.)

Occupation	Location of Program	Name of Administrative Agency	Coordinator's Name	Telephone
Environmental Health Ass't	Cedar Rapids (52406), 6301 Bowling St. SW	Kirkwood Community College	Mr. Harold Kort	(319) 398-5513
Dental Laboratory Technician	Cedar Rapids (52406), 6301 Bowling St. SW	Kirkwood Community College	Mr. Robert Doubet	(319) 398-5528
Long Term Care Administrator	Ankeny (50021), 2006 Ankeny Blvd.	Des Moines Area Comm. College		(515) 964-0651
Associate Degree Nursing	Calmar (52132), 142 Main Street	Area I Vocational-Technical Sch.	Mrs. Donna Story	(319) 562-3338
	Cedar Rapids (52406), 6301 Bowling St. SW	Kirkwood Community College	Mrs. Phyllis Drennan	(319) 398-5400
	Clinton (52732) 1000 Lincoln Blvd.	Eastern Iowa Community College	Mrs. Marjorie Bottoms	(319) 242-6841
	Council Bluffs (51501), 225 Harmony	Iowa Western Community College	*Mrs. Irma Gibson	(712) 328-3831
	Fort Dodge, (50501), 330 Avenue M	Iowa Central Community College	Mrs. Kathryn Hyllengren	(515) 576-7201
	Keokuk (52632), 627 Main Street	Southeastern Iowa Comm. College	Mrs. Barbara Georges	(319) 524-3337
	Mason City (50401), 220 East State Street	North Iowa Area Comm. College	Miss Virginia Lawrence	(515) 423-1264
	Ottumwa (52501), Ottumwa Indus. Airport	Iowa Tech Area XV Community Coll.	Miss Ruby Holton	(515) 682-6081
Practical Nursing	*Atlantic (50022)	Iowa Western Community College		(712) 328-3831
	Boone (50036), 1125 Hancock Drive	Des Moines Area Comm. College	Mrs. Marine Betts	(515) 432-7203)
	Burlington (52601), Highway 34, West	Southeastern Iowa Comm. College	Mrs. Louise Elliott	(319) 752-6731
	Calmar (52132), 142 Main Street	Area I Vocational-Technical Sch.	Mrs. Donna Story	(319) 562-3338
	Carroll (51401), South Clark Street	Des Moines Area Comm. College	Mrs. Joan Schulte	(712) 792-3581
	Cedar Rapids (52406), 6301 Bowling St. SW	Kirkwood Community College	Mrs. Sue Collogan	(319) 398-5564
	Centerville (52544), 117 East Washington	Iowa Tech Area XV Comm. College	Mrs. Barbara Kruzich	(515) 856-6568
	Cherokee (51012), 101½ East Main	Western Iowa Technical School	Mrs. Genevieve Stratton	(712) 225-2414
	Clarinda (51632), 923 East Washington	Iowa Western Community College	Mrs. Roberta Kokenge	(712) 542-5117
	Clinton (52732), 1000 Lincoln Blvd.	Eastern Iowa Community College	Mrs. Carol Connell	(319) 243-3540

*will admit first class in 1971.

*acting

-12928972

HEALTH OCCUPATIONS CURRICULA IN IOWA AREA COMMUNITY COLLEGES AND VOCATIONAL-TECHNICAL INSTITUTES (Cont.)

Occupation	Location of Program	Location of Administrative Agency	Coordinator's Name	Telephone
Practical Nursing (cont.)	Council Bluffs (51501), 225 Harmony	Iowa Western Comm. College	Mrs. Betty Marsh	(712) 328-3831
	Creston (50801), 1501 Townline Street	Southwestern Comm. College	Mrs. Jeanne Herzberg	(515) 782-7081
	Davenport (52801), 627 West 2nd Street	Eastern Iowa Comm. College	Mrs. Joyce Brandt	(319) 326-0136
	Des Moines (50314), 1440 Center Street	Des Moines Area Comm. College	Mrs. Jeanette Edwards	(515) 288-2320
	Dubuque (52001), 1500 Locust Street	Area I Vocational-Technical Sch.	Mrs. Vivian Shubert	(319) 557-2928
	Emmetsburg (50536), Iowa Lakes Comm. College	Iowa Lakes Community College	Mrs. Lynn Dole	(712) 852-3554
	Fort Dodge (50501), 330 Avenue M	Iowa Central Comm. College	Mrs. Dorothy Husske	(515) 576-7201
	Harlan (51537), 1018½ Sixth Street	Iowa Western Community College	Mrs. Freda Samuelson	(712) 755-5219
	Marshalltown (50158), MACH-WEST	Area VI Community College	Mrs. Beverly Nelson	(515) 753-6661
	Mason City (50401), 220 East State Street	North Iowa Area Comm. College	Mrs. Leona Heagel	(515) 423-1264
	Ottumwa (52501), Ottumwa Indus. Airport	Iowa Tech Area XV Comm. College	Miss Ruby Holton	(515) 682-8031
	Sioux City (51101), 3075 Floyd Blvd.	Western Iowa Technical School	Mrs. Julia Jacobson	(712) 239-2622
	Waterloo (50701), 2800 Falls Avenue	Hawkeye Institute of Technology	Mrs. Arlene Larson	(319) 234-7528
Nurse Aide-Orderly	Multiple locations within area	Area I Vocational-Technical Sch.	Mr. Gene Gardner	(319) 562-3227
	" " " "	North Iowa Area Comm. College	Mr. Don Ryerkerk	(515) 423-1264
	" " " "	Iowa Lakes Community College	Mr. Robert VanDriel	(712) 363-2260
	" " " "	Northwest Iowa Vocational Sch.	Mr. C. E. Martin	(712) 324-2567
	" " " "	Iowa Central Community College	Mr. Larry Warford	(515) 576-7201
	" " " "	Area VI Community College	Mr. Don McGuire	(515) 752-4643
	" " " "	Hawkeye Institute of Technology	Mrs. Gwen Hickey	(515) 234-7528
	" " " "	Eastern Iowa Community College	Mrs. Phyllis Panzer	(319) 326-0136
	" " " "	Kirkwood Community College	Mr. Frank Mulhern	(319) 398-5521

HEALTH OCCUPATIONS CURRICULA IN IOWA AREA COMMUNITY COLLEGES AND VOCATIONAL-TECHNICAL INSTITUTES (Cont.)

Occupation	Location of Program	Name of Administrative Agency	Coordinator's Name	Telephone
Nurse Aide-Orderly (Cont.)	Multiple locations within area	Des Moines Area Comm. College	Dr. Robert Eicher	(515) 964-0651
	" " " "	Western Iowa Community College	Mrs. Julia Jacobson	(712) 239-2622
	" " " "	Iowa Western Community College	Mr. Jack Gell	(712) 328-3831
	" " " "	Southwestern Community College	Mr. Leonard Kuhre	(515) 782-7081
	" " " "	Iowa Tech Area XV Comm. College	Miss Ruby Holton	(515) 682-8081
	" " " "	Southeastern Iowa Area Comm. Coll.	Mr. Lowell Hewitt	(319) 752-2731
Heads of Health Occupations Programs	Cedar Rapids (52406), 6301 Bowling St. SW	Kirkwood Community College	Frank Mulhern	(319) 398-5521
	Council Bluffs (51501), 225 Harmony	Iowa Western Comm. College	Mrs. Margaret Stanley	(712) 328-3831
	Davenport (52801), 627 West 2nd St	Eastern Iowa Community College	Mrs. Phyllis Panzer	(319) 326-0136
	Sioux City (51101), 3075 Floyd Blvd.	Western Iowa Tech	Mrs. Julia Jacobson	(712) 239-2622
	Waterloo, (50701), 2800 Falls Ave.	Hawkeye Institute of Technology	Mr. John Holmes	(319) 234-7528

-131-28874

A P P E N D I X B

1. Graduate Address Form

2. Questionnaire

3. Data Card Formats

   a. Address card format

   b. Data card formats, 1 & 2

7/1/69

HEALTH OCCUPATIONS EDUCATION FOLLOW-UP

PROGRAM_____ SCHOOL_____ CLASS GRADUATED_____
Month Year

Form Completed by_____ Date_____

NAME	STREET ADDRESS	CITY	STATE	ZIP	PHONE

Appendix B-1

IOWA HEALTH OCCUPATIONS EDUCATION
FOLLOW-UP STUDY

Program in Health Occupations Education
The University of Iowa

Name:_____

Street:_____

City:_____State:_____

Telephone:_____Zip Code:_____

Please check your name and address on the label carefully and make all necessary corrections in the space above.

Dear Graduate:

We understand that you are a graduate of an Iowa health occupations education program. To date, more than three thousand (3,000) people have graduated from forty-seven (47) health occupations education (HOE) programs in Iowa. The University of Iowa has undertaken a project designed to determine what the graduates--people like yourself--have done since graduation. The purpose of this study is to provide information that will help evaluate existing HOE programs and aid in planning new and expanding programs.

To meet this goal, we would like to ask you, a graduate... Where are you now? Are you working? Have you completed additional education? How do you feel about the HOE program you graduated from? And more....

If we had our way, we would ask you these questions in person. However, we've had to limit ourselves to the answers we can get from a quick-check questionnaire just about one coffee break long. We hope you will take a few minutes to fill out the questionnaire just as soon as you finish reading this letter. The information you provide us will be of great value to schools, educational planners and future health occupations students. We have provided a postage paid, self-addressed envelope so that you can put the questionnaire in the mail as soon as you complete it.

You may have some answers or suggestions that we didn't think of questions for; if so, write us a note on the extra sheet we have provided. We'll welcome any off-the-cuff comments regarding your education or experience in the health occupations.

The information you provide us will be strictly confidential. You will not be identified as an individual to anyone outside the study staff. Materials provided for use by schools in evaluation will be reported by groups of graduates, not individually.

Sincerely,

Dale F. Petersen

Dale F. Petersen
Project Director

fv

I. PERSONAL

Date of birth____/____/____ Present age_____ Sex: M F

Present marital status: (check one)
1__Single 2__Married 3__Widowed 4__Separated or Divorced 5__Religious Order

Total number of children_____ Number of children under 6 years of age_____

II. EDUCATION

From what type of health occupations education (HOE) program did you graduate? (check one)

01___ Practical Nursing
02___ Associate Degree Nursing
03___ Operating Room Technician
04___ Medical Office Assistant
05___ Medical Laboratory Assistant
06___ Dental Assistant
07___ Dental Laboratory Assistant
08___ Orthopedic Technician
09___ Environmental Technician
10___ Occupational Therapy Assistant

In what month and year did you graduate from this program?_____

In what city was this program?_____

Had you worked in a health occupation before you entered the HOE program? 1___Yes 2___No
If Yes, what type of work? (Check only the one in which you had the *most* experience)

1___ Nurse Aide
2___ Home health care worker
3___ Candy Striper
4___ Adult health volunteer worker
5___ Student nursing club
6___ Red Cross–first aide work
7___ Other (specify)_____
_____

Have you had additional formal education since you graduated from the HOE program? 1___Yes 2___No
If Yes, was it 1___in the same health occupation, 2___another field (specify)_____

Since graduation from the HOE program, have you received another
1___Certificate 2___Diploma 3___Degree
If so, in what field?_____

Do you plan to pursue more formal education in the future? 1___Yes 2___No
If so, in what field?_____

Given the opportunity to apply your current education and experience toward admission, would you
1___enter, as a full-time student, another educational program to prepare for a new health occupation which requires more education.

2___enter, as a part-time student, another educational program to prepare for a new health occupation which requires more education.

3___continue in the occupation for which I am now prepared.

Where applicable, in what states are you licensed to practice?_____

III. EMPLOYMENT EXPERIENCE

1. First job after graduation from the HOE program.

My *first job* after graduation from the HOE program was

1___in the occupation for which the HOE program prepared me.
2___in a related health occupation (specify)_____
3___other (specify)_____

How long after you graduated from the HOE program did you begin this job?_____

This job was 1___full-time, 2___part-time; Number of Hours/Wk._____

What was your *beginning* monthly salary (before deductions) on your *first* job?

1___less than $240
2___$240 – $320
3___$320 – $400
4___$400 – $480
5___$480 – $560
6___$560 – $640

My first job was in a (check one)

1___General Hospital
2___Special hospital (specify)_____
3___Nursing Home
4___Public health agency
5___Private Duty
6___Other (specify)_____

If appropriate, what was the bed size or capacity, not including bassinets?

01___ 0-25
02___ 26-49
03___ 50-99
04___100-149
05___150-199
06___200-299
07___300-399
08___400-499
09___500 and over
10___Other (specify)_____

In what city or town did you obtain your first job after graduation?_____

My first job was
1___in the health agency where I received *most* of my clinical experience while in the HOE program.
2___in the same city where I received *most* of my clinical experience.
3___in another city _____ miles away from where I received *most* of my clinical experience. City:_____

How long did you work at your first job?_____

How satisfied were you with your first job?
1___extremely satisfied 2___quite satisfied 3___satisfied 4___dissatisfied 5___very dissatisfied

How many jobs have you held since graduation from the HOE program?_____

Have you worked out of Iowa since graduation from the HOE program? 1___Yes 2___No
If Yes, where (city & state):_____

Have you moved permanently from Iowa? 1___Yes 2___No
If Yes, to what state?_____

2. Present or last job held (COMPLETE THIS SECTION ONLY IF YOU HAVE HAD MORE THAN ONE JOB SINCE GRADUATION)

My present or last job held is/was
1___in the occupation for which the HOE program prepared me.
2___in a related health occupation (specify)_____
3___other (specify)_____

My present or last job is/was 1___full-time, 2___part-time; Number of Hours/Wk._____

What is/was your *most current* monthly salary (before deductions) on your present or last job?

1___less than $240
2___$240 – $320
3___$320 – $400
4___$400 – $480
5___$480 – $560
6___$560 – $640

My present or last job is/was in a (check one)

1___General hospital
2___Special hospital (specify)_____
3___Nursing home
4___Public health agency
5___Private duty
6___Other (specify)_____

If appropriate, what is the bed size or capacity, not including bassinets.

01___ 0-25
02___ 26-49
03___ 50-99
04___100-149
05___150-199
06___200-299
07___300-399
08___400-499
09___500 and over
10___Other (specify)_____

In what city or town is/was your current or last job?_____

My present or last job is/was (check one in *a* and one in *b*)

a. 1___where I received *most* of my clinical experience while in the HOE program I attended.
2___in the same city where I received *most* of my clinical experience.
3___in another city _____ miles away from where I received *most* of my clinical experience. City:_____

b. 1___in the same health agency as my first job after graduation.
2___in another institution or agency in the same city where I had my first job.
3___in another city _____ miles away from my first job. City:_____

How long did you work at your current or last job?_____

How satisfied are you with your present job?
1___extremely satisfied 2___quite satisfied 3___satisfied 4___dissatisfied 5___very dissatisfied

Since graduation, have you worked in an occupation not related to the health field for which the HOE program prepared you?
1___Yes 2___No
If Yes, what occupation(s)_____

Are you employed at the present? 1___Yes 2___No
If No, what is the *most descriptive* reason you are not employed?

01___Retirement	06___Job not available
02___Family responsibility (general)	07___Satisfactory hours not available
03___Illness	08___Job terminated
04___Pregnancy	09___Personal reasons
05___Young children in the home	10___Other (specify)_____

If you are unemployed, do you plan to return to work sometime in the future? 1___Yes 2___No
If Yes, in approximately how many months?_____

In what occupation do you plan to return?_____

IV. HEALTH OCCUPATIONS EDUCATION PROGRAM

Do you feel the program from which you graduated prepared you adequately for employment in the health occupation you were studying for? 1___Yes 2___No

Do you feel the program 1___contained too much theory (classroom content), 2___too little theory, 3___about the right amount of theory?

Do you feel the program 1___contained too much clinical experience, 2___too little clinical experience, 3___about the right amount of clinical experience?

Have you been required by your employer to perform functions which *were not* included as a part of your educational program?
1___Yes 2___No
If Yes, what are some of these functions (use extra space if necessary)
1._____
2._____
3._____
4._____

What part or parts of your program do you feel could have been improved? (Basic Nursing, OB, Adm. of Meds., Office techniques, laboratory techniques, etc.)	How do you feel the part or parts could have been improved? (check where appropriate)				
	More time	More theory	More clinical practice	Better Equip.	Better Instruction
1. _____	____	____	____	____	____
2. _____	____	____	____	____	____
3. _____	____	____	____	____	____
4. _____	____	____	____	____	____

In general, how do you feel about the HOE program from which you graduated?
1___extremely satisfied 2___quite satisfied 3___satisfied 4___dissatisfied 5___very dissatisfied

Do you feel completing the program has helped provide you economic security? 1___Yes 2___No

Do you feel the program, or employment as a health worker, has provided you with a personal satisfaction that you would not have experienced had you not taken the program? 1___Yes 2___No

In the near future, we plan to do a study of employers of health occupations graduates. You can help us by providing the name and address of your employer. You need not feel obligated to do this, but we would appreciate your help.

Employer_____

Street_____

City & State_____

IOWA H.O.E. FOLLOW-UP

Coding Format 1

Graduates' Address Cards

Column Number	Item	Code
1-23	Name - First, middle initial, last	
24-46	Street Address	
47-67	City and State	
68-72	Zip Code	
73-74	School Number	1
75-76	Program Type	2
77-79	Graduate Number	Chronological
80	Deck Number 1	

IOWA HOE FOLLOW-UP STUDY

Coding Format 2

QUESTIONNAIRE RESPONSES

Card 1:

Column	Item	Code
1-3	Individual I.D. number	
4,5	School	1
6,7	Program type	2
8-11	Month and year of graduation	
12,13	Present age	
14	Sex	M=1,F=2
15	Marital status	3
16	Total number of children	4
17	Number of children under 6 years	4
18,19	Type of experience	6
20,21	Additional education since graduation - field	7
22	Certificate, Diploma, Degree since graduation	8
23,24	What field?	7
25,26	Pursue more formal education - field	7
27	Opportunity for advanced study	9
28	Number of states licensed	4
29	Relevance of first job	10
30,31	Title of first job (if related or other)	11
32,33	Begin job after graduation	# months
34	Full-time - Part-time	1 FT 2 PT
35,36	Number hours/week (if part-time)	Avg. range
37	Beginning salary - first job	12
38,39	First job - type of institution	13
40,41	First job - bed size	14
42	Distance - first job from clinical agency	15
43-45	First job - length of tenure	# months
46	First job - level of satisfaction	16
47	Number of jobs since graduation	4
48,49	Worked out-of-state	# states
50,51	State moved to	17
52	Relevance of last or most current job	10
53,54	Title of last or most current job(related;other)	11
55	Present or last job full-time - part-time	1 FT 2 PT
56,57	Number of hours/week (if part-time)	Avg. range
58	Most current salary	12
59,60	Last or most current job - type of institution	13
61,62	Last or most current job - bed size	14
63	Last or most current job - distance from primary clinical agency	15

64	Last or most current job - distance from first job		15
65-67	Last or most current job - length of tenure		# months
68	Last or most current job - level of satisfaction		16
69-70	Non-health related work since graduation		11
71	Currently employed?		5
72,73	Reason for unemployment		18
74,75	Plan to return to work? # months	97	not sure
		98	soon as possible
		99	no, or already working
76,77	Return in what occupation?		11
78	Blank		
79	Card number = 1		
80	Deck number = 2		

IOWA HOE FOLLOW-UP STUDY

Coding Format 2

Card 2:

Column	Item	Code
1-3	Individual I.D. number	
4,5	School number	1
6,7	Program type	2
8-11	Month and year of graduation	
12	Program prepared adequately	5
13	Amount of theory	19
14	Amount of clinical experience	19
15	Perform additional functions	5
16, 17	Additional function 1	20
18,19	Additional function 2	20
20,21	Additional function 3	20
22,23	Additional function 4	20
24,25	Area of program that could be improved 1	21
26,27	How it could be improved	22
28,29	Area of program that could be improved 2	21
30,31	How it could be improved	22
32,33	Area of program that could be improved 3	21
34,35	How it could be improved	22
36,37	Area of program that could be improved 4	21
38,39	How it could be improved	22
40	Level of satisfaction with program	16
41	Provided economic security	5
42	Provided personal satisfaction	5
43	Writtem comment	5
44-78	Blank	
79	Card number = 2	
80	Deck number = 2	

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ABSTRACT - DESIGNED FOR VOCATIONAL EDUCATORS, THIS HANDBOOK WAS DEVELOPED TO HELP THE INDIVIDUAL RESEARCHER UNDERSTAND THE PURPOSE AND METHODS OF THE LITERATURE REVIEW. THE DOCUMENT ALSO PROVIDES A DISCUSSION OF INFORMATION SOURCES AND THEIR USES. SOURCES DISCUSSED INCLUDE THE ENCYCLOPEDIA, YEARBOOKS, RESEARCH REVIEWS, THE BIBLIOGRAPHIC INDEXES, PERIODICALS, AND RELATED REFERENCES. (JS)

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UNIVERSITY OF MINNESOTA

TECHNICAL REPORT

RESEARCH COORDINATING UNIT FOR VOCATIONAL EDUCATION

JUNE, 1971

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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REVIEWING THE LITERATURE: A HANDBOOK FOR THE VOCATIONAL RESEARCHER

DAVID N. WHEELER

There were perhaps 500,000 new books published last year, along with an uncounted number of articles, pamphlets, monographs and conference proceedings (not to mention technical reports). Over the last few years also, many new methods of information processing have emerged, such as keyword searching and the extensive use of microform. This technical report is designed to help the individual researcher find his way through this veritable maze of information, so that he may gain insight into what has gone before with regard to his problem area.

The report is divided into two sections: Section I is concerned with the purpose and method of conducting reviews of the literature, and Section II deals with specific information sources, proceeding approximately from the general to the more topic-specific.

SECTION I: THE LITERATURE REVIEW — THE WHY AND THE HOW

In the past, most research in vocational education was done by the student for a graduate thesis. The relatively small volume of research completed made information retrieval a small, albeit annoying, problem. However, three aspects of the vocational situation augur for better, more productive times ahead and provide the justification for this report. First, there is increased emphasis in vocational education upon research and formalized development activities. As examples, consider the creation of state Research Coordinating Units, the national research centers, and the American Vocational Education Research Association; all have enhanced, and focused attention upon, the potential contributions of research. Second, resources for research and development, such as those specified by the 1968 Vocational Amendments, have increased means to generate significant projects. Finally, increasing attention to theoretical bases for research activities has resulted in a considerable accumulation of knowledge relevant to the field.

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Purposes of the Literature Review

Reviews of the literature are undertaken as a step in the research planning process for two basic purposes: (1) to conceptualize the problem area and to formulate insightful research problems and questions, and (2) to see how others have approached the study of the problem. The review helps to insure the efficient cumulation of useful knowledge by preventing naive attacks upon inappropriate problems.

It is predictable that one of two conditions will seem to exist in any given search of the literature; there will appear to be either too much or too little relevant material. Actually, though, there is always just the right amount of material--the less that is written directly about the research problem, the wider the search that is usually needed to properly conceptualize the problem within some broader educational context.

Method of Reviewing

To paraphrase an old Army saying, there are three ways of reviewing: the wrong way, the right way, and the new technology way. The "wrong" way is to browse through the library, find several references that fit fairly well, several more that will fit if forced, and round out the procedure by thumbing through whatever journals are at hand. It is not so much that this method is not conceptually neat, but rather that a haphazard search may be completely misleading.

The "right" way, on the other hand, may or may not take more energy, but it will give considerable assurance of balance in the search for a knowledge base. The essence of this method is to start at a broad general level to permit proper definition of the problem area under consideration, and then, as the research problem comes into focus, to spiral inward by selecting more specific kinds of references. Thus, the usual reading progression would lead from general references, such as encyclopedias, yearbooks, and texts, to reviews of research, to abstracts, and then to complete reports of specific studies. This process of delineation and delimitation should result in (1) a conceptualization of the problem area in its educational context and clarification of its practical and/or theoretical base, (2) the identification of a significant, properly delimited research problem and relevant theory, (3) knowledge about specific modifying variables and operational definitions, and (4) ideas pertaining to research design, instrumentation and existing data.

Finally, the "new technology" method typically consists of obtaining a fairly extensive bibliography of related materials, provided more-or-less to specification by way of a computerized search of a large body of literature. Systems are only now becoming operational, and are certain to become quite elaborate in the future. Two points should be kept in mind in the use of these systems: (1) the system can only draw from whatever constitutes its larger body, and all systems at present and in the foreseeable future will have some limitations in this regard, and (2) the researcher still must specify, further select, and synthesize the information desired. In fact, these systems should be utilized to facilitate and complement, rather than to replace, a carefully conducted literature review.

As references are used, the researcher should compile a complete bibliographic record of the items read, as well as those to be read; each reference provides clues to other references. The researcher should also keep notes of the ideas and information that are useful to him, and devise or select a system for classifying the notes so that they may be recalled and organized efficiently for later use in preparing research proposals and reports. (A description of such systems, however, is beyond the scope of this report; consult a text on basic research procedures for suggestions.)

Selecting and Evaluating Materials

The reviewer should not expect to read everything that is relevant; he must try to develop a feel for the point of diminishing returns, while recognizing that a little extra time spent in review is preferable to carrying out a misdirected or inadequately designed study. Similarly, reading reviews and abstracts may suffice for many studies--especially in the earlier stages of the review or when their subject matter is only tangentially related to the delimited research problem. But the "classics" in the area, and certainly the more recent, relevant studies, should be read in their entirety for several reasons. First, interpretation is difficult, so the reviewer must be particularly careful of one author's interpretation of someone else's work--always trying to get as close to the primary source as possible. Second, the results of outwardly similar research may be conflicting and careful scrutiny of the methodologies may be required to assess the validity and relevance of the results. Finally, in order to evaluate the potential usefulness of instruments, procedures, etc. utilized by other investigators, a careful examination of them is required.

Resources

Burke, Arvid J. and Mary A. Burke. Documentation in Education. New York: Teachers College Press, Columbia University, 1967.

Gillooly, William B. The Literature Search: Document Retrieval in the Behavioral Sciences. Somerset, New Jersey: Mariner Press, 1969.

Whitlock, Gerald H. "Research Information Sources in Training, A Comprehensive Survey of Present and Planned Resources." Training and Development Journal, Vol. 21, No. 11, November, 1967.

SECTION II: INFORMATION SOURCES

A good basic understanding of the historical development, current status, and possible direction of most educational problem areas may be gained by referring to the general reference books listed in the first two subsections which

follow. Then, as the research problem within the problem area is more precisely defined by the researcher, the more specific references in subsequent subsections will be consulted. The bibliography provided by each reference will assist in the construction of a comprehensive study bibliography.

The user of this report may wish, as references are located in his library, to note the call numbers or location reference in the box to the left of the reference. Space is left below each reference for personal notes and comments.

Gaining an Overview

General encyclopedias may provide an excellent overview of a topic, including a summary of practice, theoretical positions, a historical review, and an organizational framework, as well as a short bibliography. Articles are typically written by specialists and are signed. However, even in an encyclopedia with a recent copyright date, the specific article may be several years old (check the bibliography for clues). The two standard "college-level" sets of encyclopedias are listed below. Either one or both may be consulted.

ENCYCLOPEDIA AMERICANA. New York: Americana Corp. (latest edition). 30 volumes.

ENCYCLOPEDIA BRITANNICA. Chicago: Encyclopedia Britannica, Inc. (latest edition). 24 volumes.

Surprisingly, there is no current, broadly based educational encyclopedia relating to American education. The only educational encyclopedia broad in scope since the venerable, scholarly Cyclopedia of Education and the Encyclopedia of Modern Education is the volume by Blishen below. Unfortunately, its references are mainly to British schools. It would be most useful for comparative or international educational studies.

Blishen, Edward (ed.) ENCYCLOPEDIA OF EDUCATION. New York: Philosophical Library, 1970.

The other volumes, obviously dated, are:

Monroe, Paul (ed.) CYCLOPEDIA OF EDUCATION. New York: The Macmillan Co., 1913. 5 volumes.

Rivlin, Harry N. and Herbert Schueler (ed.) ENCYCLOPEDIA OF MODERN EDUCATION. New York: Philosophical Library, 1943.

Two additional encyclopedia-like references concerned with education are listed below. The first is an "encyclopedia" designed particularly for school administrators, which deals more with "how to" than "why". It is well organized around fifteen major divisions. The second volume is a somewhat dated small handbook published by Rand-McNally. It contains sections on organization and administration, curriculum by subject areas, and a section devoted to comparative education.

Smith, Edward W. and others. THE EDUCATOR'S ENCYCLOPEDIA. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1961.

Foshey, Arther W. (ed.). THE RAND-McNALLY HANDBOOK OF EDUCATION. Chicago: Rand-McNally and Co., 1963.

The Encyclopedia of Educational Research. This standard reference contains "status" reports on over 160 educational topics, mostly written by prominent specialists in each area. Illustrative of the topic headings are articles on "Vocational and Technical Education," "Agricultural Education," "Military Education," "Statistical Methods," and "Education in Developing Nations." Each article, written for a general educational research audience, contains background information, a summarization of research, and a discussion of problems and researchable

areas. Following each article is an extensive list of associated references. The three earlier editions may also provide useful information.

Ebel, Robert L. and others (ed.). ENCYCLOPEDIA OF EDUCATIONAL RESEARCH. 4th ed. New York: The Macmillan Co., 1969.

The Britannica Review of American Education. Aimed at the "practitioner" in education, particularly those at the high school level, this series proposes to survey the educational field and report on a potpourri of important educational topics through a volume each year. The reviews present information "translated from the language of the researcher into the language of the layman."

Hays, David G. (ed.). BRITANNICA REVIEW OF AMERICAN EDUCATION. Chicago: Encyclopedia Britannica, Inc., (Volume 1, 1969, plus following).

Yearbooks - An Overview Still

The wide range of materials listed in this subsection all attempt to present a current report of the state of a more-or-less specific field or topic. They differ from the reviews of research covered in the next section in that they tend to present more the status of practice and philosophical outlook than a research viewpoint.

NSSE Yearbooks. Two books each year are published by the National Society for the Study of Education (NSSE). Each book, devoted to a particular topic, is comprised of chapters prepared by various specialists under the editorship of a recognized authority in the field. The series, started in 1902, devoted its first volume to vocational education in 1905, and its most recent volume in 1965. That issue, Vocational Education, Part 1, was edited by Barlow. Other recent yearbooks have dealt with such topics as Programmed Instruction (1967), Metropolitanism (1968), and The Educationally Retarded and Disadvantaged (also 1967). The Barlow volume is listed below:

Barlow, Melvin L. (ed.). VOCATIONAL EDUCATION: The Sixty-fourth Yearbook of the National Society for the Study of Education, Part 1. Chicago: The University of Chicago Press, 1965. (One volume of a series.)

The World Year Book of Education Series. This set of yearbooks is similar in concept to the NSSE series. However, the World Year Books may best be utilized to provide an international perspective to educational problems as the authorship is drawn from the international community. The 1968 issue listed below is directly related to vocational education. Other recent issues include The Education and Training of Teachers (1963), The Education Explosion (1965), and Education in Cities (1970).

Lauwerys, Joseph A., and David G. Scanlon. EDUCATION WITHIN INDUSTRY. The World Year Book of Education 1968. New York: Harcourt, Brace, and World, 1968. (One issue of a series.)

Many other learned societies and special-interest groups produce yearbooks or similar yearly summaries. A number of those of possible interest to vocational educators are listed below:

American Council on Industrial Arts Teacher Education YEARBOOK
American Vocational Association YEARBOOK
Association for Student Teaching YEARBOOK
Association for Supervisor and Curriculum Development YEARBOOK
John Dewey Society YEARBOOK
National Art Education YEARBOOK
National Business Education YEARBOOK

Research Reviews - "Only the Facts"

These sources, if current, are potentially the most helpful in quickly building a research-related bibliography for further review. The information is often in a "less digested" form than that presented by the yearbooks above.

Review of Educational Research. This series of reviews, which was published five times a year from 1931 until 1970, devoted each issue to a different topical area of interest. Some fifteen topical areas were included in the full set of issues, and the review would periodically "revisit" areas. Examples of topical areas include "Adult Education," "Curriculum Planning and Development," and "Educational and Psychological Testing." The two most recent issues devoted to "Vocational, Technical, and Practical Arts Education" were the October issues of 1962 and 1968. This topical issue review format was discontinued by the publication in 1970.

"Vocational, Technical, and Practical Arts Education," Review of Educational Research, Vol. XXXVIII, No. 4, October, 1968. (One issue of a series.)

The Center for Vocational and Technical Education Publications. The Center for Vocational and Technical Education, The Ohio State University, has produced several publications series, including a Research and Development Series, a Leadership Training Series, a Bibliography Series, an Information Series, and a Center Related Series. The Information Series consists of over twenty titles of "Review and Synthesis of Research on . . ." for specific vocationally-related topics. These valuable reviews, produced by individual subject-matter specialists, are available in either hard-copy or microfiche form, and are listed on the back pages of the ARM-AIM publications of the Center (see below). An abbreviated partial listing of the series includes titles relating to:

Agricultural Education
Business and Office Education
Cooperative Vocational Education
Distributive Education
Home Economics Education
Industrial Arts Education
State Advisory Councils
Trade and Industrial Education
Vocational Education in Rural Areas

Minnesota Research Coordinating Unit (Minn. RCU). Several reviews of research and summaries of studies have been published by the Minnesota RCU. Separate publications are currently available at no cost on the topics listed below. Additional reviews and bibliographies will be published on a non-regular basis.

Creativity
Vocational-Technical Teacher Education
Student Selection and the Prediction of Success in Occupational Education
Bibliography of Studies in Occupational Education Conducted in Minnesota: 1965-67
Summary of Studies Conducted in Minnesota, 1965-67
Status of Vocational Education Research and Development Activities in Minnesota 1968-1970

The Bibliographic Index - A Final Check

In reviewing research in a field where the researcher is largely unfamiliar with the basic literature, or when the sources listed above seem somewhat out-of-date, a possible source for locating current bibliographies is the Bibliographic Index. This is a good source over a wide range of topics. Some 1700 periodicals, plus much other published material, are reviewed for bibliographic material.

BIBLIOGRAPHIC INDEX. New York: H. W. Wilson and Co., (monthly, cumulated).

Should the reviewer have access to the "new technology," this would be a reasonable point in the review process to request a computer search, etc. for special bibliographies. It is presumed that the process of delimiting the problem area has begun, and that the special bibliographies can be made relevant to his particular research problem.

Reviewing the Periodicals

The purpose of reviewing the periodicals is to obtain recent information about instrumentation, techniques, results, etc. not yet assimilated into published reviews and "status" articles. Therefore, in most cases there is little need to delve more than several years into back issues.

Current Index to Journals in Education (CIJE) is a companion volume to RIE (see below). Both are publications of the Educational Resources Information Center (ERIC) system. Over 500 periodicals and other journals are indexed monthly, including both journals central as well as peripheral to education. Included are four separate indexes: (1) a subject index, which lists titles according to certain keywords descriptive of the contents of the article, (2) an author index, (3) a journal contents index, and (4) a main entry index, which categorizes entries into 52 separate broad areas, such as "evaluation," "employment," and "tests." The index is cumulated semi-annually and annually.

CURRENT INDEX TO JOURNALS IN EDUCATION. New York: CCM Information Corp. (monthly,cumulated).

The Education Index. Although the Education Index covered books, yearbooks, government publications, and other published material until 1961, it is now restricted mainly to periodical education literature and U.S.O.E. materials. It is a subject-matter reference, and is published monthly. Some 240 journals are indexed, these selected by "subscriber vote." Several international and foreign journals are included; most of the larger vocational journals are reviewed.

THE EDUCATION INDEX. New York: H. W. Wilson Co., (monthly, cumulated).

Many other indexes exist. These may be consulted for special purposes. Several are listed below:

READERS GUIDE TO PERIODICAL LITERATURE. New York: H. W. Wilson Co. (semi-monthly, cumulated). This index includes both author and subject guide to popular and general periodic literature.

NEW YORK TIMES INDEX. New York: New York Times, Inc. (cumulated annually). Provides an index and brief summary to articles appearing in the New York Times.

BRITISH EDUCATIONAL INDEX. London: The Library Association (periodically cumulated). This index is similar to the Education Index, except that it lists articles appearing in British periodicals.

Various other indexes, such as the Cumulative Book Index, Psychological Index, Books in Print, The National Union Catalog, and the Vertical File Index may be of assistance in locating particular information. The librarian should be of consider-

able assistance in using these references when needed. Other indexes, such as Applied Science and Technology Index, Cumulated Index Medicus, and Public Affairs Information Service Bulletin, will be used infrequently by the educational researcher.

Current Contents. Current Contents/Behavioral, Social, and Educational Sciences is one of five Current Contents (CC) series issued weekly. This CC issue reprints the contents page of over 1100 journals as they are published. An author index is provided. Provisions are made to secure reprints of articles from the indexing source.

CURRENT CONTENTS. Philadephia: Institute for Scientific Information. (weekly)

The Abstracts - Broad and/or Specific Information

The abstracts in many cases act as indexes as well as abstracts. Because they provide brief resumes of studies, they are a particularly useful resource in "narrowing down" the potential bibliography to particularly relevant material.

Research in Education (RIE). This is a monthly abstract journal (cumulated semi-annually and annually) which is published by the ERIC system (Educational Resources Information Center). ERIC is a network of 19 federally-funded educational clearinghouses. RIE lists significant educational-related (1) publications reported and processed by the 19 clearinghouses (including ERIC Vocational and Technical Education at The Ohio State University), and (2) status reports of current U.S.O.E. contracted projects underway. RIE contains subject, author, and institutional indexes. The subject index classifies works on the basis of a set of "descriptors" assigned to each work. Thus, each report may be listed under from four to six or more "descriptor" words or phrases. Each study is abstracted, and in most cases, the complete text may be obtained through ERIC, either as "hard-copy" or microfiche. If the document cannot be obtained through ERIC, the ordering source is indicated. A number of large libraries and special-purpose libraries have all or part of the ERIC collection on file. Although the descriptors associated with each study are ideally suited for computer searching, ERIC itself does not provide this service to individual researchers. However, certain agencies, such as several state RCU's, are beginning to do so. ERIC has issued a Thesaurus of ERIC Descriptors which will assist in computer searching.

RESEARCH IN EDUCATION (RIE). U.S. Government Printing Office, (monthly, cumulated).

Abstracts of Research Materials (ARM) and Abstracts of Instructional Materials (AIM). These twin publications are produced by ERIC clearinghouse for Vocational and Technical Education at The Ohio State University. The volumes, produced quarterly, contain those vocationally-related studies which, while important, are considered too specialized to be included in RIE.

ABSTRACTS OF RESEARCH MATERIALS (ARM) AND ABSTRACTS OF INSTRUCTIONAL MATERIALS (AIM). ERIC Clearinghouse for Vocational and Technical Education, The Ohio State University, (quarterly, cumulated).

CIRF Abstracts. As stated, the aim of the CIRF Abstracts is ". . . to convey information about vocational training ideas, programs, experience and experiments described in periodicals, books and other publications. . . ." The CIRF Abstracts, published by the International Labour Office, provide an up-to-date overview of international training activities. The abstracted articles represent only a portion of the published information indexed by the Central Library and Documentation Branch of the International Labour Office. This branch will, under certain conditions, prepare computerized bibliographies and supply photocopies.

CIRF ABSTRACTS. CIRF Publications, International Labour Office, Geneva, Switzerland, (monthly, arranged in yearly looseleaf notebook).

Dissertation Abstracts (D.A.). This set of documents, initiated in 1938 as Microfilm Abstracts, contains bibliographic data and fairly extensive abstracts of the doctoral dissertations produced in some 270 higher education institutions in the U.S. and Canada. D.A. is published monthly, with an annual cumulative index (subject as well as author). Beginning with Volume 27 (1966), D.A. has been produced as two editions, Part A--the humanities and social sciences, and Part B--sciences and engineering. Beginning with Volume 30 (1969), the subject matter index of titles is by keyword (the title is reported under each significant keyword in the study title). Dissertations may be ordered in "hard copy" or microfilm.

A Retrospective Index of nine volumes, covering D.A. volumes 1-29, has produced a cumulative index for both authors and subject matter by title keyword. Volume 7, Parts 1 and 2, of the Retrospective Index contains the Education subject matter references.

DATRIX is a computer-based retrieval system for producing a bibliography from D.A. issues. Keywords may be submitted by the researcher. The search will then be conducted by University Microfilms for a set fee.

DISSERTATION ABSTRACTS INTERNATIONAL. University Microfilms, Inc., Ann Arbor, Michigan, (monthly, cumulated).

An additional, more limited, attempt has been made to index Master's theses in the field of education. Annual volumes have been prepared since 1952. It is indexed by author, by subject, and by institution.

Silvey, H. M. (ed.). MASTER'S THESES IN EDUCATION. Northern Iowa University (formerly State College of Iowa) Cedar Falls, Iowa, (annual editions).

Psychological Abstracts. Certain of the material contained in these abstracts is of direct interest to educational theorists. Contained are abstracts of current literature under eleven headings, including personnel and industrial psychology, personality, and educational psychology. Subject matter and author indexes are provided.

PSYCHOLOGICAL ABSTRACTS. The American Psychological Association, Washington, D.C., (6 times annually).

Government Reports Announcements (GRA). The National Technical Information Service of the U.S. Department of Commerce publishes the GRA semi-monthly. It includes abstracts of research and development projects, as well as technical publications, released to the public through NTIS by U.S. government departments and agencies. The subject field of "Behavioral and Social Sciences" included in the GRA is particularly relevant to educators. A companion volume, Government Reports Index, indexes all the reports in the concurrent GRA by corporate author, subject, personal author, contract number and accessor-report number.

GOVERNMENT REPORTS ANNOUNCEMENTS. National Technical Information Service, U.S. Department of Commerce, Washington, D.C., (24 times annually).

Additional abstracts which may be of occasional interest to the vocational researcher are listed below:

TECHNICAL EDUCATION ABSTRACTS (Britain)
SOCIOLOGY OF EDUCATION ABSTRACTS (Britain)
EDUCATIONAL ADMINISTRATION ABSTRACTS
BIOLOGICAL ABSTRACTS
CHILD DEVELOPMENT ABSTRACTS
MENTAL RETARDATION ABSTRACTS
SOCIOLOGICAL ABSTRACTS
POVERTY AND HUMAN RESOURCES ABSTRACTS
TRAINING RESEARCH ABSTRACTS (in Training and Development Journal)

Specific Handbooks and Related References

The resources listed below are of most help to those who are either looking for information in a fairly well-defined area, or else looking for specific information.

Handbook of Research on Teaching. The aims of this large volume are ". . . to summarize, to critically analyze, and to integrate . . ." the backlog of knowledge about teaching. The volume is organized into four parts: (1) theoretical orientations, (2) methodologies in research on teaching, (3) major variables and measures of research on teaching, and (4) research on teaching various grade levels and subject matters. Many research studies are reported in the various chapters in considerable detail. A revised edition of this volume is due in the early 1970's.

Gage, N. L. (ed.). HANDBOOK OF RESEARCH ON TEACHING. Chicago: Rand-McNally and Co., 1963.

Handbook of Adult Education. This handbook, the fifth in the series of the same title, contains thirty-one chapters produced by subject matter experts,

including a chapter on vocational-technical education (by G. Venn). The book deals generally with (1) philosophical foundations, (2) organizational patterns and settings, and (3) program areas.

Smith, Robert M., and others (ed.). HANDBOOK OF ADULT EDUCATION. New York: The Macmillan Co., 1970.

Mental Measurement Yearbooks. Buros has provided a series of standard reference volumes concerning published tests. These books contain signed reviews of current tests by experts in the field. Extensive bibliographies are also provided concerning most of the tests included. For tests which have not gone through revision since the previous yearbooks, the earlier reviews may be as appropriate as later ones. (The seventh yearbook is due Fall, 1971.)

Other volumes of interest in this general series include Tests in Print, a 1961 abbreviated index to the then-available tests, and two large monographs, Reading Tests and Reviews (1968), and Personality (1970). Each of the two monographs contain information from the first six volumes of MMY plus additional new material. Two additional monographs, on Intelligence and Vocational Aptitude, are to be published following the seventh yearbook.

Buros, Oscar K. (ed.). THE SIXTH MENTAL MEASUREMENT YEARBOOK. Highland Park, New Jersey: The Gryphon Press, 1965.

Dictionary of Education. This scholarly work contains definitions of terms provided by area specialists. Its contents cover nearly 700 pages, and include special terms from several foreign countries. A pronunciation guide is included for more difficult words.

Good, Carter V. (ed.). DICTIONARY OF EDUCATION, 2nd Ed. New York: McGraw-Hill, 1959. (3rd edition to be published.)

Miscellany — Touching Distant Bases

The resources and material considered in this subsection may never be used by the vocational researcher. However, under some special circumstances, one may prove of utmost value. Therefore, all might well be kept in mind.

UNESCO. This United Nations agency has produced a number of documents related to education in general as well as to vocational education in particular. Several documents in the Educational Studies and Documents series relate to "Technical and Vocational Education" in the U.K. (no. 27), in the U.S.S.R. (no. 30), and the U.S.A. (no. 36). A second series, Statistical Reports and Studies, contains monographs relating to international education statistics. Other UNESCO literature may be found by referring to the library author card catalog.

U.S.O.E. The 1970 catalog of the Office of Education lists some 550 publications then currently available. Organized by subject and/or special problem area, entries include bibliographical data, a short abstract, and cost information.

U.S. Office of Education. PUBLICATIONS OF THE OFFICE OF EDUCATION. Washington, D.C.: U.S. Gov't Printing Office, (current year).

Another important publication of the Federal Government is the MONTHLY CATALOG OF UNITED STATES GOVERNMENT PUBLICATIONS, which lists by subject and by issuing agency all publications by the Government Printing Office. It is cumulated annually.

Special Information Sources. In addition to the information processing and retrieval systems already mentioned (ERIC, D.A.), several less widely used systems are available. These may best be approached by securing further information either from the source or by contacting a research librarian.

Phi Delta Kappa. SCHOOL RESEARCH INFORMATION SERVICE. Bloomington, Indiana.
Phi Delta Kappa has undertaken the collection and indexing of "school" research, educational reports, curriculum documents, and the like. Bibliographies may be provided.

ACIATE Research Committee (D. R. Jeldon, ed.). SUMMARIES OF STUDIES IN INDUSTRIAL ARTS, TRADE AND INDUSTRIAL EDUCATION. University of Northern Colorado, Greeley.
This source provides a doctoral dissertation index that largely replicates D.A., but is specialized in the field of Industrial Education. Searches are available.

Smithsonian Institute. SCIENCE INFORMATION EXCHANGE. Washington, D.C.
Information, including bibliographic data and abstracts, on current government and foundation funded research in progress in a variety of fields, may be secured from this source.

A final set of resources include (1) the library card catalog, and (2) individual authors and researchers. Requests to individuals should be direct and to the point, and show some evidence of previous study in the area. The use of the subject (and author) card indexes is obvious, but too often overlooked. For a look at the holdings of another educational library, see the volumes below. Almost any book is available through inter-library loan.

Columbia University. DICTIONARY CATALOG OF THE TEACHERS COLLEGE LIBRARY. Boston: G. K. Hall and Co., 1970. (36 volumes).

CURRENTLY AVAILABLE PUBLICATIONS

OF THE

MINNESOTA RESEARCH COORDINATING UNIT

Bailey, W. F. Jr. and J. Moss, Jr. A Comparison of Mail-Techniques for Stimulating Interest in Occupational Education Research. ED 011 289. 1966.

Moss, J. Jr. The Influence of Industrial Arts Experience on Grades Earned in Post-High School Trade and Technical Curriculums. ED 012 324. 1966.

Pucel, D. J., et. al. Estimating the Human Resources for Research in Occupational Education in Minnesota. ED 011 290. 1966.

Moss, J. Jr. Report of a Five-State Occupational Education Research and Development Planning Conference. ED 012 317. January 1967.

* Technical Report No. 2: Selecting and Developing a Research Problem. September 1967.

* Moss, J. Jr. Review of Research in Vocational-Technical Teacher Education. ED 016 803. September 1967.

* Pucel, D. J. Variables Related to MDTA Trainee Employment Success in Minnesota. ED 027 449. February 1968.

* Moss, J. Jr. Technical Report No. 3: The Evaluation of Occupational Education Programs. September 1968.

Hahn, M. Review of Research on Creativity. ED 029 090. September 1968.

Pratzner, F. C. and L. Faurot. Summary of Studies Conducted in Minnesota, 1965-67. ED 023 895. September 1968.

McMillion, M. B. Correlates of Leadership Decision Patterns of High School Pupils. ED 025 646. 1968.

Klaurens, M. (Ed.) Developing Innovative Vocational and Technical Teacher Education Programs. ED 029 094. May 1968.

Pratzner, F. C. and M. Hanson. The Relative Effectiveness of Two Ways of Structuring and Presenting Pre-Service and Initial In-Service Vocational-Industrial Teacher Education Lessons. ED 029 995. April 1969.

* Stock, W. E. and F. C. Pratzner. Review of Research on Student Selection and the Prediction of Success in Occupational Education. ED 039 319. August 1969.

* Collofello, P., et. al. The Relative Effectiveness of Two Sources of Feedback on Teachers in the Micro-Teaching Situation. ED 044 490. 1970.

* Smith, B. B. and J. Moss, Jr. (Eds.) Report of a Seminar: Process and Techniques of Vocational Curriculum Development. ED 042 917. April 1970.

Persons, E. and G. Copa (Eds.) Report of the Central Regional Research Conference on Agricultural Education. October 1970.

* Copa, G. Technical Report No. 4: Identifying Inputs Toward Production Function Application in Education. April 1971.

* Smith, B. B. and E. L. Jiloca. The Relationships of Selected Factors to the Occupational-Educational Choices of Twelfth Grade Students. April 1971.

* Wheeler, D. Technical Report No. 5: Measuring Job Relatedness. June 1971.

* Kreutzkampf, J. and C. Kiefer. Status of Vocational Education Research and Development Activities in Minnesota 1968-1970, an Annotated Bibliography. June 1971.

* [Several editions of a newsletter, News and Reviews, are also available.]

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* Single copies of these publications will be sent, at no charge, upon your request to the Minnesota Research Coordinating Unit for Vocational Education. The other publications are available in either hard copy or microfiche from Central ERIC.

THE MINNESOTA RESEARCH COORDINATING UNIT FOR VOCATIONAL EDUCATION performs the following four functions in behalf of the State and national systems of vocational education:

1. Stimulate, facilitate and coordinate innovative research and development efforts.

2. Disseminate research-related information to assist research and development efforts and to speed the implementation of worthy educational innovations.

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VT 014 132
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(4) PROGRAM LENGTH, (5) ARRANGEMENT FOR
COURSES GIVEN OUTSIDE THE SCHOOL, (6) LIVING
ARRANGEMENTS, AND (7) APPROXIMATE COST FOR
EACH YEAR. AN INTRODUCTORY SECTION DISCUSSES
THE CHARACTERISTICS OF DIPLOMA SCHOOL
EDUCATION AND THE MEANING OF THE TERMS STATE
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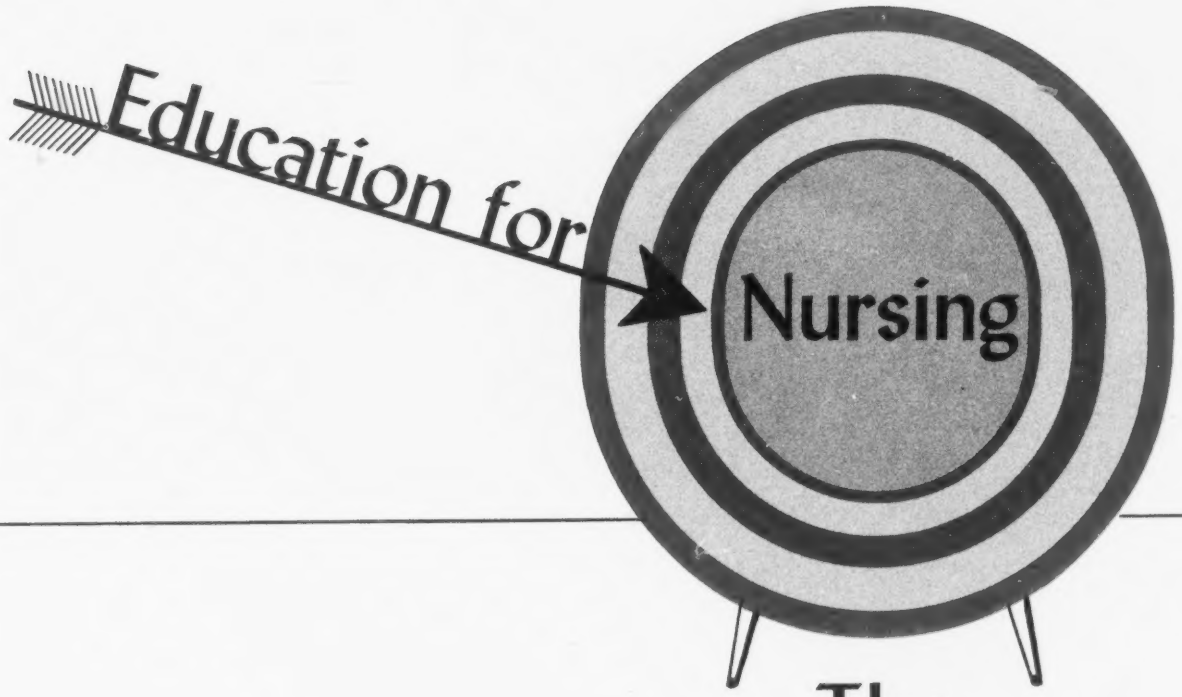

The Diploma Way

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Education for Nursing—
the Diploma Way

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About NLN-Accredited
Diploma Programs in Nursing

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2969

INTRODUCTION

Today, educational preparation for practice as a registered nurse (R.N.) is available in a variety of settings for several fundamental and urgent reasons, the most important of which are:

- To enable nursing to fulfill its commitment to serve humanity by providing the best possible nursing care to patients and their families.
- To attract into nursing a maximum number of men and women with different interests, abilities, goals, and educational preferences.
- To meet the nation's extensive and constantly increasing nursing needs.

One of the settings for preparation is the school that offers a diploma program in nursing. This type of school, usually under the control of a hospital but in some instances independently incorporated, occupies a significant position in preparing registered nurses to meet the current and the future needs of society. The diploma program in nursing serves the interests and the goals of qualified high school graduates who want to receive their education in a program centered in a community institution identified with the care of patients, who want an early and continuing opportunity of being with patients and with personnel who provide health services, and who want to prepare for beginning nursing positions in hospitals and similar institutions.

This pamphlet gives general information about diploma education for nursing, explains the importance of selecting a school that offers an accredited program, and lists the diploma programs accredited by the National League for Nursing (NLN) together with specific information about each program. The pamphlet will be of particular interest to high school students and high school graduates of all ages who wish to prepare for a career as an R.N.

2960

DIPLOMA EDUCATION FOR NURSING

Only through exploration of the distinctive characteristics of this type of program can you, the prospective student in nursing, determine if it is the one best suited to your interest and goals in nursing. A number of characteristics typify the education provided in an NLN-accredited diploma program in nursing.

- The diploma program of study is offered by a single-purpose school—a school that focuses all of its attention and activities on developing the potentials of individual students as persons, citizens, and competent practitioners of nursing.
- The school of nursing may enter into cooperative relations with collegiate or other institutions in order to provide certain courses of study needed to meet the requirements for graduation from the diploma program.
- The faculty of the school have the academic preparation and the experience in nursing and nursing education that ensure quality education.
- Students are selected by the faculty and admitted directly to the diploma program in nursing.
- Admission requirements include graduation from an approved or accredited high school, satisfactory general academic achievement, and successful completion of certain prerequisite subjects. Personal characteristics and health qualifications are also assessed.
- The faculty develops, implements, and controls the program of study within the framework of the policies of the governing body of the school.
- The program of study includes courses in the theory and the practice of nursing and courses in the biological, physical, and behavioral sciences and may include offerings in the humanities.
- All courses offered as part of the program are planned to meet the personal needs of the student and to develop the skills required of the registered nurse practitioner.
- The faculty of the school has responsibility for all courses planned for students.
- The nursing courses offered throughout the program of study build upon preceding and concurrent learning in the required basic sciences.
- The content of nursing courses combines theory with practice and reinforces learning through the application of scientific, health, and nursing principles to the care of medical and surgical patients, mothers, children, and the mentally ill.
- The primary focus of the nursing courses is on learning to provide nursing care to patients in hospitals and similar community institutions.

2911

- Graduates of accredited diploma programs in nursing (1) know basic scientific principles and utilize them in planning and giving quality nursing care to people; (2) recognize the indication of diseases and disabilities and the psychological, social, and physical needs of patients; (3) have the understanding and the skills necessary to organize and implement a plan of nursing care that will meet the needs of groups of patients and promote the restoration of health; (4) are qualified to plan for the care of patients with other members of the health team and to direct other members of the nursing team; (5) are qualified for general duty nurse positions in the medical, surgical, obstetric, pediatric, and psychiatric nursing areas of hospitals and similar community institutions; (6) need to be oriented to new work situations as beginning practitioners and to be given time and opportunity to become increasingly effective in the practice of nursing.

Plan Early to Reach Your Target in Nursing

Will you qualify for admission to an NLN-accredited diploma program? The answer will be yes only if you inform yourself of the specific admission requirements of several programs and plan early in your high school career to meet those requirements. Select a number of schools from the list beginning on page 6 and write to them for their catalogues or bulletins. Study the requirements carefully and then enroll in the high school courses that are listed as prerequisite for admission. Strive to achieve the stipulated grade average and rank in the graduating class.

Other considerations in choosing "the" school for you are curriculum offerings and tuition and fees. In addition to talking over your plans with your parents and counselors, it would be well to visit the programs you are considering and talk with nursing faculty members and students. If you will need financial assistance, seek information about scholarships and loans from the school you finally choose. Also, ask your high school counselor to help you explore sources of help on the local, state, and national levels.

Why an Accredited Diploma Program?

NLN-accredited diploma programs in nursing have demonstrated their ability to attract, retain, and graduate the largest number of students, to recruit and retain qualified faculty, and to provide educational programs of good quality. The phrase "NLN-accredited" identifies for you, the prospective

2912

student, the schools that offer programs that have received recognition through a process of "specialized" accreditation. What you should know about the significance of specialized accreditation and how it differs from state approval is the following:

1. *State Approval.*—The practice of nursing is regulated in each state by law, just as is the practice of medicine. Each state and territory appoints an authority—usually a board of nursing or of nurse examiners —to administer its particular nurse practice act. Approval by such an authority means that the program in nursing meets the minimum legal requirements set by the state for the preparation of nurses for licensure. Only graduates of a school offering a program approved by a state board are eligible to take the state examination for licensure to practice nursing as a registered nurse.
2. *Specialized Accreditation.*—In the United States, institutions that offer educational programs in nursing and other professions are not regulated by a federal authority. Instead, an organization or an agency that is national in scope and represents the educational institutions and the profession is designated as the body responsible for conducting a program of voluntary national accreditation. The purpose of such a program is to ensure that education for the particular profession will continue to improve and that quality programs will be offered to students. This type of accreditation program serves as the means whereby the educational institutions themselves voluntarily formulate and apply criteria of excellence in education for the profession. The procedure for accreditation usually includes four steps: formulation of criteria; evaluation of the institution and the program of studies by competent educators; publication of a list of institutions meeting the criteria; and periodic reevaluations to determine whether or not institutions and programs continue to meet the criteria.

   The National League for Nursing is recognized by the U. S. Office of Education, by the American Hospital Association, and by the nursing profession itself as the national accrediting agency for diploma programs.

   The NLN-accredited programs described in this pamphlet are approved by individual state boards of nursing and, in addition, have met national criteria of excellence that exceed the legal standards set by state boards in each of the 50 states, the District of Columbia, and the Commonwealth of Puerto Rico.

The official and complete list of NLN-accredited diploma programs appears annually in the August issue of *Nursing Outlook,* and a supplementary list is published annually in the March issue. (*Nursing Outlook* is the official magazine of the National League for Nursing.)

2913

Diploma Programs in Nursing Accredited by The National League for Nursing

The following pages present specific information about the schools that offer diploma programs in nursing accredited by the National League for Nursing. The information given is for classes to be admitted in 1972 and was supplied by the schools in response to questionnaires distributed during April, 1971. As in all publications of this type, the information is subject to change. As additional diploma programs apply for and are granted NLN accreditation, they will be added to this pamphlet.

For further information about any school and its nursing program, write to the head of the school for a catalogue or bulletin.

The meanings of the symbols and letters that appear in the list are:

Columns 3-7: X means *Yes.*
A blank space means *No* or *None.*
# indicates that the information is available from the school.

Column 5: All diploma programs include required courses in the biological, physical, and behavioral sciences and in nursing, but the arrangements made for giving these courses vary.

(a) Some schools arrange the diploma program of studies in such a way that *all* required courses are given in the school and its own or adjacent clinical resources. *Both sections of column 5 are blank in this instance.*

(b) Some schools arrange the program in such a way that *certain of the required basic science courses* are given in cooperation with a nearby college or university. *An X appears in the first section of column 5 in this instance.*

(c) Some schools arrange the program in such a way that *certain of the required nursing courses* are given in cooperation with institutions *located in other cities or in other states.* The number of weeks planned for the nursing course(s) is indicated in the second section of column 5 in this instance.

In all instances, see school bulletin for details.

Column 6: The letters signify the living arrangements for students:
R means that all students are required to live in the school residence facilities.
P means that off-campus living is permitted.

Column 7: * indicates that the cost may include some or all of the cost of room and board, uniforms, books, et cetera.

2914

(1) School of Nursing and Address (Information in parentheses designates the legal control of the school; the year in which the school was established; whether the school is coeducational or for women only; and educational prerequisite for admission in addition to graduation from high school, if any.)	(2) Head of School and Title	(3) School Accepts: Married students	(3) School Accepts: Transfer students	(4) Length of program in weeks, excluding vacations	(5) Arrangements for Certain Courses: Some courses given at a college or university	(5) Arrangements for Certain Courses: Weeks away from school for some nursing courses	(6) Living Arrangements	(7) Approximate cost (in dollars) of required tuition and fees. (Does not include cost of room and board, transportation, or supplies unless followed by an asterisk, in which case see school bulletin for details.): 1st Year	2d Year	3d Year
ALABAMA										
Carraway Methodist Medical Center 1619 N. 25th St. Birmingham, Ala. 35234 (Hosp.; 1917; coed)	Ann Sorge Assistant Administrator-Nursing	X	X	93	X		P	585	444	
Ida V. Moffett School of Nursing–Baptist Medical Centers 800 Montclair Rd. Birmingham, Ala. 35213 (Hosp.; 1915; coed)	Elizabeth Calhoun Director School of Nursing	X	X	96	X		P	997	435	
St. Vincent's Hospital 2701 Ninth Court St. Birmingham, Ala. 35205 (Hosp.; 1900; coed)	Mary Catherine King Director School of Nursing	X	X	116		8	P	765	645	625
Holy Name of Jesus Hospital Moragne Park Gadsden, Ala. 35902 (Hosp.; 1926; coed)	Sister Joan Marie Director School of Nursing	X	#	144	X	10	P	#	#	#
Mastin School of Nursing–Mobile General Hospital 2451 Fillingim St. Mobile, Ala. 36617 (Hosp.; 1907; coed)	Inez A. Perry Director School of Nursing	X	X	134	X		P	822*	579*	599*
Mobile Infirmary P.O. Box 7544 Mobile, Ala. 36607 (Hosp.; 1910; women only)	Hilda F. Reynolds Director School of Nursing	X	X	96	X		P	800*	700*	
Providence School of Nursing 156 N. Catherine St. Mobile, Ala. 36604 (Hosp.; 1902; coed)	Sister Anita Doyle Director School of Nursing	X	X	108	X		P	819	433	417
St. Margaret's Hospital 834 Adams Ave. Montgomery, Ala. 36104 (Hosp.; 1903; women only)	Sister Marilynn Director School of Nursing	X	X	116	X	8	P	1401*	907*	978*
Sylacauga Hospital W. Hickory St. Sylacauga, Ala. 35150 (Hosp.; 1951; women only)	Lou C. Spradley Director School of Nursing	X	#	120	X	12	P	840	352	260
Druid City Hospital 809 University Blvd. Tuscaloosa, Ala. 35401 (Hosp.; 1923; coed)	Maxine Walker Director School of Nursing	X	X	120			P	620	244	220
ARIZONA										
Good Samaritan Hospital 1033 E. McDowell Rd. Phoenix, Ariz. 85006 (Hosp.; 1919; coed)	Vurlyne E. Boan Director School of Nursing	X	X	#	X		P	#	#	#
CALIFORNIA										
California Hospital 1414 S. Hope St. Los Angeles, Calif. 90015 (Hosp.; 1898; coed)	Barbara Jury Director School of Nursing	X	X	108	X		P	230	215	240
Hollywood Presbyterian Hospital 1322 N. Vermont Ave. Los Angeles, Calif. 90027 (Hosp.; 1944; coed)	B. Barrett Smith Director School of Nursing	X	X	108	X		P	620	620	645
Los Angeles County Medical Center 1200 N. State St. Los Angeles, Calif. 90033 (Hosp.; 1895; coed)	Mary O. Martinetti Director School of Nursing	X	X	108	X		P	440*	240*	150*

(1) School of Nursing and Address (Information in parentheses designates the legal control of the school; the year in which the school was established; whether the school is coeducational or for women only; and educational prerequisite for admission in addition to graduation from high school, if any.)	(2) Head of School and Title	(3) School Accepts: Married students	(3) School Accepts: Transfer students	(4) Length of program in weeks, excluding vacations	(5) Arrangements for Certain Courses: Some courses given at a college or university	(5) Arrangements for Certain Courses: Weeks away from school for some nursing courses	(6) Living Arrangements	(7) Approximate cost (in dollars) of required tuition and fees. (Does not include cost of room and board, transportation, or supplies unless followed by an asterisk, in which case see school bulletin for details.): 1st Year	2d Year	3d Year
CALIFORNIA—Continued										
Queen of Angels School of Nursing 626 N. Coronado Terr. Los Angeles, Calif. 90026 (Hosp.; 1927; coed; 30 sem. coll. units)	Eva Stockonis Director School of Nursing	X	#	108	X		P	1141*	1141*	
St. Vincent's College of Nursing 262 S. Lake St. Los Angeles, Calif. 90057 (Hosp.; 1899; coed)	Diane Thiele Acting Director College of Nursing	X	X	108	X	32	P	758	673	665
Kaiser Foundation School of Nursing 3451 Piedmont Ave. Oakland, Calif. 94611 (Ind.; 1947; coed)	Josephine M. Coppedge Director School of Nursing	X	X	108	X		P	1925	1745	1380
Samuel Merritt Hospital 370 Hawthorne Ave. Oakland, Calif. 94609 (Hosp.; 1909; women only)	Jean Ruxton Director of Nursing Education	X	X	120	X		P	1850	1250	900
St. Luke's Hospital 555 San Jose Ave. San Francisco, Calif. 94110 (Hosp.; 1889; women only)	Donnelle N. Rodack Director School of Nursing	X	X	114	X		P	800	800	800
San Jose Hospital 675 E. Santa Clara St. San Jose, Calif. 95114 (Hosp.; 1923; coed)	Barbara J. Schmidt Director of Education	X	X	114	X		P	#	#	#
COLORADO										
Beth-El School of Nursing—Memorial Hospital 1400 E. Boulder St. Colorado Springs, Colo. 80909 (Hosp.; 1904; coed)	Gloria Haughton Director School of Nursing	X	X	108	X	9	P	680	650	650
Mercy Hospital 1601 Milwaukee St. Denver, Colo. 80206 (Hosp.; 1902; coed)	Sister Maura Director School of Nursing	X	X	110	X		P	1480	560	600
Presbyterian Medical Center 2025 High St. Denver, Colo. 80205 (Hosp.; 1962; coed)	Lucille Fisher Director School of Nursing	X	X	108			P	421	421	451
CONNECTICUT										
Bridgeport Hospital 267 Grant St. Bridgeport, Conn. 06602 (Hosp.; 1884; coed)	Margaret T. Madden Director of Nursing	X	X	121	X	12	P	818	513	323
St. Vincent's Hospital 2820 Main St. Bridgeport, Conn. 06606 (Hosp.; 1905; coed)	Anelia Kerbelis Director School of Nursing	X	X	118	X	8	P	900	695	725
Greenwich Hospital Perry Ridge Rd. Greenwich, Conn. 06830 (Hosp.; 1906; coed)	Catherine Mulcahy Director of Nursing	X	X	114	X	10	P	1175*	600*	600*
Hartford Hospital 80 Seymour St. Hartford, Conn. 06115 (Hosp.; 1877; coed)	Lillian C. Solomon Director School of Nursing	X	X	123	X	12	P	1090*	750*	700*

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CONNECTICUT—Continued										
St. Francis Hospital 338 Asylum St. Hartford, Conn. 06103 (Hosp.; 1899; coed)	Sister Dennis Marie Director School of Nursing	X	#	120	X	10	P	1549	1108	651
Meriden–Wallingford Hospital 181 Cook Ave. Meriden, Conn. 06450 (Hosp.; 1892; coed)	Agnes A. Plikunas Director School of Nursing	X	X	120		20	P	1100*	1000*	900*
Ona M. Wilcox School of Nursing–Middlesex Memorial Hospital Middletown, Conn. 06457 (Hosp.; 1895; coed)	Mary B. Heath Director of Nursing Education	X	X	120	X	12	P	1063*	984*	673*
The New Britain General Hospital 100 Grand St. New Britain, Conn. 06050 (Hosp.; 1907; coed)	Eleanor Melledy Director School of Nursing	X	X	112	X	16	P	1025*	525*	545*
Grace-New Haven School of Nursing 25 Park St. New Haven, Conn. 06519 (Hosp.; 1895; coed)	Anna E. Ryle Director of Nursing	X	X	119	X	11	P	#	#	#
Hospital of St. Raphael 1450 Chapel St. New Haven, Conn. 06511 (Hosp.; 1908; coed)	Margaret King Director School of Nursing	X	X	117	X	10	P	533	460	555
Joseph Lawrence School of Nursing—Lawrence & Memorial Hospitals New London, Conn. 06320 (Hosp.; 1913; coed)	Mary C. Mulvany Director of Nursing Service & Nursing Education	X	X	108	X	12	P	650	350	350
Norwalk Hospital 24 Stevens St. Norwalk, Conn. 06852 (Hosp.; 1905; coed)	Marion H. Ramsey Director School of Nursing	X	#	108	X	12	P	1355*	635*	
Stamford Hospital Shelburne at W. Broad St. Stamford, Conn. 06902 (Hosp.; 1901; coed)	Frances F. Richardson Director School of Nursing	X	X	107	X	11	P	570	260	260
St. Mary's Hospital 56 Franklin St. Waterbury, Conn. 06702 (Hosp.; 1909, coed)	Sister Rose Eileen Director of Nursing	X	X	113	X	11	R	2034	889	789
DELAWARE										
St. Francis Hospital 1600 W. 7th St. Wilmington, Del. 19805 (Hosp.; 1924; coed)	Sister M. Ann Elizabeth Director School of Nursing	X	#	116	X	13	P	915*	450*	457*
DISTRICT OF COLUMBIA										
Washington Hospital Center 100 Irving St. N.W. Washington, D. C. 20010 (Hosp.; 1889; coed)	Nan Dunn Director School of Nursing	X	X	116	X	13	P	805	410	360

2917

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FLORIDA										
Jackson Memorial Hospital 1700 N.W. 10th Ave. Miami, Fla. 33136 (Hosp.; 1920; coed)	Betty J. Severyn Director School of Nursing	X	X	124	X		P	#	#	#
GEORGIA										
Crawford W. Long Memorial Hospital 543 W. Peachtree St. N.E. Atlanta, Ga. 30308 (Hosp.; 1908; coed)	Ann M. Stroud Director School of Nursing	X	X	118	X		P	538	403	403
Georgia Baptist Hospital 300 Blvd. N.E. Atlanta, Ga. 30312 (Hosp.; 1901; women only)	Kathryn Ransbotham Director School of Nursing	X	X	132	X	8	P	925	800	600
Grady Memorial Hospital 80 Butler St., S.E. Atlanta, Ga. 30303 (Hosp.; 1898; coed)	Bernice K. Dixon Director School of Nursing	X	X	134	X		P	785	635	335
Piedmont Hospital 1968 Peachtree Rd. N.W. Atlanta, Ga. 30309 (Hosp.; 1905; women only)	Sarah Helen Killgore Director School of Nursing	X	X	120	X	8	P	1200*	750*	750*
ILLINOIS										
Copley Memorial Hospital 310 Seminary Ave. Aurora, Ill. 60507 (Hosp.; 1893; coed)	Gertrude M. Banaszak Director School of Nursing & Nursing Service	X	X	129	X		P	1835*	960*	955*
Mennonite Hospital 804 N. East St. Bloomington, Ill. 61701 (Hosp.; 1919; coed)	Jacquelyn S. Kinder Director School of Nursing	X	X	120	X		P	984	800	908
Graham Hospital 210 W. Walnut Canton, Ill. 61520 (Hosp.; 1910; coed)	Betty Jane Stockov Director School of Nursing	X	X	108	X		P	812	797	797
Augustana Hospital 427 W. Dickens Ave. Chicago, Ill. 60614 (Hosp.; 1894; coed)	Genevieve Carb Director of Nursing Education	X	X	96	X		P	Res.: 1450 Nonres.: 450	1450 450	
Chicago Wesley Memorial Hospital 250 E. Superior St. Chicago, Ill. 60611 (Hosp.; 1889; coed)	Vera E. Thompson Director of Nursing	X	X	117	X		P	1053*	740*	700*
Cook County School of Nursing 1900 W. Polk St. Chicago, Ill. 60612 (Ind.; 1929; coed)	F. Pauline Gesner Director Pre-Professional Division	X	X	141	X	10	P	961*	971*	493*
I. J. Goldberg School of Nursing–Mount Sinai Hospital Medical Center 2730 W. 15th Pl. Chicago, Ill. 60608 (Hosp; 1920; coed; 30-32 college units)	Catherine G. Meier Director School of Nursing	X	X	#	X		P	750	600	
Illinois Masonic Medical Center 836 Wellington Ave. Chicago, Ill. 60657 (Hosp.; 1921; coed)	Penelope Mavrelis Associate Director Nursing Education	X	X	108	X		P	1000*	600*	500*

2918

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ILLINOIS—Continued										
James Ward Thorne School of Nursing—Passavant Memorial Hospital 244 E. Pearson St. Chicago, Ill. 60611 (Hosp.; 1949; women only)	Evelyn E. Nicholson Director School of Nursing	X	X	119	X		P	541	615	640
Michael Reese Hospital & Medical Center 2816 S. Ellis Ave. Chicago, Ill. 60616 (Hosp.; 1881; women only)	Carol M. Eady Director Nursing Education	X	X	123			P	535	240	230
Ravenswood Hospital Medical Center 1931 W. Wilson Ave. Chicago, Ill. 60640 (Hosp.; 1907; coed)	C. Phillip Hannan Director of Nursing	X	X	104		16	P	1000	1000	
St. Anne's Hospital 4950 W. Thomas St. Chicago, Ill. 60651 (Hosp.; 1913; coed)	Anna Franzen Director School of Nursing	X	X	105			P	730	675	700
St. Mary of Nazareth Hospital 1127 N. Oakley Blvd. Chicago, Ill. 60622 (Hosp.; 1900; coed)	Sister M. Antonia Director School of Nursing	X	X	96	X		P	768	851	
South Chicago Community Hospital 2320 E. 93d St. Chicago, Ill. 60617 (Hosp.; 1900; coed)	Josephine Chan Director of Nursing	X	X	120	X	#	P	400	400	400
Lake View Memorial Hospital 810 N. Logan St. Danville, Ill. 61832 (Hosp.; 1894; coed)	Charline Grygiel Director of Nursing	X	X	120	X	16	P	919*	703*	600*
Decatur Memorial Hospital 2300 N. Edward St. Decatur, Ill. 62526 (Hosp.; 1916; coed)	Sharon D. Molineaux Director of Nursing Education	X	X	105	X	8	P	1520	985	375
Evanston Hospital 2650 Ridge Ave. Evanston, Ill. 60201 (Hosp.; 1898; coed)	Marjorie Beyers Director School of Nursing	X	X	108	X		P	870	870	870
St. Francis Hospital 319 Ridge Ave. Evanston, Ill. 60202 (Hosp.; 1919; coed)	Estelle Rogers Assistant Administrator Nursing Education	X	X	86			P	789	755	
Passavant Memorial Area Hospital 1600 W. Walnut St. Jacksonville, Ill. 62650 (Hosp.; 1902; women only)	Gertrude O. Hohmann Director of Nursing Education	X	X	110	X	16	P	800	600	385
St. Joseph Hospital 333 N. Madison St. Joliet, Ill. 60435 (Hosp.; 1920; coed)	Lois Benich Director School of Nursing	X	X	132	X			855	520	545
Lutheran Hospital 555 6th St. Moline, Ill. 61265 (Hosp.; 1916; coed)	Harriet S. Olson Director of Nursing Education	X	X	98	X		P	1165	1170	
Moline Public Hospital 635 10th Ave. Moline, Ill. 61265 (Hosp.; 1898; coed)	Elizabeth H. Wright Educational Director		X	124	X	8	P	1100*	600*	460*

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ILLINOIS—Continued										
Evangelical School of Nursing–Christ Community Hospital 4440 W. 95th St. Oak Lawn, Ill. 60453 (Ind.; 1911; coed)	Elida Mundt Director School of Nursing	X	X	120	X	4	P	1000	800	600
West Suburban Hospital 518 N. Austin Blvd. Oak Park, Ill. 60302 (Hosp.; 1914; women only)	Sharon E. Bolin Director School of Nursing	X	X	120	#		R #	1350*	675*	675*
Lutheran General & Deaconess Hospitals 1700 Western Ave., Park Ridge, Ill. 60068 (Hosp.; 1925; coed)	Erna M. Rueggeberg Associate Director of Nursing & Director, School of Nursing	X	X	121	X	3	R #	600	600	450
Methodist Hospital of Central Illinois 221 N.E. Glen Oak Ave. Peoria, Ill. 61603 (Hosp.; 1900; coed)	Louise B. Guest Director School of Nursing	X	X	96	X		P	844*	484*	509*
St. Francis Hospital 211 Greenleaf St. Peoria, Ill. 61603 (Hosp.; 1915; coed)	Magdalen Baumann Director School of Nursing	X	X	120	X		P	464	449	505
Blessing Hospital 1005 Broadway Quincy, Ill. 62301 (Hosp.; 1891; coed)	Lauretta M. Eno Director of Nursing	X	X	120	X	12	P	928	415	385
St. Anthony's Hospital 767 30th St. Rock Island, Ill. 61201 (Hosp.; 1899; coed)	Sister Dorothy Lampe Director of Nursing Education	X	X	96	X		P	690	720	
Rockford Memorial School of Nursing 2400 Rockton Ave. Rockford, Ill. 61103 (Hosp.; 1887; coed)	Gilda Bevilacqua Director Nursing Education	X	X	126		16	P	733	500	425
Swedish-American Hospital 1316 Charles St. Rockford, Ill. 61101 (Hosp.; 1919; coed)	Marguerite L. Manfreda Director School of Nursing	X	X	133		12	P	565	565	465
Memorial Hospital 200 W. Dodge St. Springfield, Ill. 62701 (Hosp.; 1897; coed)	Hazel J. Kellams Director School of Nursing	X	X	108	X		P	#	#	#
St. John's Hospital 401 N. 9th St. Springfield, Ill. 62701 (Hosp.; 1886; coed)	Sister Agnes McDougall Director School of Nursing	X		120			P	680	570	500
INDIANA										
Deaconess Hospital 600 Edgar St. Evansville, Ind. 47710 (Hosp.; 1896; coed)	Ellen Lynch Associate Director of Nursing School of Nursing	X	X	128	X		P	822	507	377
Lutheran Hospital 535 Home Ave. Fort Wayne, Ind. 46807 (Hosp.; 1904; coed)	Virginia Williamson Director of Nursing	X	X	132	X		#	932	302	286
Parkview-Methodist School of Nursing 2200 Randalia Dr. Fort Wayne, Ind. 46805 (Hosp.; 1902; coed)	Dorothy Craig Director of Nursing Education	X	X	120	X		P	1000	600	500

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INDIANA—Continued										
St. Joseph's Hospital 735 W. Berry St. Fort Wayne, Ind. 46804 (Hosp.; 1918; coed)	Josephine K. Schweier Director School of Nursing	X	X	120			P	437	213	300
Marion County General Hospital 960 Locke St. Indianapolis, Ind. 46202 (Hosp.; 1883; coed)	Thelma L. Richardson Director of Nursing Service & Education	X		133	X		P	880*	580*	430*
St. Elizabeth School of Nursing 1508 Tippecanoe St. Lafayette, Ind. 47904 (Hosp.; 1897; coed)	Sister M. Florianne Director School of Nursing	X	X	112	X		P	947	698	675
Holy Cross School of Nursing 410 N. Notre Dame Ave. South Bend, Ind. 46622 (Hosp.; 1950; coed)	Sister M. Blanche Director School of Nursing	X		130	X	4	P	890	602	605
Memorial Hospital of South Bend 615 N. Michigan South Bend, Ind. 46601 (Hosp.; 1894; coed)	Irene M. Kardasen Director School of Nursing & Nursing Service	X	X	137	X		P #	1450	600	450
St. Anthony Hospital 1021 S. 6th St. Terre Haute, Ind. 47807 (Hosp.; 1918; coed)	Sister M. Alvera Director School of Nursing	X	X	118	X		P	550	375	375
IOWA										
St. Luke's School of Nursing 225 12th St. N.E. Cedar Rapids, Iowa 52402 (Hosp.; 1890; coed)	John A. Wilkinson Director School of Nursing	X	X	133	X		#	2350*	305*	300*
Jennie Edmundson Memorial Hospital 933 E. Pierce St. Council Bluffs, Iowa 51501 (Hosp.; 1887; coed)	Ralph R. Swift Director School of Nursing	X	X	101	X		P	891	660	665
St. Luke's Hospital 1227 E. Rusholme St. Davenport, Iowa 52803 (Hosp.; 1895; coed)	Mary E. Meehan Director School of Nursing	X	X	96	X	8	#	1400	760	
Broadlawns Polk County Hospital 18th & Hickman Rd. Des Moines, Iowa 50314 (Hosp.; 1921; coed)	Neta McCleary Acting Director of Nursing Education	X	X	116	X	8	P	1090	340	340
Iowa Lutheran Hospital 716 Parnell Ave. Des Moines, Iowa 50316 (Hosp.; 1914; coed)	Nellie Osterlund Director of Nursing	X	X	120	X		R	890	275	275
Iowa Methodist School of Nursing 1117 Pleasant St. Des Moines, Iowa 50309 (Hosp.; 1902; coed)	Richard E. Armstrong Director of Nursing Education	X	X	132	X	12	P	1600	470	430
Mercy Hospital 1165 5th Ave. Des Moines, Iowa 50314 (Hosp.; 1899; coed)	Patricia Meintel Director School of Nursing	X	X	99	X	11	P	1500	615	645
Finley Hospital 1480 Allison Pl. Dubuque, Iowa 52001 (Hosp.; 1897; coed)	Marian L. Herring Director School of Nursing	X	X	132	X	16	#	1630*	592*	500*

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IOWA—Continued										
Mercy Medical Center Mercy Dr. Dubuque, Iowa 52001 (Hosp.; 1900; coed)	Sister Mary Bernice Director School of Nursing	X	#	84	X		P	1783	708	
Marshalltown Community School of Nursing 3 S. 4th Ave. Marshalltown, Iowa 50158 (Hosp.; 1914; coed)	Isabelle A. Youngblood Director of Nursing Education	X	X	108	X	8	P	648	578	615
St. Joseph Mercy School of Nursing 2217 Court St. Sioux City, Iowa 51104 (Ind.; 1900; coed)	Sister M. Maurice Sheehy Director Nursing Education	X	X	84	X	8	P	1170	597	
St. Luke's School of Nursing–St. Luke's Medical Center Box 2000 Sioux City, Iowa 51104 (Hosp.; 1967; coed)	Gladys M. Holm Director School of Nursing	X	X	120	X	10	P	1275	395	425
Lutheran School of Nursing–Allen Memorial Hospital 1825 Logan Ave. Waterloo, Iowa 50703 (Hosp.; 1942; coed)	Virginia C. Turner Director Nursing Education	X	X	120	X	8	P	840	280	280
KANSAS										
Newman Hospital 1127 Chestnut St. Emporia, Kans. 66801 (Hosp.; 1922; coed)	Marguerite Coleman Director of Nursing Education	X	X	123	X	10	R	365	260	230
Mercy School of Nursing 810 Burke St. Fort Scott, Kans. 66701 (Ind.; 1915; coed)	Sister M. Julita Director School of Nursing	X	X	121	X	24	#	800	500	400
Grace School of Nursing 815 N. Walnut St. Hutchinson, Kans. 67501 (Hosp.; 1915; coed; 1 yr. coll.)	Maybelle Ruse Director School of Nursing	X	X	80	X	10	P	425	415	
St. Margaret School of Nursing 759 Vermont Ave. Kansas City, Kans. 66101 (Hosp.; 1929; coed)	Sister M. Philomene Director School of Nursing	X	X	110	X	24	P	660	300	300
Bethel Deaconess Hospital 411 S.E. 2d St. Newton, Kans. 67114 (Hosp.; 1908; coed; 28 sem. coll. units)	Ruth Specht Director of Nursing	X	X	84	X	24	P #	635*	477*	
Asbury Hospital South & 7th Salina, Kans. 67401 (Hosp.; 1921; coed)	Dorothy D. Soderberg Director School of Nursing	X	X	112	X	22	P	#	235	235
Stormont-Vail School of Nursing 10th & Washburn Sts. Topeka, Kans. 66606 (Hosp.; 1949; coed)	Sarah W. Belcher Director School of Nursing	X	X	117	X	10	P	#	400	400
St. Francis Hospital 512 E. 9th St. Wichita, Kans. 67214 (Hosp.; 1917; coed)	Sister M. Basilla Director School of Nursing	X	X	124	X		P	#	#	#

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KANSAS—Continued										
Wesley Medical Center 550 Hillside Ave. Wichita, Kans. 67214 (Hosp.; 1912; coed; 1 yr. coll.)	Ilse C. Steg Director School of Nursing	X	X	90	#		P	850*	850*	
Wichita–St. Joseph School of Nursing 1121 S. Clifton Wichita, Kans. 67218 (Hosp.; 1896; coed)	Sister M. Valeria Klenke Director School of Nursing	X	X	123	X	36	P	#	#	#
KENTUCKY										
King's Daughters' Hospital 2201 Lexington Ave. Ashland, Ky. 41101 (Hosp.; 1953; coed)	Lahoma Fannin Acting Director School of Nursing	X		86	X		P	1138*	758*	
Kentucky Baptist Hospital 768 Barret Ave. Louisville, Ky. 40204 (Hosp.; 1924; coed)	Myrna R. Myers Director School of Nursing	X	X	130	X		P	1212*	1000*	694*
Norton Memorial Infirmary 231 W. Oak St. Louisville, Ky. 40203 (Hosp.; 1886; coed)	Mildred C. Metz Director School of Nursing	X		82	X		P	760	605	
LOUISIANA										
Our Lady of the Lake Hospital 1600 N. 3rd St. Baton Rouge, La. 70802 (Hosp.; 1923; women only)	Bertha Mae Anders Director School of Nursing	X	X	108	X		P	305	305	345
Charity Hospital 450 S. Claiborne Ave. New Orleans, La. 70112 (Hosp.; 1894; coed)	Sister Blanche McDonnell Director School of Nursing	X	X	120			P	Res.: 72 Nonres.: 272	55 155	79 179
Hotel Dieu School of Nursing P.O. Box 61262 New Orleans, La. 70160 (Ind.; 1899; coed)	Sister Mary Agnes Tehan Director School of Nursing	X	X	108	X		P	827	689	590
Touro Infirmary 1400 Foucher St. New Orleans, La. 70115 (Hosp.; 1896; coed)	Emily S. Saylors Director Nursing Education	X	X	128	X		P	424	424	330
MAINE										
Eastern Maine Medical Center 489 State St. Bangor, Maine 04401 (Hosp.; 1892; coed)	Irene Shannon Director School of Nursing	X	X	100	X	22	P	812*	575*	350*
Central Maine General Hospital 300 Main St. Lewiston, Maine 04240 (Hosp.; 1891; coed)	Mary Ann Burn Director of Nursing	X	X	119			P	545	380	315
St. Mary's General Hospital 45 Golder St. Lewiston, Maine 04240 (Hosp.; 1908; coed)	Sister Jeannette Corneau Director School of Nursing	X	X	120		4	P	900*	900*	900*
Mercy Hospital 144 State St. Portland, Maine 04101 (Hosp.; 1920; coed)	Sister Mary Consuela Director of Nursing	X	X	130	X		P	1100*	1100*	1100*

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MARYLAND										
Church Home and Hospital Broadway & Fairmount Ave. Baltimore, Md. 21231 (Hosp.; 1894; coed)	George W. Mason Director of Nursing	X	X	127	X	8	P	740*	460*	460*
Helene Fuld School of Nursing of Provident Hospital 2600 Liberty Heights Ave. Baltimore, Md. 21215 (Hosp.; 1895; coed)	Doris H. Reese Assistant Administrator for Nursing Service & School of Nursing	X	X	116	X	26	P	#	#	#
Maryland General Hospital 827 Linden Ave. Baltimore, Md. 21201 (Hosp.; 1891; women only)	Sally Jane Ransom Director School of Nursing & Nursing Service		X	133	X	24	#	440*	370*	185*
Sinai Hospital of Baltimore, Inc. Belvedere Ave. at Greenspring Baltimore, Md. 21215 (Hosp.; 1906; coed)	Carol L. Cook Director School of Nursing	X	X	100	X		P	875	585	170
Union Memorial Hospital 33d & Calvert Sts. Baltimore, Md. 21218 (Hosp.; 1890; coed)	Frances D. Tompkins Director of Nursing	X	X	130	X	12	P	500*	500*	500*
Macqueen Gibbs Willis School of Nursing—Memorial Hospital S. Washington St. Easton, Md. 21601 (Hosp.; 1907; coed)	Bettye Smith Associate Director School of Nursing	X	X	130		2	P	550*	550*	575*
Peninsula General Hospital W. Locust St. Salisbury, Md. 21801 (Hosp.; 1905; coed)	Ruth E. Hyde Director School of Nursing	X	X	96	X	12	P	760	760	
St. Joseph Hospital 7260 York Rd. Towson, Md. 21204 (Hosp.; 1901; coed)	Sister Mary Andrew Director School of Nursing	X	X	130	X	24	P	650	315	287
MASSACHUSETTS										
Boston City Hospital School of Nursing, Dept. of Health and Hospitals 818 Harrison Ave. Boston, Mass. 02118 (City; 1878; coed)	Mary F. Moran Director School of Nursing	X		108		8	P	#	#	#
Catherine Labouré School of Nursing 2100 Dorchester Ave. Boston, Mass. 02124 (Ind.; 1951; coed)	Sister Angelica Ahl Director School of Nursing	X	X	109			P	640	605	630
Children's Hospital School of Nursing, Children's Medical Center 300 Longwood Ave. Boston, Mass. 02115 (Hosp.; 1889; coed)	Muriel R. Vesey Director School of Nursing & Nursing Service	X	X	132	X	12	P	1573	573	473
Faulkner Hospital 1153 Centre St. Boston, Mass. 02130 (Hosp.; 1900; coed)	Margarita M. Farrington Director School of Nursing & Nursing Service	X	X	124		24	P	1410*	695*	350*

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MASSACHUSETTS—Continued										
Massachusetts General Hospital Fruit St. Boston, Mass. 02114 (Hosp.; 1873; coed)	Natalie Petzold Director School of Nursing	X	X	124			P	1400*	1400*	1200*
New England Baptist Hospital 91 Parker Hill Ave. Boston, Mass. 02120 (Hosp.; 1896; women only)	Elizabeth H. Gould Director School of Nursing	X	X	129			P	780	770	695
New England Deaconess Hospital 185 Pilgrim Rd. Boston, Mass. 02215 (Hosp.; 1896; coed)	Ellen D. Howland Director of Nursing	X	X	116	X	12	P	1500*	1100*	700*
Peter Bent Brigham Hospital 721 Huntington Ave. Boston, Mass. 02115 (Hosp.; 1913; coed)	Marion L. Metcalf Director School of Nursing	X	X	110			P	679	679	714
St. Elizabeth's Hospital 235 Washington St. Brighton, Mass. 02135 (Hosp.; 1895; coed)	Anne E. McCarthy Director School of Nursing	X	X	112		8	P	930*	750*	570*
Brockton Hospital 680 Centre St. Brockton, Mass. 02402 (Hosp.; 1897; coed)	Elsie M. Burgeson Director of Nursing	X	X	120		10	R	800*	700*	500*
Mt. Auburn Hospital 330 Mt. Auburn St. Cambridge, Mass. 02138 (Hosp.; 1908; #)	Mary Ellen Thompson Director of Nursing	X	X	118			P	900*	430	230
Whidden Memorial Hospital 103 Garland St. Everett, Mass 02149 (Hosp.; 1896; coed)	Mary M. Kennedy Director School of Nursing	X	X	120	X	10	P	1100*	555*	480*
Burbank Hospital Nichols Rd. Fitchburg, Mass. 01420 (Hosp.; 1894; coed)	Dolores M. Ouellette Director School of Nursing	X	X	114	X	10	P	812*	541*	528*
Framingham Union Hospital 25 Evergreen St. Framingham, Mass. 01701 (Hosp.; 1893; coed)	Eileen R. White Director School of Nursing	X	X	120		22	P	840*	840*	715*
Holyoke Hospital 575 Beech St. Holyoke, Mass. 01040 (Hosp.; 1893; coed)	Marjorie Heywood Director School of Nursing	X	X	118	X	10	P	930*	745*	740*
Lawrence General Hospital 1 Garden St. Lawrence, Mass. 01842 (Hosp.; 1882; coed)	Carole A. Schultz Director School of Nursing	X	X	110	X		P	625	615	615
Leominster Hospital Hospital Rd. Leominster, Mass. 01453 (Hosp.; 1912; coed)	Jean M. Grady Director School of Nursing	X	X	122	X	12	#	250	370	295
Lowell General Hospital Varnum Ave. Lowell, Mass. 01854 (Hosp.; 1895; coed)	Barbara Hussey Director School of Nursing	X	X	110	X		#	530	350	355
Lynn Hospital 212 Boston St. Lynn, Mass. 01904 (Hosp.; 1883; coed)	M. Genevieve Wing Dean School of Nursing			132		12	#	850	425	425

2925

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MASSACHUSETTS—Continued										
Malden Hospital Hospital Rd. Malden, Mass. 02148 (Hosp.; 1892; coed)	Ellen Kennedy Director School of Nursing	X	X	119	X	10	P	1000	600	600
Lawrence Memorial Hospital of Medford 170 Governors Ave. Medford, Mass. 02155 (Hosp.; 1924; coed)	Mary D. Brown Director Nursing Education	X	X	112	X		P	1500*	800*	700*
Melrose-Wakefield Hospital 340 Main St. Melrose, Mass. 02176 (Hosp.; 1894; coed)	Jane M. Bain Director School of Nursing	X	X	120			P	940*	750*	745*
St. Luke's Hospital New Bedford, Mass. 02742 (Hosp.; 1884; coed)	Livia R. Duhaime Director School of Nursing	X	X	120	X	10	P	525*	150*	135*
Newton-Wellesley Hospital 2014 Washington St. Newton Lower Falls, Mass. (Hosp.; 1888; coed)	Myrtice L. Fuller Director of Nursing	X	X	81			P	736	765	
St. Luke's School of Nursing of Berkshire Medical Ctr. 333 East St. Pittsfield, Mass. 01201 (Hosp.; 1916; coed)	Edith E. Lickman Director of Nursing Education	X	X	103	X	10	P	1178*	710*	585*
Quincy City Hospital 114 Whitwell St. Quincy, Mass. 02169 (Hosp.; 1890; coed)	Frances LaMontagne Director of Nursing	X	X	96	X		P	339*	327*	312*
Salem Hospital 81 Highland Ave. Salem, Mass. 01970 (Hosp.; 1879; women only)	Margaret E. LeTourneau Director of Nursing	X	X	128	X		P	465	425	475
Somerville Hospital 125 Lowell St. Somerville, Mass. 02143 (Hosp.; 1891; coed)	Dorothy Martyn Director School of Nursing	X	X	82	X		P	1244	1200	
Springfield Hospital Medical Center 759 Chestnut St. Springfield, Mass. 01107 (Hosp.; 1892; coed)	Jeanne S. Murphy Assistant Executive Director Nursing	X	X	114	X	10	P	620	695	425
Memorial Hospital 119 Belmont St. Worcester, Mass. 01605 (Hosp.; 1889; coed)	Phyllis A. Olson Director of Nursing	X	X	120	X	10	P	700*	400*	345*
St. Vincent Hospital 25 Winthrop St. Worcester, Mass. 01610 (Hosp.; 1900; coed)	Carolina Cressotti Director School of Nursing	#	X	117	X		#	900	303	303
Worcester City Hospital 26 Queen St. Worcester, Mass. 01610 (Hosp.; 1883; coed)	Phyllis A. Migliozzi Director School of Nursing	X	X	110	X		P	350*	150*	150*
Worcester Hahnemann Hospital 281 Lincoln St. Worcester, Mass. 01605 (Hosp.; 1900; women only)	Mary L. Lovering Director School of Nursing	X	X	124	X	12	P	435	485	185
MICHIGAN										
Grace Hospital 4160 John R St. Detroit, Mich. 48201 (Hosp.; 1888; coed)	LaVaughn Sharp Director School of Nursing	X	X	128	X		P	1600*	300*	300*

2926

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MICHIGAN—Continued										
Harper Hospital 3825 Brush St. Detroit, Mich. 48201 (Hosp.; 1883; coed)	Helen D. Wenning Director School of Nursing	X	X	93		8	P	690	690	
Henry Ford Hospital 2799 W. Grand Blvd. Detroit, Mich. 48202 (Hosp.; 1925; women only)	Cleo I. Stewart Assistant Director School of Nursing	X		92		7	[illegible]	650*	500*	
Mercy School of Nursing of Detroit 2242 E. Grand Blvd. Detroit, Mich. 48211 (Ind.; 1934; coed)	Mildred Lesinski Executive Director School of Nursing	X		88		8	P	620	620	
Hurley Hospital 701 W. 8th Ave. Flint, Mich. 48502 (Hosp.; 1909; coed)	Dorothy Ann Nelson Acting Director School of Nursing	X	X	128	X		R	875*	315*	315*
Butterworth Hospital 100 Michigan N.E. Grand Rapids, Mich. 49503 (Hosp.; 1890; coed)	Betty June Kiley Director School of Nursing	X	X	120	X		P	748	540	540
Mercy Central School of Nursing 220 Cherry St. S.E. Grand Rapids, Mich. 49503 (Ind.; 1935; coed)	Florence E. Sullivan Acting Director School of Nursing	X	#	94		8	P	800	700	
St. Joseph's Hospital 200-212 Michigan Ave. Hancock, Mich. 49930 (Hosp.; 1920; coed)	Sister John Kenneth Scott Director School of Nursing	X		80	X		P	746	598	
W. A. Foote Memorial Hospital 205 N. East Ave. Jackson, Mich. 49201 (Hosp.; 1902; coed)	Mary C. Mitchell Director of Nursing Education	X		111	X		P	853	700	636
Bronson Methodist Hospital 252 E. Lovell St. Kalamazoo, Mich. 49006 (Hosp.; 1904; coed)	Helen E. Weber Director School of Nursing	X	X	126	X		R #	800	400	400
St. Luke's Hospital 515 W. College Ave. Marquette, Mich. 49855 (Hosp.; 1898; coed)	Jane F. Mahowald Director School of Nursing	X	X	80	X		P	800	650	
Hackley Hospital 1700 Clinton St. Muskegon, Mich. 49443 (Hosp.; 1905; coed)	Bonnie Osborn Director School of Nursing	X	X	120	X		P	690	650	650
Providence Hospital 16001 Nine Mile Rd. Southfield, Mich. 48075 (Hosp.; 1910; coed)	Agnes McMenemy Director School of Nursing	X	X	80	X		P	600*	600*	
MINNESOTA										
St. Luke's Hospital 915 E. 1st St. Duluth, Minn. 55805 (Hosp.; 1889; coed)	Mary E. Blair Director of Nursing	X	X	126	X		#	1280	715	700
Fairview Hospital 2312 S. 6th St. Minneapolis, Minn. 55406 (Hosp.; 1916; women only)	Harriet R. Bestul Director School of Nursing	X	X	108	X		#	1150	750	760
Lutheran Deaconess Hospital 2315 14th Ave. S. Minneapolis, Minn. 55404 (Hosp.; 1916; women only)	Clara Johanson Director School of Nursing	X	X	105	X	9	#	1159	738	773

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MINNESOTA—Continued										
Methodist Hospital 6500 Excelsior Blvd. Minneapolis, Minn. 55426 (Hosp.; 1961; coed)	H. Joan Barber Director School of Nursing	X	X	111	X	10	P	1216	820	840
St. Cloud School of Nursing 13th St. & 6th Ave. N. St. Cloud, Minn. 56301 (Hosp.; 1908; coed)	Sister Mary Jude Director School of Nursing	X	X	108		10	P	906	630	663
Arthur B. Ancker Memorial School of Nursing–St. Paul-Ramsey Hospital 640 Jackson St. St. Paul, Minn. 55101 (Hosp.; 1891; coed)	Marlys W. Lilleskov Director School of Nursing	X	X	111			#	985	760	800
Mounds-Midway School of Nursing 1700 University Ave. St. Paul, Minn. 55104 (Hosp.; 1907; coed)	Virginia Anderson Director School of Nursing	X	X	108			P	803	803	838
MISSISSIPPI										
St. Dominic—Jackson Memorial Hospital 969 Lakeland Dr. Jackson, Miss. 39216 (Hosp.; 1949; coed)	Sister Maura Director School of Nursing	X	X	123	#		P	#	#	#
MISSOURI										
Research Hospital and Medical Center Meyer Blvd. & Prospect Ave. Kansas City, Mo. 64132 (Hosp.; 1905; coed)	Teresa Mitchell Director School of Nursing	X	X	120	X	24	P	Res.: 510 Nonres.: 1430	460 460	410 410
St. Luke's Hospital of Kansas City Wornall Rd. at 44th Kansas City, Mo. 64111 (Hosp.; 1903; coed)	Rose Marie Hilker Director of Nursing Education	X	X	125	X	12	P	515	195	195
Barnes Hospital 416 S. Kingshighway St. Louis, Mo. 63110 (Hosp.; 1955; coed)	Joan Hrubetz Director Nursing Education	X	X	97	X		P	768*	790*	
Deaconess Hospital 6150 Oakland Ave. St. Louis, Mo. 63139 (Hosp.; 1889; coed)	Sister Olivia Drusch Director of Nursing	X		136	X	12	P	1048*	724*	437*
DePaul Hospital 5050 Highland Ave. St. Louis, Mo. 63113 (Hosp.; 1894; coed)	Sister Elizabeth Director School of Nursing	X	X	80	X		P	895	870	
Jewish Hospital 306 S. Kingshighway St. Louis, Mo. 63110 (Hosp.; 1902; coed)	Margaret Loh Director of Nursing	X	X	108	X		P	800	650	
Lutheran Hospital 2639 Miami St. St. Louis, Mo. 63118 (Hosp.; 1898; coed)	Georgia von Conrad Director of Nursing	X	X	120	X		#	1280*	508*	653*
Missouri Baptist Hospital 3015 N. Ballas Rd. St. Louis, Mo. 63131 (Hosp.; 1895; coed)	Ferne Boehmer Director School of Nursing	X	X	90	X		P	970	780	

2928

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MISSOURI—Continued										
St. Louis Municipal School of Nursing 1621 Grattan St. Louis, Mo. 63104 (Hosp. Commissioner; 1966; coed)	Minnie Edythe T. Gore Director School of Nursing	X	X	117	X		P	677*	400*	400*
St. Luke's Hospital 5535 Delmar Blvd. St. Louis, Mo. 63112 (Hosp.; 1889; coed)	Lorraine M. Sherk Director of Nursing Education	X	X	117	X		P	520	430	330
St. John's Hospital 1930 S. National Ave. Springfield, Mo. 65804 (Hosp.; 1907; coed)	Sister M. Sharon Schmitz Director School of Nursing	X	X	118	X		P	600*	500*	300*
MONTANA										
St. Patrick School of Nursing 500 W. Pine St. Missoula, Mont. 59801 (Hosp.; 1906; coed)	Phyllis M. McDonald Director School of Nursing	X	X	119	X	11	P	790	545	449
NEBRASKA										
St. Francis School of Nursing 1405 W. Koenig St. Grand Island, Nebr. 68801 (Hosp.; 1920; coed)	Sister M. Martha Director of Nursing	X	X	126	X	10	P	585	690	482
Mary Lanning Memorial Hospital 715 N. St. Joseph Ave. Hastings, Nebr. 68901 (Hosp.; 1915; coed)	Leota Rolls Director of Nursing Education	X	X	134	X	24	P	2165*	1107*	466*
Bryan Memorial Hospital 4848 Sumner St. Lincoln, Nebr. 68506 (Hosp.; 1926; coed)	Phyllis Bovee Director of Nursing Education	X	X	136	X	12	P	#	900*	800*
Lincoln General Hospital 2440 St. Mary's Ave. Lincoln, Nebr. 68502 (Hosp.; 1925; coed)	Sister Mary James Director of Nursing Education	X	X	130	X	24	#	1500	1000	1000
Bishop Clarkson Memorial Hospital 333 S. 44th St. Omaha, Nebr. 68131 (Hosp.; 1869; coed)	Maxine F. Jacks Director of Nursing Education	X	X	131	X		P	620	620	515
Creighton Memorial—St. Joseph's Hospital 921 Dorcas St. Omaha, Nebr. 68108 (Hosp.; 1897; coed)	Sister M. Louis Director School of Nursing	X	X	124	X		P	819	567	387
Immanuel Hospital 3483 Larimore Omaha, Nebr. 68111 (Ind., 1922; coed)	Kathleen Cheney Director of Nursing Education	X		132	X	12	P	1385	1143	938
Nebraska Methodist Hospital 8303 Dodge St. Omaha, Nebr. 68114 (Hosp.; 1891; coed)	Edna A. Fagan Assistant Administrator & Director of Nursing	X	X	133	X		P	1189	290	290
West Nebraska General Hospital 4021 Ave. B Scottsbluff, Nebr. 69361 (Hosp.; 1925; coed)	Virginia Miller Director of Nursing Education	X	X	126	X	20	P	County Res.: 488 State Res.: 682 Nonres.: 782	530 530 530	530 530 530

2929

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NEW HAMPSHIRE										
Concord Hospital 250 Pleasant St. Concord, N. H. 03301 (Hosp.; 1946; coed)	Kathleen C. Yeaple Director School of Nursing	X	X	130		24	P	10	750	625
Mary Hitchcock Memorial Hospital 2 Maynard St. Hanover, N. H. 03755 (Hosp.; 1893; coed)	Clair E. McGinley Director Nursing Education	X	X	110			P	700	700	700
Elliot Community Hospital 305 Main St. Keene, N. H. 03431 (Hosp.; 1893; coed)	Marcella McCarty Director School of Nursing	X	X	115	X	24	P	695	685	470
NEW JERSEY										
Clara Maass Memorial Hospital 1A Franklin Ave. Belleville, N. J. 07109 (Hosp.; 1895; coed)	Evelyn H. Hamilton Director School of Nursing	X	X	122	X		#	1050	600	600
Helene Fuld School of Nursing at West Jersey Hospital Camden, N. J. 08104 (Hosp.; 1894; coed)	Jane Born Director Nursing Education & Service	X		108	X	17	P	#	#	#
Our Lady of Lourdes School 1565 Vesper Blvd. Camden, N. J. 08103 (Ind.; 1961; coed)	Sister M. John Francis Director School of Nursing	X	X	108			P	250	290	275
Elizabeth General Hospital and Dispensary 925 E. Jersey St. Elizabeth, N.J. 07201 (Hosp.; 1891; coed)	Lily Bierstein Director of Nursing	X	X	114	X		P	600	600	600
Englewood Hospital 350 Engle St. Englewood, N. J. 07631 (Hosp.; 1896; women only)	Gladys B. Loew Assistant Administrator in Nursing	X	X	96	X		P	1150	1150	
Christ Hospital 176 Palisade Ave. Jersey City, N. J. 07306 (Hosp.; 1890; coed)	Phyllis L. Gray Assistant Administrator Division of Nursing	X	X	133	X	10	P	775*	400*	400*
St. Francis Hospital 1 McWilliams Pl. Jersey City, N. J. 07302 (Hosp.; 1923; coed)	A. Virginia Meyer Director School of Nursing	X	X	120	X		P	700	500	500
Mountainside Hospital Montclair, N. J. 07042 (Hosp.; 1894; coed)	Sarah L. Sherlock Director School of Nursing	X	X	120	X	10		991*	639*	608*
St. Peter's General Hospital 254 Easton Ave. New Brunswick, N. J. 08903 (Hosp.; 1908; coed)	Dorothy May Director School of Nursing	X	X	108	X		P	950*	950*	950*
Orange Memorial Hospital School of Nursing—Hospital Center at Orange 188 S. Essex Ave. Orange, N. J. 07050 (Hosp.; 1882; coed)	Grace Marie Howard Director School of Nursing	X	X	129	X	10	P	900*	753*	710*
Charles E. Gregory School of Nursing—Perth Amboy General Hospital 530 New Brunswick Ave. Perth Amboy, N. J. 08861 (Hosp.; 1903; coed)	Suzanne Law Hawes Director of Nursing Education	X	X	120	X		#	1300*	450*	450*

2930

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NEW JERSEY—Continued										
Muhlenberg Hospital Park Ave. & Randolph Rd. Plainfield, N. J. 07061 (Hosp.; 1894; coed)	Ruth Mitchell Director Nursing Service & Nursing Ed.	X	X	130			#	400*	400*	400*
Holy Name Hospital 690 Teaneck Rd. Teaneck, N. J. 07666 (Hosp.; 1925; coed)	Sister M. Claire Tynan Director of Nursing Education	X	X	120	X		P	1010	910	860
Helene Fuld School of Nursing of New Jersey at Helene Fuld Hospital 750 Brunswick Ave. Trenton, N. J. 08638 (Hosp.; 1890; coed)	Anne M. De Mille Director of Nursing	X	X	106	X		P	185*	150*	150*
St. Francis Hospital 601 Hamilton Ave. Trenton, N. J. 08629 (Hosp.; 1905; coed)	Sister Catherine Lawrence Meyer Director School of Nursing	X	X	92			#	342*	135*	
NEW YORK										
St. Mary's Hospital 427 Guy Park Ave. Amsterdam, N. Y. 12010 (Ind.; 1920; coed)	Sister M. Kevin Director School of Nursing	X	X	134		18	P	455	690	410
Binghamton General Hospital Mitchell Ave. Binghamton, N. Y. 13903 (Hosp.; 1896; coed)	Mary K. Thomas Director of Nursing	X	#	132	X		P	842*	209*	229*
Misericordia Hospital 4141 Carpenter Ave. Bronx, N. Y. 10466 (Hosp.; 1911; coed)	Grace C. Lukas Director School of Nursing	X	X	86			P	800	800	
Jewish Hospital and Medical Center of Brooklyn 567 Prospect Pl. Brooklyn, N. Y. 11238 (Hosp.; 1906; coed)	Esther Gurian Charnes Director School of Nursing	X	X	120		12	P	600	380	380
Kings County Hospital Center 451 Clarkson Ave. Brooklyn, N. Y. 11203 (Hosp.; 1889, coed)	Mary E. Mullen Director Department of Nursing	X	X	120	X		P	333	316	86
Buffalo General Hospital 100 High St. Buffalo, N. Y. 14203 (Hosp.; 1877; coed)	Aileen L. Carroll Director School of Nursing	X	X	116	X	9	P	878	50	65
Deaconess Hospital 1001 Humboldt Parkway Buffalo, N. Y. 14208 (Hosp.; 1908; coed)	Ida M. Pell Director of Nursing Education	X	X	96	X		P	625	625	
Edward J. Meyer Memorial Hospital 462 Grider St. Buffalo, N. Y. 14215 (Hosp.; 1918; coed)	Kathleen M. Marshall Director School of Nursing & Nursing Service	X	X	120	X	8	P	750*	85	110
Millard Fillmore Hospital 3 Gates Cir. Buffalo, N. Y. 14209 (Hosp.; 1887; coed)	Myrtle J. Rathmann Director School of Nursing	X		108	X		P	770	120	140
Sisters of Charity Hospital of Buffalo 2157 Main St. Buffalo, N. Y. 14214 (Hosp.; 1889; coed)	Sister Catherine Director School of Nursing	X		113	X	8	P	1475	655	400

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NEW YORK—Continued										
Arnot-Ogden Memorial Hospital Roe Ave. Elmira, N. Y. 14901 (Hosp.; 1889; coed)	Olga I. Krazinski Director of Nursing	X	X	123	X	10	P	#	#	#
St. Joseph's Hospital 555 E. Market St. Elmira, N. Y. 14901 (Hosp.; 1908; coed)	Sister Remigia Director of Nursing Education	X	#	129	X	10	P	750	240	85
Flushing Hospital and Medical Center Parsons Blvd. & 45th Ave. Flushing, N. Y. 11355 (Hosp.; 1888; coed)	Mary Gamer Director of Nursing	X	X	123		14	P	315	290	190
St. James Mercy Hospital 411 Canisteo St. Hornell, N. Y. 14843 (Hosp.; 1912; coed)	Loretta T. Haefele Director School of Nursing	X	X	132			P	550	550	550
Columbia Memorial Hospital 71 Prospect Ave. Hudson, N. Y. 12534 (Hosp.; 1900; coed)	Joan Tompkins Director of Nursing Education	X	#	100	X		#	776*	686*	330*
Queens Hospital Center 82-68 164th St. Jamaica, N. Y. 11432 (Hosp.; 1956; coed)	Agnes J. Coote Director Department of Nursing	X	X	102	X		P	#	#	#
Charles S. Wilson Memorial Hospital 33 Harrison St. Johnson City, N. Y. 13790 (Hosp.; 1912; coed)	Rowena Dutcher Director of Nursing	X		120			P	735	575	605
New Rochelle Hospital Medical Center 16 Guion Pl. New Rochelle, N. Y. 10802 (Hosp.; 1908; women only)	Georgia B. Hudson Director of Nursing	X	X	105	X		P	1030*	1000*	1000*
Beth Israel Medical Center 317 E. 17th St. New York, N. Y. 10003 (Hosp.; 1904; coed)	Rose Muscatine Hauer Director of Nursing	X	X	108	X		#	#	#	#
Harlem Hospital Center 27 W. 136th St. New York, N. Y. 10037 (Hosp.; 1923; coed)	Edith B. Benoit Director School of Nursing	X	X	80	X		P	649	167	57
Helene Fuld School of Nursing of the Hospital for Joint Diseases and Medical Center 1919 Madison Ave. New York, N.Y. 10035 (Hosp.; 1964; coed; L.P.N.)	Justine Hannon Director of Nursing	X		47			P	560		
Roosevelt Hospital 428 W. 59th St. New York, N. Y. 10019 (Hosp.; 1896; coed)	Eileen O. Scott Director School of Nursing	X	X	96			P	647*	448*	
St. Clare's Hospital & Health Center 426 W. 52d St. New York, N. Y. 10019 (Hosp.; 1951; coed)	Sister Maureen Marie Director School of Nursing	X	X	96			P	775	795	
St. Luke's Hospital 114th St. & Amsterdam Ave. New York, N. Y. 10025 (Hosp.; 1888; women only)	Ruth E. Dittmar Director School of Nursing	X	X	121			#	400	300	300

2932

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NEW YORK—Continued										
St. Vincent's Hospital 158 W. 12th St. New York, N. Y. 10011 (Hosp.; 1892; coed)	Sister Mary Robert Nagle Director School of Nursing	X	X	130	X		P	870	790	650
Champlain Valley Physicians Hospital Medical Center 10 Beekman St Plattsburg, N.Y. 12901 (Hosp.; 1926; coed)	Agnes M. Pearl Director School of Nursing	X	X	102	X	4	P	423	423	468
Rowena Lee Teagle School of Nursing of United Hospital 406 Boston Post Rd. Port Chester, N. Y. 10574 (Hosp.; 1963; coed)	Jane E. Rowlands Director School of Nursing	X	X	96		10	P	575	655	
Genesee Hospital 224 Alexander St. Rochester, N. Y. 14607 (Ind.; 1889; coed)	Jeanette Moore Principal School of Nursing	X	X	113	X		P	782	330	350
Highland Hospital South Ave. & Bellevue Dr. Rochester, N. Y. 14620 (Hosp.; 1891; coed)	Jeanne C. Hadfield Director School of Nursing	X	X	118	X		P	800	400	400
St. Vincent's Medical Center of Richmond 355 Bard Ave. Staten Island, N. Y. 10310 (Hosp.; 1961; coed)	Sister Mary Jan Nasiadka Director School of Nursing	X	X	96	X		P	522	565	
St. Joseph's Hospital 206 Prospect Ave. Syracuse, N. Y. 13203 (Hosp.; 1898; coed)	Sister Mary Sheila Director of Nursing Education	X	X	124	X		P	1430*	535*	235*
Samaritan Hospital Burdett and Peoples Ave. Troy, N. Y. 12180 (Hosp.; 1899; women only)	Leora E. Belknap Director of Nursing Education	X	#	130	X	10	P	750	750	750
St. Elizabeth Hospital 2215 Genesee St. Utica, N. Y. 13501 (Hosp.; 1904; coed)	Sister M. Amata Director School of Nursing	X	X	126	X	2	P	1160*	415*	400*
Westchester School of Nursing–Grasslands Hospital Valhalla, N. Y. 10595 (Hosp.; 1927; coed)	Anne B. Staus Associate Director Nursing Education	X	X	112	X		P	710*	#	#
Pilgrim State Hospital Fifth Ave. W. Brentwood, N. Y. 11717 (Hosp.; 1940; coed)	Eloise Owens Director School of Nursing	X	X	108	X		P	200*	125*	125*
Cochran School—St. John's Riverside Hospital 967 N. Broadway Yonkers, N. Y. 10701 (Hosp.; 1894; coed)	Vera M. Unger Director of Nursing	X		96	X	12	P	946*	989*	
NORTH CAROLINA										
Mercy School of Nursing 1921 Vail Ave. Charlotte, N. C. 28207 (Hosp.; 1906; coed)	Sister Jeanne Margaret Director of Nursing Education	X	X	132	X	12	P	600	530	550

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NORTH CAROLINA—Continued										
Presbyterian Hospital P.O. Box 10157 Charlotte, N. C. 28201 (Hosp.; 1903; women only)	Anne Pleasants White Director Nursing Education	X	#	133	X	10	P	840*	600*	860*
Cabarrus Memorial Hospital 920 Church St. N. Concord, N. C. 28025 (Hosp.; 1942; coed)	Martha M. Adams Director of Nursing Education	X	X	132		12	P	586	388	368
Watts Hospital Club Blvd. & Broad St. Durham, N. C. 27705 (Hosp.; 1895; coed)	Lucile H. Holsinger Director of Nursing	X		132	X	12	P	800*	700*	500*
Rex Hospital 1311 St. Mary's St. Raleigh, N. C. 27603 (Hosp.; 1896; coed)	Joan M. Reid Director of Nursing Education	X	X	146	X	12	P	535	181	100
Forsyth Memorial Hospital 3333 Silas Creek Pkwy. Winston-Salem, N.C. (Hosp.; 1901; coed)	Daisy M. McCommons Director of Nursing Education	X	X	127		12	P	Res.: 824 Nonres.: 524	624 324	549 324
NORTH DAKOTA										
St. Luke's Hospital 736 Broadway Fargo, N. Dak. 58102 (Hosp.; 1908; coed)	Lazette Chang-Yit Director School of Nursing	X	X	104	X		P	Res.: 828 Nonres.: 1200	671 671	
Trinity Hospital 404 1st St. S.W. Minot, N. Dak. 58701 (Hosp.; 1925; coed)	Florence Kuntz Director of Nursing Education	X	X	108	X	12	P	1000	900	400
OHIO										
Akron City Hospital 525 E. Market St. Akron, Ohio 44309 (Hosp.; 1895; coed)	Ella Mae Murdie Director Nursing Education	X	X	117	X	12	P	1008*	621*	441*
Akron General Hospital 400 Wabash Ave. Akron, Ohio 44307 (Hosp.; 1915; coed)	Marjorie L. Grandon Dean School of Nursing	X	X	130	X	24	P	State Res.: 575 Nonres.: 1119	482 482	552 552
St. Thomas Hospital 444 N. Main St. Akron, Ohio 44310 (Hosp.; 1928; coed)	Bernadette G. Griggy Director of Nursing Education	X	X	119	X	22	P	900	425	325
Aultman Hospital 2614 6th St. S. W. Canton, Ohio 44710 (Hosp.; 1892; coed)	Jean Boyd Director Nursing Education	X	X	104	X		P	1230	535	385
Mercy School of Nursing 2015 12th St. N.W. Canton, Ohio 44708 (Hosp.; 1908; women only)	Katherine Rankin Director School of Nursing	X	X	126	X		R	1800*	570	550
Bethesda Hospital Reading Rd. & Oak St. Cincinnati, Ohio 45206 (Hosp.; 1915; coed)	Barbara Richard Acting Director School of Nursing	X	X	109		12	P	372	432	352
Christ Hospital 2125 Eleanor Pl. Cincinnati, Ohio 45219 (Hosp.; 1903; coed)	Mary Deegan Director of Nursing			129	X	12	P	City Res.: 940 State Res.: 1237 Nonres.: 1633	334 334 334	257 257 257

2934

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OHIO—Continued										
Deaconess Hospital 415 Straight St. Cincinnati, Ohio 45219 (Hosp.; 1888; coed)	Lina L. Drake Director School of Nursing	X	X	130	X	12	P	800	700	525
Good Samaritan Hospital Clifton Ave. & Dixmyth Cincinnati, Ohio 45220 (Hosp.; 1897; coed)	Jacqueline A. Boothe Director of Nursing Education	X	X	120			P	425	325	325
Jewish Hospital of Cincinnati 3161 Harvey Ave. Cincinnati, Ohio 45229 (Hosp.; 1891; coed)	Helen J. Rigdon Director School of Nursing	X		85			P	707	458	
Cuyahoga County School of Nursing—Cleveland Metropolitan General Hospital 3395 Scranton Rd. Cleveland, Ohio 44109 (Hosp.; 1896; coed)	Director School of Nursing	X	X	121	X		#	1200*	280*	275*
Fairview General Hospital 18101 Lorain Ave. Cleveland, Ohio 44111 (Hosp.; 1892; coed)	Phyllis Blenkhorn Director of Nursing Education	X	X	99	X		P	420	300	335
Huron Road Hospital 13951 Terrace Rd. Cleveland, Ohio 44112 (Hosp.; 1884; coed)	Mary Margaret Miller Director School of Nursing	X	X	112	X		P	600	300	300
Lutheran Medical Center 2609 Franklin Blvd. Cleveland, Ohio 44113 (Hosp.; 1898; women only)	Margaret Kirschbaum Director of Nursing	X	X	133	X	10	P	850	320	270
St. Alexis Hospital 5303 McBride Ave. Cleveland, Ohio 44127 (Hosp.; 1918; women only)	Sister M. Wilberta Director School of Nursing	X	X	138	X		P	1155	760	730
St. Vincent Charity Hospital 2320 E. 24th St. Cleveland, Ohio 44115 (Hosp.; 1898; women only)	Sister M. Maurice Director School of Nursing	X	X	128	X	16	P	540	327	187
Grant Hospital 300 E. Town St. Columbus, Ohio 43215 (Hosp.; 1900; coed)	Karleen A. Streitenberger Director School of Nursing	X	X	132		12	P	858	829	652
Mt. Carmel School of Nursing 127 S. Davis Ave. Columbus, Ohio 43222 (Hosp.; 1903; coed)	Eleanor S. Wilson Director School of Nursing	X	X	113	X	12	P	1764	861	897
Riverside-White Cross School at Riverside Methodist Hospital 3535 Olentangy River Rd. Columbus, Ohio 43214 (Hosp.; 1891; coed)	Hazel Hurlburt Director of Nursing Education	X		128	X	12	P	2185*	1190*	545*
Miami Valley Hospital 122 E. Apple St. Dayton, Ohio 45409 (Hosp.; 1899; coed)	Mary E. Edwards Director School of Nursing	X	X	124	X	12	P	800	480	480
St. Elizabeth Medical Center 128 Hopeland St. Dayton, Ohio 45408 (Hosp.; 1915; coed)	Sister M. Lucy Farrell Director School of Nursing	X	X	110	X		P	500	590	480
East Liverpool City Hospital 425 W. 5th St. East Liverpool, Ohio 43920 (Hosp.; 1908; women only)	Lillian Ammon Director School of Nursing	X	X	150	X	20	P	500	300	200

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OHIO—Continued										
M. B. Johnson School of Nursing—Elyria Memorial Hospital, 630 E. River St., Elyria, Ohio 44035 (Hosp.; 1908; coed)	Margaret A. Krapp, Director of Nursing	X	X	112	X	10	P	1410*	740*	740*
Holzer Medical Center, 514 First Ave., Gallipolis, Ohio 45631 (Hosp.; 1920; coed)	Berenice D. Skehan, Director of Nursing Education	X	X	120	X	10	P	1313*	945*	630*
Mansfield General Hospital, 335 Glessner Ave., Mansfield, Ohio 44903 (Hosp.; 1919; coed)	Virginia B. Uhl, Director, School of Nursing	X	X	125	X		P	850	409	331
Massillon City Hospital, 876 Amherst Rd. N.E., Massillon, Ohio 44646 (Hosp.; 1910; coed)	Barbara C. Mertes, Director, School of Nursing	X	X	128	X	16	P	1000*	500*	500*
Providence School of Nursing, 1912 Hayes Ave., Sandusky, Ohio 44870 (Hosp.; 1905; coed)	Sister Jeanne Stack, Director, School of Nursing	X	X	122		24	P	1000	1000	1000
Community Hospital of Springfield & Clark County, 2615 E. High St., Springfield, Ohio 45501 (Hosp.; 1904; coed)	Louise D. Carroll, Director of Nursing	X	X	124	X	22	P	980	490	370
Ohio Valley Hospital, 380 Summit Ave., Steubenville, Ohio 43952 (Hosp.; 1912; coed)	Alice M. Ryan, Acting Director, School of Nursing	X	X	119	X	10	#	566	292	164
Flower Hospital, 3350 Collingwood Blvd., Toledo, Ohio 43610 (Hosp.; 1909; coed)	Dorcas Crossman, Administrative Assistant	X	X	131	X	24	P	1200	700	500
Mercy School of Nursing, 2238 Jefferson Ave., Toledo, Ohio 43624 (Hosp.; 1918; coed)	Sister Sylvia Felsch, Director, School of Nursing	X	X	93	X	8	P	1000	500	500
Riverside Hospital, 1530 Superior St., Toledo, Ohio 43604 (Hosp.; 1921; coed)	E. Wanda Quay, Director, School of Nursing	X	#	134	X	25	P	600	300	500
St. Vincent Hospital, 2201 Cherry St., Toledo, Ohio 43608 (Hosp.; 1896; coed)	Eleanor Walsh, Director, School of Nursing	X	X	120	X		#	#	#	#
Toledo Hospital, 2701 Oatis Ave., Toledo, Ohio 43606 (Hosp.; 1893; coed)	Beulah Klingler, Director, School of Nursing	X		120	X	13	P	1500*	624*	502*
Trumbull Memorial Hospital, 1350 E. Market St., Warren, Ohio 44482 (Hosp.; 1907; coed)	Helen Ludwig, Director, School of Nursing	X	X	131	X	26	P	1355*	570*	465*
St. Elizabeth Hospital, 1044 Belmont Ave., Youngstown, Ohio 44505 (Hosp.; 1911; coed)	Sister Dorothy Zwick, Director, School of Nursing	X	X	135		14	P	545	450	500
Good Samaritan Medical Center, 730 Laurel Ave., Zanesville, Ohio 43701 (Hosp.; 1905; coed)	Sister M. St. Barbara, Director, School of Nursing	X	X	132	X	12	P	740	185	225

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OKLAHOMA										
St. Anthony Hospital O'Donoghue Hall 1117 N. Shartel St. Oklahoma City, Okla. 73103 (Hosp.; 1908; coed)	Peggy J. Windes Director School of Nursing	X	X	112	X		P	1775	980	775
Hillcrest Medical Center 1120 S. Utica Tulsa, Okla. 74104 (Hosp.; 1918; coed)	Bernice Joy Regaldo Director Nursing Education	X	X	114	X		P	1119	290	330
St. John's Hospital 1802 E. 19th St. Tulsa, Okla. 74104 (Hosp.; 1926; coed)	M. Virginia Andersen Director School of Nursing	X	X	108	X		P	275	450	480
OREGON										
Emanuel Hospital 2828 N. Gantenbein Ave. Portland, Oreg. 97227 (Hosp.; 1912; coed)	Florence E. Elliott Director School of Nursing	X	X	130	X	10	P	1775	600	350
Good Samaritan Hospital & Medical Center 1015 N.W. 22d Ave. Portland, Oreg. 97210 (Hosp.; 1890; coed)	Lloydena Grimes Director School of Nursing	X	X	108	X	10	#	915	915	915
PENNSYLVANIA										
Abington Memorial Hospital 1200 York Rd. Abington, Pa. 19001 (Hosp.; 1914; coed)	Margaret Kohler Director School of Nursing	X	X	132	X	6	#	#	#	#
Allentown Hospital 17th & Chew Sts. Allentown, Pa. 18102 (Hosp.; 1899; coed)	Anne O. Winkler Director School of Nursing	X	X	133	X		P	915	500	300
Sacred Heart Hospital 421 Chew St. Allentown, Pa. 18102 (Hosp.; 1916; coed)	Sister M. Eileen Director School of Nursing	X	X	130	X		P	850	260	205
Altoona Hospital 7th St. & Howard Ave. Altoona, Pa. 16603 (Hosp.; 1904; coed)	Margaret A. Greiner Director of Nursing	X	X	124	X		P	800	300	215*
Mercy Hospital 2601 8th Ave. Altoona, Pa. 16603 (Hosp.; 1910; coed)	Sister M. Noemi Director School of Nursing	X	X	103	X	8	P	666	358	252
St. Luke's Hospital 801 Ostrum St. Bethlehem, Pa. 18015 (Hosp.; 1884; coed)	Julia S. Ritter Director of Nursing	X	#	131	X		R	#	#	#
Bryn Mawr Hospital Bryn Mawr Ave. Bryn Mawr, Pa. 19010 (Hosp.; 1905; coed)	Helen T. Butler Director of Nursing	X	X	120		12	P	550*	500*	500*
Butler County Memorial Hospital E. Brady St. Extension Butler, Pa. 16001 (Hosp.; 1901; coed)	Sara Jean Clark Director of Nursing	X	X	120	X	20	P	1215	580	320
St. Joseph's Hospital Carbondale, Pa. 18407 (Hosp.; 1926; coed)	Sister Mary Luke Zaleski Director of Nursing	X	X	127	X	18	P	1070	900	600
Coatesville Hospital 300 Strode Ave. Coatesville, Pa. 19320 (Hosp.; 1917; coed)	Ida M. Tompkins Director of Nursing	X	X	144	X	26	P	750	350	200

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PENNSYLVANIA—Continued										
Geisinger Medical Center Poplar St. Danville, Pa. 17821 (Hosp.; 1915; coed)	Emma Jean Knapper Director of Nursing	X		96			P	665*	715*	
Easton Hospital 21st & Lehigh Sts. Easton, Pa. 18042 (Hosp.; 1900; coed)	Virginia M. McIlroy Director School of Nursing	X		132	X	12	P	542	250	261*
Hamot Hospital 2 W. Second St. Erie, Pa. 16512 (Hosp.; 1890; coed)	Florence G. Deutsch Director Diploma Program of Nursing Education	X	X	112	X		P	640*	625*	530*
St. Vincent Hospital 241 W. 24th St. Erie, Pa. 16502 (Hosp.; 1901; coed)	Sister Rose Evelyn Director of Nursing Education	X		80			#	650	650	
Westmoreland Hospital 532 W. Pittsburgh St. Greensburg, Pa. 15601 (Hosp.; 1895; coed)	Ruth S. Woodward Director of Nursing	X	X	117	X	20		1118*	245*	312*
Harrisburg Hospital South Front St. Harrisburg, Pa. 17101 (Hosp.; 1905; coed)	E. Jean Deeter Director of Nursing	X	X	118	#		#	850*	850*	850*
Harrisburg Polyclinic Hospital Third & Radnor Sts. Harrisburg, Pa. 17105 (Hosp.; 1909; coed)	Jane U. Arnold Director School of Nursing	X	X	128	X		P	1010	290	150
Hazleton State General Hospital E. Broad St. Hazleton, Pa. 18201 (Hosp.; 1894; coed)	Nancy D. Super Director of Nursing	X		144	X	25	R	510	445	445
Indiana Hospital Indiana, Pa. 15701 (Hosp.; 1915; coed)	Ruby B. Dobson Director of Nursing Education	X	X	134	X	16	#	510*	375*	375*
Conemaugh Valley Memorial Hospital 1086 Franklin St. Johnstown, Pa. 15905 (Hosp.; 1896; coed)	Movene Ponas Director of Nursing	X		135	X	11	P	455	130	115
Lancaster General Hospital 555 N. Duke St. Lancaster, Pa. 17604 (Hosp.; 1903; coed)	Eleanor Frany Director of Nursing Education	X	X	132	X	12	R #	970*	660*	660*
St. Joseph Hospital 250 College Ave. Lancaster, Pa. 17604 (Hosp.; 1902; coed)	Sister Helen Martin Director School of Nursing	X	X	114	X		P	700*	325*	512*
Ohio Valley General Hospital Heckel Rd. McKees Rocks, Pa. 15136 (Hosp.; 1901; coed)	Mary E. Schuchert Director of Nursing Education	X	X	120	X	19	#	1010*	700*	570*
Allegheny Valley Hospital 1300 Carlisle St. Natrona Heights, Pa. 15065 (Hosp.; 1910; women only)	Margaret Greulich Director of Nursing	X	X	119	X	11	R	415	415	435

2938

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PENNSYLVANIA—Continued										
Jameson Memorial Hospital West Leasure Ave. New Castle, Pa. 16101 (Hosp.; 1895; coed)	Donna V. Stewart Director of Nursing Education	X	X	113	X		P	700	400	400
St. Francis Hospital of New Castle 1100 S. Mercer St. New Castle, Pa. 16101 (Hosp.; 1919; coed)	Sister Virginia Mary Director School of Nursing	X	X	116	X	8	P	480	440	575
Citizens General Hospital 651 4th Ave. New Kensington, Pa. 15068 (Hosp.; 1913; coed)	Mary K. Slezak Director School of Nursing	X	X	122	X	8	P	387	360	385
Montgomery Hospital Powell & Wood Sts. Norristown, Pa. 19401 (Hosp.; 1893; coed)	Dorothy Z. Allison Director School of Nursing	X	X	120		25	#	550	500	400
Albert Einstein Medical Center York & Tabor Rds. Philadelphia, Pa. 19141 (Hosp.; 1952; coed)	Ella W. Allison Assistant Executive Vice-President in Charge of Nursing Education and Patient Services	X	X	96		4	P	360	350	
Chestnut Hill Hospital 8835 Germantown Ave. Philadelphia, Pa. 19118 (Hosp.; 1908; coed)	Laura May Beery Director of Nursing	X	X	126	X	19	P	700	600	500
Episcopal Hospital Front St. & Lehigh Ave. Philadelphia, Pa. 19125 (Hosp.; 1888; coed)	Gilberta M. Trani Administrator for Nursing	X	X	132	X	12	#	470*	470*	470*
Frankford Hospital 4918 Penn St. Philadelphia, Pa. 19124 (Hosp.; 1904; coed)	Johanna Broske Director Nursing Education	X	X	130	X		P	Res.: 1132* Nonres.: 2067*	772* 892*	637* 877*
Germantown Dispensary and Hospital E. Penn & E. Wister Sts. Philadelphia, Pa. 19144 (Hosp.; 1892; coed)	Margaret Buell Director Nursing Service & Nursing Education	X	X	141	X	13	P	450	250	100
Hahnemann Medical College and Hospital 230 N. Broad St. Philadelphia, Pa. 19102 (Hosp.; 1890; coed)	Mary E. Schlosser Director School of Nursing	X	X	120	X	3	R #	260	260	310
Hospital of the Medical College of Pennsylvania 3300 Henry Ave. Philadelphia, Pa. 19129 (Hosp.; 1908; coed)	William J. Miller Director of Nursing	X	X	136	X		P	325	250	250
Hospital of the University of Pennsylvania 105 S. 36th St. Philadelphia, Pa. 19104 (Hosp.; 1886; coed)	Iris Machlan Gross Director School of Nursing	X	X	114	X	10	P	605	205	210
Lankenau Hospital Lancaster & City Line Ave. Philadelphia, Pa. 19151 (Hosp.; 1899; women only)	Dorothy J. Schwika Director of Nursing	X	X	132	X	8	R	625	550	435

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PENNSYLVANIA—Continued										
Methodist Hospital 2301 S. Broad St. Philadelphia, Pa. 19148 (Hosp.; 1892; coed)	Miriam Lundgren Assistant Vice-President	X	X	129	X	11	P	540	540	565
Pennsylvania Hospital 8th & Spruce Sts. Philadelphia, Pa. 19107 (Hosp.; 1895; coed)	Sandy F. Mannino Director School of Nursing	X	X	122	X	26	P	600*	400*	450*
Philadelphia General Hospital 34th St. & Civic Ctr. Blvd. Philadelphia, Pa. 19104 (Hosp.; 1885; coed)	Regina B. Matela Associate Director Nursing Education	X	X	120			#	450*	150*	175*
Presbyterian School—University of Pennsylvania Medical Center 51 N. 39th St. Philadelphia, Pa. 19104 (Hosp.; 1889; coed)	Dorothy M. Richards Director School of Nursing	X		120	X	26	P	675*	400*	400*
St. Agnes Hospital Broad & McKean Sts. Philadelphia, Pa. 19145 (Hosp.; 1894; coed)	Sister Katherine Marie Director School of Nursing	X	X	133		10	P	267	150	160
St. Joseph's Hospital 16th St. & Girard Ave. Philadelphia, Pa. 19130 (Hosp.; 1894; coed)	Sister Mary Jolanta Director School of Nursing	X	X	132	X	22	P	825*	400*	400*
Thomas Jefferson University 11th & Walnut Sts. Philadelphia, Pa. 19107 (Coll. Allied Health Sci.; 1891; women only)	Doris E. Bowman Director School of Nursing	X		134	X		R	#	#	#
Columbia Hospital Penn Ave. & West St. Pittsburgh, Pa. 15221 (Hosp.; 1906; coed)	Doris Gosnell Director of Nursing	X	X	122	X	20	P	Res.: 802* Nonres.: 478*	802* 478*	401* 239*
Liliane S. Kaufmann School of Nursing—Montefiore Hospital 3471 5th Ave. Pittsburgh, Pa. 15213 (Hosp.; 1908; coed)	Anna Marie Keenan Director of Nursing	X	X	120	X	8	P	#	#	#
Louise Suydam McClintic School—St. Margaret Memorial Hospital 265 46th St. Pittsburgh, Pa. 15201 (Hosp.; 1910; coed)	Grace A. Devitt Director School of Nursing	X	X	120	X	8	P	1275*	415*	265*
Mercy Hospital 1401 Blvd. of the Allies Pittsburgh, Pa. 15219 (Hosp.; 1893; coed)	Sister Margaret Mary Laitta Director School of Nursing	X	X	96			P	540	540	
Pittsburgh Hospital 500 Finley St. Pittsburgh, Pa. 15206 (Hosp.; 1905; coed)	Patricia Scuffle Director School of Nursing	X	#	110	X		P	1247*	840*	370*
St. Francis General Hospital 45th St. & Penn. Ave. Pittsburgh, Pa. 15201 (Hosp.; 1901; coed)	Sister Mary Bertin Director of Nursing	X	X	80			#	500	500	
St. John's General Hospital 3339 McClure Ave. Pittsburgh, Pa. 15212 (Hosp.; 1902; coed)	Catherine Marburger Director of Nursing	X	X	118			P	672*	292*	282*

2940

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PENNSYLVANIA—Continued										
St. Joseph's Hospital 2112 Sidney St. Pittsburgh, Pa. 15203 (Hosp.; 1902; coed)	Margaret Ann Shaffer Associate Director School of Nursing	X	X	96		#	P	450*	500*	
Shadyside Hospital 5230 Centre Ave. Pittsburgh, Pa. 15232 (Hosp.; 1884; coed)	Margaret R. Dietz Director School of Nursing	X	X	123		8	P	1000	500	300
South Side Hospital S. 20th & Jane Sts. Pittsburgh, Pa. 15203 (Hosp.; 1895; coed)	James F. Repella Assistant Administrator, Nursing	X		120	X	19	P	770	500	230
Western Pennsylvania Hospital 4900 Friendship Ave. Pittsburgh, Pa. 15224 (Hosp.; 1892; coed)	Marie Trimble Director of Nursing	X	X	120	X	16	P	1040	530	380
Reading Hospital Reading, Pa. 19602 (Hosp.; 1889; coed)	Emma L. Rahn Director of Nursing	X	#	142		12	P	400*	400*	400*
St. Joseph's Hospital 215 Birch St. Reading, Pa. 19603 (Hosp.; 1903; coed)	Sister Miriam Director School of Nursing	X	X	114			P	280	280	355
Robert Packer Hospital S. Wilbur Ave. Sayre, Pa. 18840 (Hosp.; 1901; coed)	Helen R. Saunders Director of Nursing	X	X	120	X	20	P	800	550	550
Mercy Hospital 520 Jefferson Ave. Scranton, Pa. 18501 (Hosp.; 1917; coed)	Anna C. Golden Director School of Nursing	X	X	132	X		P	850	500	475
Scranton State General Hospital Mulberry St. & Franklin Ave. Scranton, Pa. 18501 (Hosp.; 1893; coed)	Ellen A. Gillard Director School of Nursing	X	X	140	X	12	P	1548	648	150
Sewickley Valley Hospital Blackburn Rd. Sewickley, Pa. 15143 (Hosp.; 1916; coed)	Patricia A. Roche Director School of Nursing	X	#	132	X	11	R #	3233*	2636*	1445*
Sharon General Hospital 740 E. State St. Sharon, Pa. 16146 (Hosp.; 1889; women only)	Dolores Carey Director Nursing Education	X	X	122	X	12	P	800*	600*	600*
Uniontown Hospital 500 W. Berkeley St. Uniontown, Pa. 15401 (Hosp.; 1904; coed)	Thelma C. Sandy Director of Nursing	X	#	144	X	11	P	1171*	914*	753*
Washington Hospital 155 Wilson Ave. Washington, Pa. 15301 (Hosp.; 1897; coed)	Mary Deegan Vice President	X	X	96			P	1145	900	
Chester County Hospital 701 E. Marshall St. West Chester, Pa. 19380 (Hosp.; 1894; coed)	Jean M. Reidnour Director of Nursing	X	X	144	X	26	R #	1000*	1000*	1000*
Mercy Hospital 8-16 Church St. Wilkes-Barre, Pa. 18702 (Hosp.; 1898; coed)	Leona Lanza Director of Nursing Education	X	X	114	X	8		915	470	495

2941

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PENNSYLVANIA—Continued										
Wilkes-Barre General Hospital N. River & Auburn Sts. Wilkes-Barre, Pa. 18702 (Hosp.; 1887; coed)	Lois E. Knaub Director of Nursing Education	X		131	X		P	#	#	#
York Hospital 1001 S. George St. York, Pa. 17403 (Hosp.; 1894; coed)	Beulah L. Langman Director School of Nursing	X	X	133	X	3	P	1462*	500*	375*
PUERTO RICO										
Puerto Rico Medical Center Apartado 10306 Caparra Heights Station San Juan, P. R. 00935 (Ind.; 1963; coed)	Ana L. Falcon Director School of Nursing	X	X	120	X	4	P	127	127	127
RHODE ISLAND										
Newport Hospital Friendship St. Newport, R. I. 02840 (Hosp.; 1886; coed)	Agnes V. Hudder Director of Nursing	X	X	120		10	#	825	575	650
St. Joseph's Hospital 21 Peace St. Providence, R. I. 02907 (Hosp.; 1899; coed)	Grayce R. Felmann Director School of Nursing	#	#	128		18	R	575	375	335
SOUTH DAKOTA										
St. John's Hospital 4th & Kansas S.E. Huron, S. Dak. 57350 (Hosp.; 1947; coed)	Sister Mary Natalie Director School of Nursing	X	X	120		16	P	748	1003	624
St. John's McNamara Hospital 1018 11th St. Rapid City, S. Dak. 57701 (Hosp.; 1927; coed)	Sister Margaret Mary Keogh Director School of Nursing	X	X	133	X	8	P	975	600	675
Sioux Valley Hospital 1123 S. Euclid Sioux Falls, S. Dak. 57105 (Hosp.; 1899; coed)	Ruth Organ Director of Nursing	X	X	132	X	8	P	#	#	#
TENNESSEE										
Baroness Erlanger Hospital 261 Wiehl St. Chattanooga, Tenn. 37403 (Hosp.; 1899; coed)	Betty R. Potter Director of Nursing Education	X	X	108	X		P	690	390	390
East Tennessee Baptist Hospital Blount Ave. Knoxville, Tenn. 37901 (Hosp.; 1948; coed)	Modena Beasley Director Nursing Education	X	X	127	X		P	890*	550*	360*
Fort Sanders Presbyterian Hospital 1915 White Ave. Knoxville, Tenn. 37916 (Hosp.; 1920; coed)	Ruby A. Tompkins Associate Director for Nursing Education	X	X	130	X		#	900*	700*	450*
St. Mary's Memorial Hospital Oak Hill Ave. Knoxville, Tenn. 37917 (Hosp.; 1930; coed)	Margaret Heins Director School of Nursing	X	X	120	X		P	500*	370*	330*

2942

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TENNESSEE—Continued										
University of Tennessee Memorial Research Center and Hospital, Alcoa Highway, Knoxville, Tenn, 37920 (Hosp.; 1957; coed)	Dorothy B. Stephens, Director of Nursing Education	X	X	132	X		#	600	200	200
Baptist Memorial Hospital, 999 Monroe Ave., Memphis, Tenn. 38104 (Hosp.; 1912; women only)	Virginia L. Goss, Associate Director Nursing Education		X	119	X		R	550	350	300
Methodist Hospital, 251 S. Claybrook, Memphis, Tenn. 38104 (Hosp.; 1921; coed)	Joy Lynn Douglas, Director Nursing Education	X	X	105	X		P	1045	465	575
St. Joseph Hospital, 204 Overton Ave., Memphis, Tenn. 38105 (Hosp.; 1918; coed)	Sister M. Julitta, Director Nursing Education	X	X	108			P	500	225	225
TEXAS										
Mary Meek School of Nursing–Hendrick Memorial Hospital, N. 19th & Hickory Sts., Abilene, Tex. 79601 (Hosp.; 1924; coed)	Lonell Jones, Director School of Nursing	X	X	126	X	9	#	#	838*	562*
Northwest Texas Hospital, Box 1110, Amarillo, Tex. 79106 (Hosp.; 1924; coed)	Marilyn L. Dyer, Director School of Nursing	X	X	120	X		P	400	325	300
John Peter Smith Hospital, 1500 S. Main St., Fort Worth, Tex. 76104 (Hosp.; 1906; coed)	Myrna Pickard, Nurse Administrator	X	X	114	X		P	157	150	130
Methodist Hospital, 2001 Nashville, Lubbock, Tex. 79410 (Hosp.; 1918; coed)	Irene Wilson, Director School of Nursing	X	X	126	X		#	450	684	684
Baptist Memorial Hospital, 111 Dallas St., San Antonio, Tex. 78205 (Hosp.; 1903; coed)	Margie Crawford, Director Nursing Education	X	X	126	X		P	#	450*	230*
Texas Eastern School of Nursing, 801 Clinic Dr., Tyler, Tex. 75701 (Ind.; 1951; coed)	Larue J. Hardee, Nurse Administrator	X	X	120	X	#	P	363	398	260
VIRGINIA										
Alexandria Hospital, Alexandria, Va. 22314 (Hosp.; 1894; coed)	Edith Harper, Director of Nursing Education	X		117		23	P	1315*	1250*	995*
Rockingham Memorial Hospital, 738 S. Mason St., Harrisonburg, Va. 22801 (Hosp.; 1912; coed)	Marian C. Jameson, Director of Nursing Education	X	X	#	X	22	P	#	#	#
Riverside Hospital, J. Clyde Morris Blvd., Newport News, Va. 23601 (Hosp.; 1916; coed)	Stella R. Whitehead, Director School of Nursing	X	X	127	X	22	P	1411*	639*	340*

2943

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VIRGINIA—Continued										
De Paul Hospital Granby St. & Kingsley Lane Norfolk, Va. 23505 (Hosp.; 1893; women only)	Sister Mary Louis Director School of Nursing	X	X	118	X	8	P	840	360	535
Norfolk General Hospital 600 Gresham Dr. Norfolk, Va. 23507 (Hosp.; 1892; coed)	Florence Bogush Director School of Nursing	X	#	138	X		#	896	421	446
Portsmouth General Hospital 1020 Leckie St. Portsmouth, Va. 23704 (Hosp.; 1904; coed)	Lois S. Daniels Director School of Nursing	X	X	130	X	12	P	1165	470	365
Johnston-Willis Hospital 2908 Kensington Ave. Richmond, Va. 23221 (Hosp.; 1909; coed)	Helena C. Gee Director School of Nursing	X	X	130	X	10	P	1000	900	500
Richmond Memorial Hospital 1300 Westwood Ave. Richmond, Va. 23227 (Hosp.; 1961; coed)	Laura A. Murphy Director School of Nursing	X	X	120	X		P	1100*	850*	650*
Community Hospital of Roanoke Valley Roanoke, Va. 24009 (Hosp.; 1965; coed)	Educational Director	X	X	131	X		P	689*	449*	351*
Roanoke Memorial Hospital Belleview & Lake Aves. S.E. Roanoke, Va. 24014 (Hosp.; 1900; coed)	Sarah S. Luster Director Nursing Service & Nursing Education	X	X	132	X		#	950	655	660
Louise Obici School of Nursing Suffolk, Va. 23434 (Hosp.; 1951; coed)	Mary E. Martin Director School of Nursing	X	X	126	X	20	R #	875*	350*	350*
WASHINGTON										
Deaconess Hospital 422 S. Wall St. Spokane, Wash. 99210 (Hosp.; 1898; coed)	Frances L. Wise Director School of Nursing	X	X	108	X		P	350	250	250
Tacoma General Hospital 314 S. K St. Tacoma, Wash. 98405 (Hosp.; 1895; coed)	Bess M. Piggott Director of Nursing	X	X	115	X		#	1142	552	427
WEST VIRGINIA										
St. Mary's Hospital 2900 1st Ave. Huntington, W. Va. 25701 (Hosp.; 1926; coed)	Sister M. Celeste Director of Nursing	X	X	112	X		P	Res.: 345 Nonres.: 869	299 522	270 270
Ohio Valley General Hospital 2000 Eoff St. Wheeling, W. Va. 26003 (Hosp.; 1892; coed)	Rita L. Askew Director of Nursing	X	X	122			P	700	515	465
Wheeling Hospital 203 Main St. Wheeling, W. Va. 26003 (Hosp.; 1900; coed)	Julia Bannan Director School of Nursing	X	X	120		20	#	421*	546*	321*
WISCONSIN										
Bellin Memorial Hospital 744 S. Webster Ave. Green Bay, Wis. 54301 (Hosp.; 1909; coed)	Betty J. Jameson Director School of Nursing	X	X	117	X	8	#	1378	1124	993

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WISCONSIN—Continued										
Madison General Hospital 1010 Mound St. Madison, Wis. 53715 (Hosp.; 1902; coed)	Alice D. Schmitt Director of Nursing Education	X	X	120	X	8	P	#	539	539
Holy Family School of Nursing 607 S. 24th St. Manitowoc, Wis. 54220 (Hosp.; 1920; coed)	Lorraine Regenfuss Director School of Nursing	X		112	X	10	P	1168	989	947
St. Joseph's Hospital 509 St. Joseph Ave. Marshfield, Wis. 54449 (Hosp.; 1914; coed)	Helen L. Brunclik Educational Administrator	X	X	105	X	12	P	558	770	692
Columbia Hospital 3321 N. Maryland Ave. Milwaukee, Wis. 53211 (Hosp.; 1909; coed)	Merle McFeters Director School of Nursing	X		136	X	22	P	500	200	200
Deaconess Hospital 620 N. 19th St. Milwaukee, Wis. 53233 (Hosp.; 1917; coed)	Evelyn B. Rouse Director of Nursing Education	X	X	122	X		P	840	785	425
Milwaukee County General Hospital 8700 W. Wisconsin Ave. Milwaukee, Wis. 53226 (Hosp.; 1888; coed)	Margaret A. Bahr Director School of Nursing	X	X	118	X		P	1023*	385*	355*
Mercy Medical Center 660 Oak St. Oshkosh, Wis. 54901 (Hosp.; 1906; coed)	Lois L. Slemp Educational Administrator	X	X	134	X	24	R #	1238	911	845
St. Luke's Hospital 1320 Wisconsin Ave. Racine, Wis. 53403 (Hosp.; 1906; coed)	Marian B. Bower Director of Nursing Education	X	X	120	X		P	800	675	575

VT 014 166
FORSSLUND-LJUNGHILL, LENA
THE INTEGRATED UPPER SECONDARY SCHOOL; THREE SCHOOLS IN ONE.

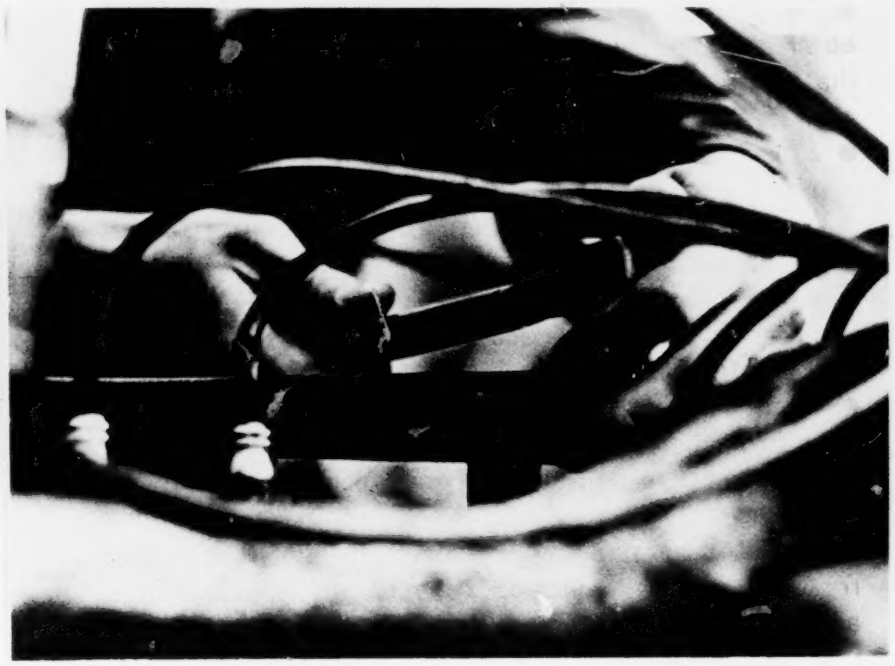
SWEDISH NATIONAL BOARD OF EDUCATION, STOCKHOLM.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - 71 19P.

DESCRIPTORS - *EDUCATIONAL CHANGE; EDUCATIONAL INNOVATION; ORGANIZATIONAL CHANGE; *VOCATIONAL EDUCATION; *SECONDARY EDUCATION; *POST SECONDARY EDUCATION; *INTEGRATED CURRICULUM; FOREIGN COUNTRIES; ADMISSION CRITERIA; COURSE ORGANIZATION; PROGRAM DESCRIPTIONS
IDENTIFIERS - *SWEDEN

ABSTRACT - DURING THE SUMMER OF 1971, THE UPPER SECONDARY SCHOOL, CONTINUATION SCHOOL AND VOCATIONAL SCHOOL OF SWEDEN'S EDUCATIONAL SYSTEM WERE COMBINED INTO ONE INTEGRATED UPPER SECONDARY SCHOOL. THE NEW SCHOOL COMPRISES SOME TWENTY LINES OF STUDY LASTING TWO OR THREE YEARS AND A 4-YEAR LINE CORRESPONDING TO THE TECHNICAL LINE OF THE PRESENT SECONDARY SCHOOL. TWO IMPLICATIONS OF THIS INTEGRATION ARE THAT THE LINES CORRESPONDING TO CONTINUATION SCHOOL ARE TO BE ORGANIZATIONALLY SIMPLIFIED, STUDIES MORE VOCATIONALLY ORIENTED, AND VOCATIONAL EDUCATION REFORMED SO THAT A BROADER BASIC EDUCATION, MADE UP OF THE GENERAL SUBJECTS, IS OFFERED. THE REASONS FOR THIS INTEGRATION ARE SOCIAL, EDUCATIONAL AND FINANCIAL. (GEB)

VT 014 166

THE NATIONAL SWEDISH BOARD OF EDUCATION



The integrated
UPPER SECONDARY SCHOOL
Three schools in one

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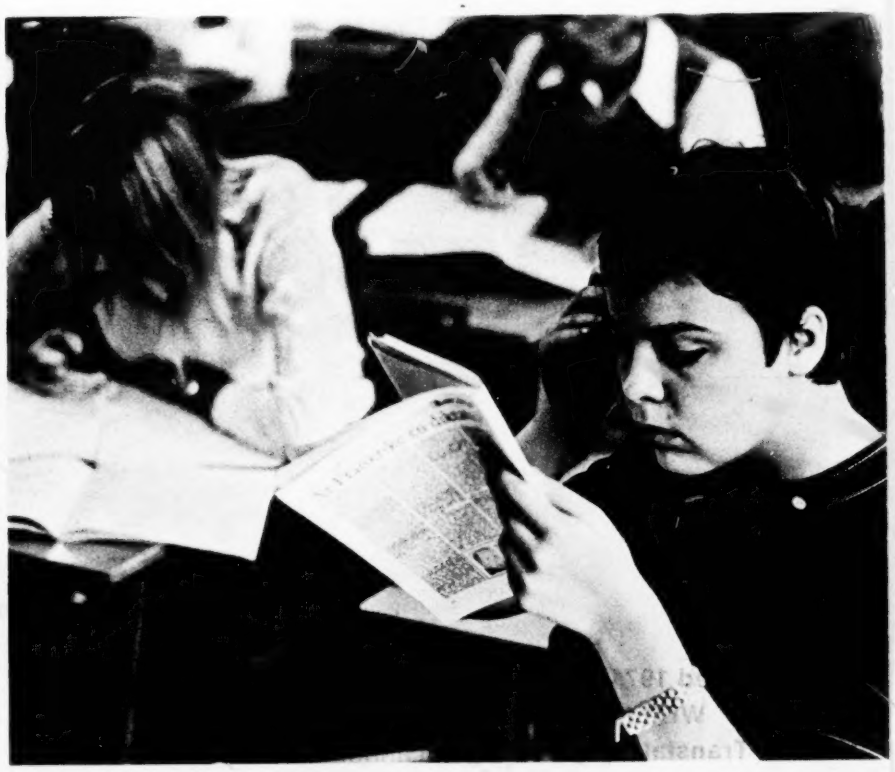

COOPERATIVE

Utbildningsförlaget

Contents

Three schools in one 3

Why integration? 5

What happens to gymnasium and continuation school? 6

The new deal in vocational education 12

Lines and special courses 14

Options, merits and admissions 21

What comes next? 23

More and more people are looking for more and more education. The past decade has come to be known as that of the explosion in education.

- At the beginning of the 1960s just over 30 per cent of each generation of sixteen-year-olds attended vocational school, general, technical and commercial upper secondary school.
- By 1968 about 75 per cent of all sixteen-year-olds were attending vocational school, continuation school or upper secondary school.
- Today almost 90 per cent of the school population go on to further studies of one kind or another on completion of their nine years of compulsory schooling.

The new integrated upper secondary school that has replaced the present upper secondary, continuation and vocational schools as from 1 July 1971 is a voluntary school which it is expected will be attended by practically the entire younger generation.

More and more people are looking for more and more education. Schools no longer exist for the purpose of training an élite. They are no longer reserved for a minority whose social background and environment encourage them to continue studying.

The prolongation of compulsory school attendance coupled with the opportunities given to the entire school population to continue studying after completing their obligatory nine years have led to a general rise in Swedish educational standards.

- In 1950 about 7 per cent of nineteen-year-olds matriculated.
- In 1960 about 11 per cent of nineteen-year-olds matriculated.
- In 1970 about 30 per cent of nineteen-year-olds completed their studies at upper secondary school.

It is in this light that the current debate on the educational system should be seen.

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2948

Three schools in one

On 1 July 1971 upper secondary school, continuation and vocational school ceased to exist as three distinct types of school with separate organisations and objectives. They were replaced by a single, integrated upper secondary school.

In practice this means that students going on from comprehensive school from the autumn term 1971 will all start at the same upper secondary school.

The new school comprises some twenty lines of study lasting either two or three years. There is also a four-year line corresponding to the technical line of the present upper secondary school. Most of these lines are divided into sub-alternatives, some of them into variants as well, in addition to which there are a number of special courses of varying duration.

The new upper secondary school was introduced in each of the present upper secondary school areas. The range of lines and special courses varies from place to place. The directives issued for planning work on the upper secondary school system lay down among other things that efforts should be made to include the majority of study alternatives in every upper secondary school area, but the full range will not be provided everywhere.

During a transitional period the present vocational school will be retained in places not specified as upper secondary school areas, the courses thus provided being known as special upper secondary school courses.

Briefly the implications of the new upper secondary school are as follows. The lines corresponding to the former upper secondary school remain intact. Those corresponding to **continuation school** are undergoing certain alterations, e.g. their organization is simplified and studies are more vocationally oriented. The new school entails a thoroughgoing reform of **vocational education.** Thus more scope is given to general subjects and students receive a broader basic education. The new upper secondary school supersedes the following institutions

- municipal upper secondary, continuation and vocational schools
- county vocational schools, schools of agriculture, rural schools of home economics and schools of forestry.

(Students who started at upper secondary school, continuation school or vocational school in the autumm term 1970 or earlier will complete their studies in accordance with the earlier curricula.

Why integration?

In 1968 the Riksdag resolved in favour of the replacement of continuation school, vocational school and upper secondary school by a single institution, the integrated upper secondary school. Earlier the 1964 enactment concerning continuation school and upper secondary school had affirmed the principle of joint planning to cover the entire field of upper secondary education, i. e. continuation school, upper secondary school and vocational school. This resulted in the pooling of premises, staff and material. Thus the 1968 reform was a logical consequence of the 1964 legislation.

There are many good reasons — social, educational and financial — for co-ordinating the objectives, organization and resources of upper secondary education.

Social reasons

The partition into separate institutions was both a reflection and a cause of certain social attitudes. The distinction between practical and academic education is and, if the truth were but known, has always been an artificial one. Many people have credited academic subjects with a superior status to the practical ones. It is hoped that the introduction of a single school will eliminate the social connotations attaching to different subjects and make them equally attractive. Only then will it be possible for the individual pupil to choose a line of studies on the basis of his or her wishes, interest and aptitudes.

Hitherto the different sectors of upper secondary education have been separately housed. The physical segregation of the academic and the practical has produced one-sided groups of pupils bearing little or no resemblance to the social realities of subsequent working life.

Educational reasons

An integrated upper secondary school will make it easier to deploy resources of staff and equipment more effectively. Co-ordination will facilitate a better range of teaching posts, so that more qualified teachers will be available for more subjects and students can be taught by the teacher best qualified for the work in hand. Integration also makes it easier for studies to be conducted on the best premises for each subject.

General subjects in the lines replacing vocational school follow the same syllabus as similar subjects in the lines corresponding to continuation school, thus simplifying the internal co-ordination of upper secondary school studies.

Financial reasons

Integration also presents financial advantages, above all at municipal level. Not only will it reduce administrative costs to a certain extent, it will also make for a more effective utilization of resources such as expensive special facilities and technical apparatus.

2950

What happens to gymnasium and continuation school?

Gymnasium

The new upper secondary school lines corresponding to those of the gymnasium (i. e. the former — unintegrated — upper secondary school) are

three-year liberal arts line
three-year social sciences line
three-year economics line
three-year natural sciences line
four-year technical line (also offering a complete course of studies lasting three years only)

These lines are not affected by the present reform.

The following subjects are to be studied, for a longer or shorter period, by most pupils taking these lines: Swedish, English, another modern language, religious knowledge, history, mathematics, general science (or physics, chemistry, biology), civics, psychology and gymnastics.

year 1	year 2	year 3
LIBERAL ARTS LINE		
	Semi-classical variant	
	Classical variant	
	Aesthetic variant	
	Social variant	

In the **liberal arts line** more emphasis is given to modern languages and less to mathematics. Students taking this line can also opt for a **classical** variant including Latin and Greek, a **semi-classical** variant including Latin only, a **social variant** and an **aesthetic** variant.

SOCIAL SCIENCES LINE		
	Aesthetic variant	
	Social variant	

The core subjects of the **social sciences line** are civics and psychology, which are backed up by continued studies in mathematics and general science. This line also offers a **social** and an **aesthetic** variant.

2951

year 1	year 2	year 3	year 4
ECONOMICS LINE			
		Accounting sub-alternative	
		Distribution sub-alternative	
		Administration sub-alternative	
		Economics/languages sub-alternative	
	Aesthetic variant	Aesthetic variant	
	Social variant	Social variant	

Variants chosen in year 2 are continued in the economics/languages sub-alternative of year 3.

The main emphasis in the **economics line** is on managerial economics, law and other commercial subjects. There is an **economics/languages sub-alternative** giving more scope to languages, shorthand and practical secretarial work. This sub-alternative includes a **social** and an **aesthetic** variant. There is also an **accounting sub-alternative,** a **distribution sub-alternative** and an **administration sub-alternative.**

NATURAL SCIENCES LINE		

The **natural sciences line** is not divided into sub-alternatives or variants. The emphasis here is on mathematics, physics, chemistry and biology.

TECHNICAL LINE			
		Mechanical engineering sub-alternative	
		Building sub-alternative	Construction variant
			Housing construction variant
		Electro-technical sub-alternative	Electro-power variant
			Telecommunications variant
		Chemical variant	

The **technical line** is the most specialized of all. Students here study much the same mathematics, chemistry and physics as the natural scientists but they start technology in their very first year. Specialized technical subjects are added during the last two years. In the third year the line divides into four sub-alternatives, two of which are further divided into two sub-alternatives each in the fourth year.

2952

Continuation school

The following lines in the integrated upper secondary school correspond to those of the present continuation school

two-year social line
two-year economics line
two-year technical line

Certain alterations will be made to these lines to adapt them better to the other two-year lines of the integrated upper secondary school, i. e. those superseding vocational school. These alterations are designed to help bring about the internal co-ordination which is the objective of the integrated upper secondary school. It is with this aim in mind that

- the organization of studies in the different lines has been simplified
- education has been made more vocationally oriented
- an obligatory system of options has been introduced, including the same subjects as the explicitly vocational lines.

Surveys carried out by the Board of Education have revealed that the organization of the continuation school has been excessively fragmented, especially as regards the social and economics lines. There have been too many options and there has not been sufficient demand for all the alternatives available. Sub-alternatives have therefore been abolished in the social and economics lines.

The changes made in the technical line of continuation school affect only the building sub-alternative, where the second year variants have been abolished.

year 1	year 2
ECONOMICS LINE	

The main subject in the **economics line** is the block subject business economics, which is allotted an increased number of periods on the timetable. It is including a number of formerly separate subjects, among them distribution and accounting.

SOCIAL LINE	

The **social line** focusses on social careers, particularly the nursing profession and certain aspects of teacher training. Students in this line will therefore devote special attention to the subject of human relations. Civics occupies a prominent position with three periods per week in each year.

All students taking this line will broaden their study of general science, the subject being obligatory. General science here is a block subject replacing biology, physics and chemistry.

Typing is also obligatory for the social line, where it was previously an optional subject only.

2953

Subjects common to the social and economics lines

The system of free options previously applied in the social and economics lines is now abolished and replaced by obligatory options. One of the following subjects is chosen and studied for three periods per week in both years

B-language
C-language
psychology
consumer education
an aesthetic subject, i. e. art, music, handicraft or drama.

Mathematics is obligatory in the social and economics lines. The aim has been to make as large a proportion of studies as possible common to both these lines and their curricula are in fact identical for no less than 43 of the 70 student periods (in both years together).

year 1	year 2
TECHNICAL LINE	
Mechanical engineering sub-alternative	
Building sub-alternative	
Electro-technical sub-alternative	Electro-power variant Telecommunications variant
Chemical sub-alternative	

The **technical line** has been left unchanged for the time being except as regards the building sub-alternative, where, as has already been noted, the second year variants have been abolished. In this line roughly half the time taken up by the two years together is devoted to general subjects. The remainder is devoted to vocational technical subjects, the nature of which is evident from the various designations: mechanical engineering, building, electro-engineering and chemistry.

Technical line students have to complete nine months' practical training before starting their second year.

2954

The new deal in vocational education

As things stand, vocational education presents a somewhat inchoate picture owing to the great variation affecting the length of courses, their content and orientation and the jurisdiction under which they come. The majority of courses have been quite rigidly specialized, focussing on individual trades. This is no longer a practial arrangement, owing among other things to her rapid changes taking place in the labour market.

With the introduction of the new integrated upper secondary school, the vocational school will be given a new content and organization. The salient points of the new organization for vocational education are as follows:

- All lines replacing vocational school will be of two years' duration. A number of special courses will also be provided. These vary in length.
- Students following the vocational lines will be given av broader basic education than previously. Specialization will proceed successively.
- More scope will be given to the so-called general subjects.

A broader basic education

The labour market is constantly changing and individual occupations with it. Excessively specialized training is liable to become obsolescent fairly rapidly.

Students taking the vocational lines are therefore to be given a broader basic education than previously. Specialization will be effected gradually by means of sub-alternatives and, in certain cases, variants. This means among other things that more definite decisions about their course of studies can be taken by the students at a later stage. It also means that they will be given a more allround education, making it easier for them to adjust to changes in the labour market.

The new vocational education is based on the so-called block principle, whereby similar occupations are merged into larger vocational sectors. The basic block, i. e. the initial course of studies, contains items common to the entire sector. Studies are then gradually specialized in keeping with the character of the various occupations. Here are two examples of how block studies can be organized.

Motor engineering line

term

4	Sub-alternative for motor mechanics	Sub-alternative for mechanical engineers	Sub-alternative for spares personnel	Sub-alternative for aircraft mechanics
3				
2	**Common studies**			
1				

Consumer line

term

4	Consumer sub-alternative with home management bias	Consumer sub-alternative with textile bias	Restaurant and catering sub-alternative [x]
3			
2			
1	**Common studies** (with certain deviations in restaurant and catering sub-alternative)		

[x] This sub-alternative forms part of the foodstuffs line, if one exists

2955

More general subjects

One important innovation is the great increase in the study of so-called general subjects included in vocational education. Swedish, labour market orientation and gymnastics are obligatory in all lines. Students also have to choose at least one of several optional extra subjects of a general character. These are English, German, Fench, civics, religious knowledge, psychology, mathematics, consumer education, music or art. A student can also dispense with one vocational subject in order to study subjects belonging to another line within the upper secondary school. This form of substitution, which may not comprise more than 12 periods per week, is generally confined to the second year. The subjects thus chosen must fit into the general pattern of studies of the student concerned.

The general subjects for the lines replacing vocational school follow the same syllabus as in the lines replacing continuation school.

A new subject: labour market orientation

Labour market orientation is a new subject included in the majority of vocational lines. This subject is designed to provide the students with a general background to their subsequent careers, e. g. through information on the labour market and working life. Students are also introduced to social economic affairs, trade unions and other labour market organizations, industrial safety, industrial democracy, personnel welfare and other matters concerning joint determination, co-operation etc.

2956

Lines and special courses

At present the integrated upper secondary school comprises 22 lines together with a music line to be introduced on an experimental basis in selected areas in the school year 1971/72. The majority of lines are divided into sub-alternatives and variants. There are also a number of special courses of varying length. Some of these can be taken immediately after comprehensive school, while others are deferred until a more advanced stage. A special course following at least two years of upper secondary school studies is termed a senior special course.

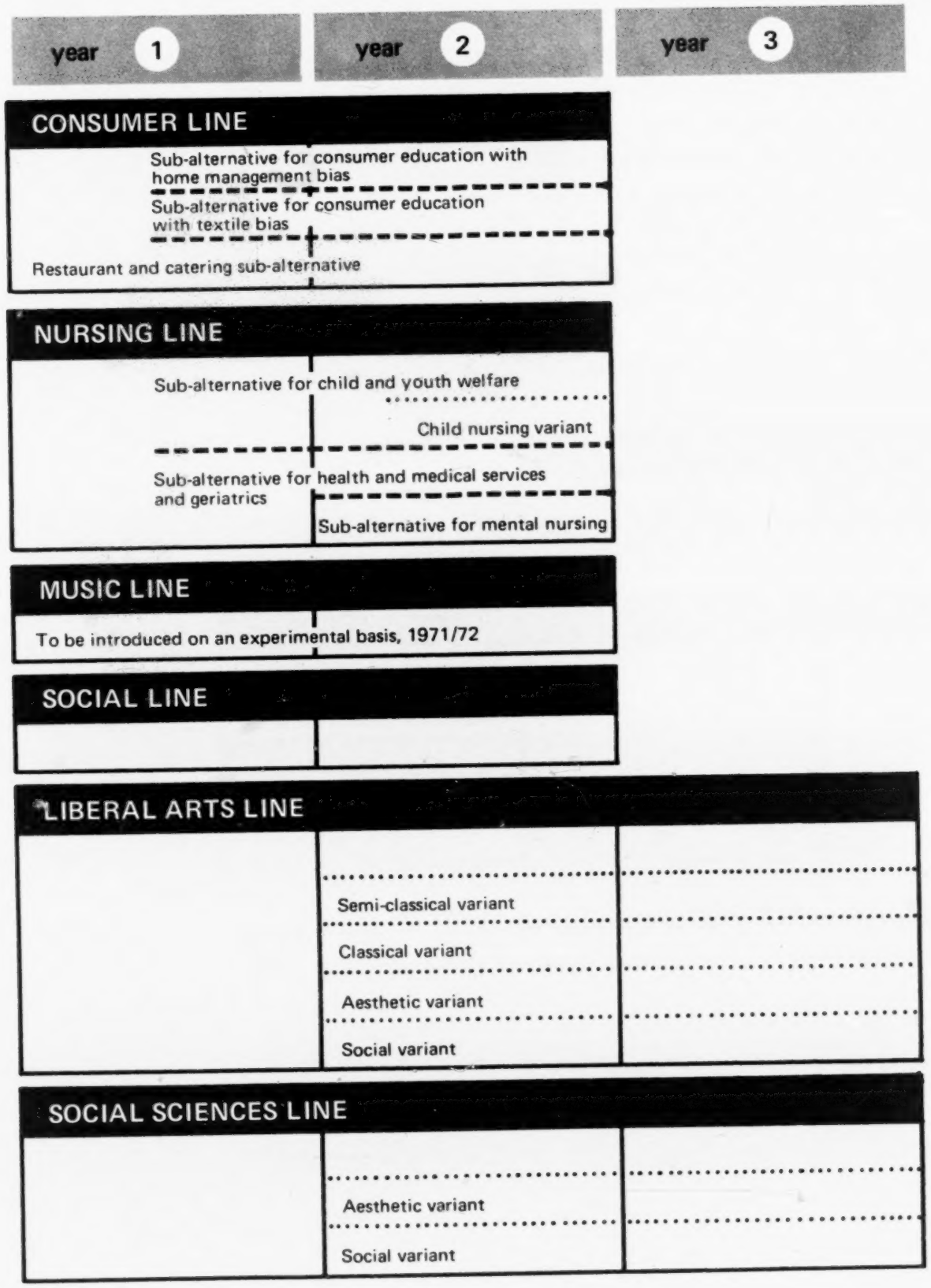
Lines and special courses can be divided into three principal subject areas: arts and social subjects, economics and commercial subjects and, thirdly, technical and scientific subjects.

In the following tabulation, lines and special courses are grouped together in terms of orientation and content, regardless of whether they replace the present upper secondary, continuation or vocational school.

ARTS AND SOCIAL SUBJECTS	ECONOMICS AND COMMERCIAL SUBJECTS	TECHNICAL AND SCIENTIFIC SUBJECTS
7 lines	3 lines	13 lines
Special courses	Special courses	Special courses

2957

ARTS AND SOCIAL SUBJECTS



Among the special courses provided within this sector are those for occupational therapists (3 years), physiotherapists (2 years) and playspace staff (1 term).

2958

ECONOMICS AND COMMERCIAL SUBJECTS

year 1	year 2	year 3

DISTRIBUTION AND CLERICAL LINE

	Sub-alternative for distribution
	Clerical sub-alternative divided into
	Accounting variant
	Typing variant

ECONOMICS LINE

ECONOMICS LINE

		Accounting sub-alternative
		Distribution sub-alternative
		Administration sub-alternative
		Economics/languages sub-alternative
	Aesthetic variant	Aesthetic variant
	Social variant	Social variant

Variants chosen in year 2 are continued in the economics/languages sub-alternative of year 3.

Special courses within this subject area include:
Decorators (2 years)
Pharmacy assistants (2 years)
Receptionists (2 years)

2959

TECHNICAL AND SCIENTIFIC SUBJECTS

year 1	year 2

CLOTHING MANUFACTURE LINE

	Sub-alternative for women's clothes
	Sub-alternative for men's clothes

FOOD MANUFACTURING LINE

Service sub-alternative	
	Sub-alternative for catering
	Sub-alternative for restaurant staff
	Sub-alternative for baking and pastry making
	Sub-alternative for butchers

WORKSHOP LINE

	Sub-alternative for workshop mechanics
	Sub-alternative for metal workers and welders
	Variant for heavy plate
	Sub-alternative for steelmill trades

MOTOR ENGINEERING LINE

	Sub-alternative for motor mechanics
	Sub-alternative for mechanical engineers
	Sub-alternative for spares personnel
	Sub-alternative for aircraft mechanics

WOODWORK LINE

	Sub-alternative for joiners
	Sub-alternative for pattern makers
	Sub-alternative for boat builders

year 1	year 2
BUILDING AND CONSTRUCTION LINE	
	Sub-alternative for concrete
	Sub-alternative for building joiners
	Sub-alternative for bricklayers
	Sub-alternative for streets, roads and conduits
	Sub-alternative for mining
Sub-alternative for heating and sanitary fitters	
Sub-alternative for painters	
Sub-alternative for building platers	
Sub-alternative for floor-layers	
ELECTRO-TECHNICAL LINE	
Sub-alternative for electricians	
Sub-alternative for telecommunications repairs staff	
Sub-alternative for guiding and regulating devices	
Sub-alternative for telecommunications fitters	
Sub-alternative for office machinery repairs staff	
PROCESSING TECHNIQUES LINE	
	Sub-alternative for chemistry
	Sub-alternative for food processing
	Sub-alternative for paper and pulp
	Sub-alternative for metallurgy
	Sub-alternative for building materials
FORESTRY LINE	

2961

year 1	year 2	year 3	year 4

AGRICULTURAL LINE	

TECHNICAL LINE	
Mechanical engineering sub-alternative	
Building sub-alternative	
Electro-technical sub-alternative	Electro-power variant Telecommunications variant
Chemical sub-alternative	

NATURAL SCIENCES LINE		

TECHNICAL LINE			
		Mechanical engineering sub-alternative	
		Building sub-alternative	Construction variant Housing construction variant
		Electro-technical sub-alternative	Electro-power variant Telecommunications variant
		Chemical variant	

Special courses in this sector include:
Furriers (3 years), Ladies'/Gentlemen's hairdressers (3 years), Cartographers (1 year).

2962

Options, merits and admissions

At the beginning of the spring term, pupils in the final grade of comprehensive school together with their parents are given detailed information on the various alternatives available at upper secondary school.

Pupils in this final grade are also kept regularly informed of upper secondary school opportunities through the study careers guidance activities organized by the comprehensive schools.

At present the main responsibility for study and careers guidance in continuation and upper secondary schools rests with vocational advisers from the Labour Market Board acting in co-operation with school welfare officers, while study and careers guidance at comprehensive school level is mainly the responsibility of careers teachers on the staff.

The Board of Education have now proposed that a new joint organization for study and careers guidance in comprehensive school and the integrated upper secondary school be introduced starting on 1 July 1972. The Board's proposal envis ages a full-time municipal official taking charge of study and careers guidance in schools. It is proposed that every municipality, regardless of size, appoint at least one such official. Municipalities with over 800 pupils in the four senior classes of comprehensive school and upper secondary school should appoint additional staff.

Merits

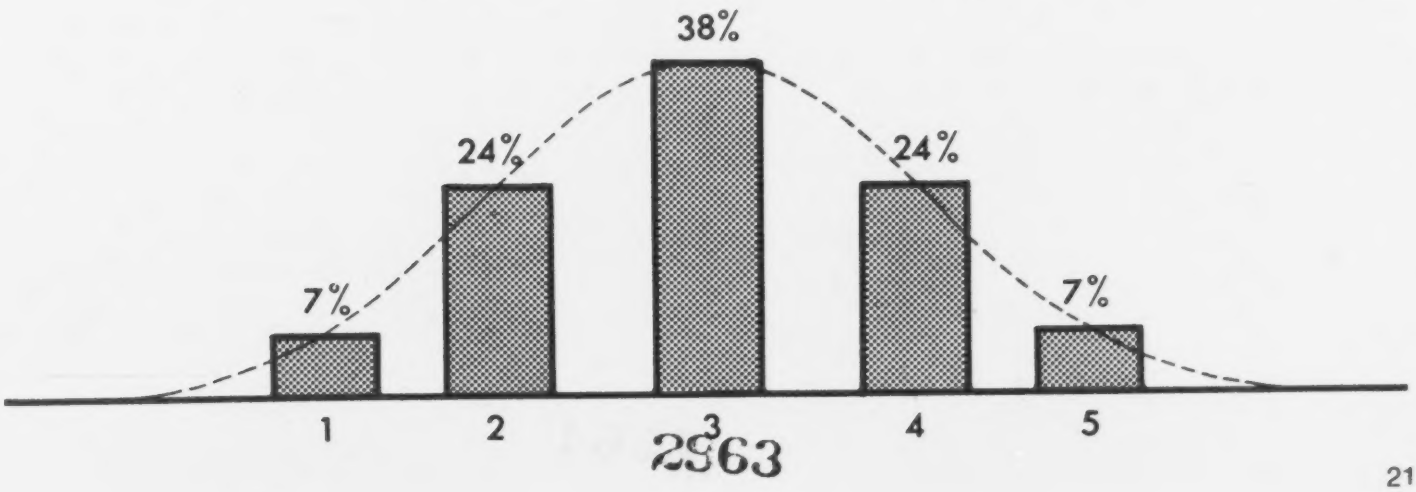
For some years now merits in comprehensive school, upper secondary school and continuation school have been awarded on a relative scale of 1—5, 5 being the highest merit and 1 the lowest. Relative merits indicate the position of the individual pupil in relation to the other pupils in the same grade all over the country. Thus a pupil gaining a 3 shows an average performance compared to all the other pupils in his grade throughout the country studying the same subject.

On the basis of the so-called normal curve it is estimated that

7 per cent of all pupils in a given grade throughout the country are awarded
a **5**
7 per cent of all pupils in a given grade throughout the country are awarded
a **1**
24 per cent of all pupils in a given grade throughout the country are awarded
a **2**
24 per cent of all pupils in a given grade throughout the country are awarded
a **4**
38 per cent of all pupils in a given grade throughout the country are awarded
a **3**

Thus the normal curve does not necessarily apply to the individual class.

Vocational schools have hitherto applied the old seven-degree alphabetical scale, but the five-degree numerical scale is now to apply to all branches of upper secondary school.



2563

Admission requirements

Admission requirements vary somewhat as between

- two-year lines
- three or four-year lines
- special courses

in upper secondary school.

Two-year lines — with final award according to curriculum of 1962

Pupils with final awards from grade 9 of comprehensive school (or other comparable classes) qualify for admission to the two-year lines of the upper secondary school. Admission to the following lines is also subject to the conditions indicated below:

1. Two-year social line
English (either course)
Mathematics (either course) and
commercial arithmetic (grade 9, commercial line)
chemistry

2. Two-year economics line
English (either course)
mathematics (either course) and
commercial arithmetic (grade 9, commercial line)

3. Two-year technical line
English (either course)
mathematics (special course)
physics
chemistry
art together with draughtmanship and technical drawing (grade 9, technical-practical line)

Two-year lines — with final award according to curriculum of 1969
Pupils with final awards from grade 9 of comprehensive school (according to Lgr 69, the new comprehensive school curriculum) qualify for admission to the two-year lines of upper secondary school. Admission to the technical line is conditional on completion of the special mathematics course in comprehensive school.

Three and four-year lines — according to curriculum of 1962
Pupils with final awards from the gymnasium, liberal arts, technology, commercial, social-economic and economics lines of comprehensive school qualify for admission to the first year of the three and four-year lines of upper secondary school on the same conditions are previously applied to gymnasium option groups.

Three and four-year lines — according to the 1969 curriculum
Pupils with final awards from grade 9 of comprehensive school according to the 1969 curriculum and who have completed the special English course qualify for admission to the three and four-year lines of upper secondary school.

Completion of the special mathematics course is also required for admission to the natural sciences and technical lines.

Special courses
Most of the special courses at upper secondary school can be commenced immediately after comprehensive school, subject to the same admission qualifications as apply to the two-year lines of upper secondary school. Special conditions regarding e. g. age or practical experience are laid down for certain special courses. Information on this point is provided during study and careers guidance in comprehensive school.

2964

What comes next?

Hitherto the student's choice of studies at the upper level of comprehensive school has decisively influenced his or her range of choice regarding later studies. Thus a pupil in grade 6 choosing a more practical course of studies was unable to apply for admission to gymnasium or continuation school and so go on to university or college.

The new comprehensive school curriculum which came into force in the autumn term 1970 has abolished this early cleavage between practical and academic studies. All comprehensive school options rate equally for admission at comsecondary school or other post-comprenhensive school institutions, so that a pupil is no longer excluded from any of the lines of upper secondary school for chosing the "wrong" subjects at comprehensive school. (This new dispensation will come into effect in the spring term 1973, when the first generation following the new curriculum leave comprehensive school).

Some of the lines at upper secondary school are specifically vocational, others prepare students for broader spheres of activity while others again equip them for continued studies at university, college or other more specialized institutions.

To qualify for admission to university or college a student must today (with certain exceptions) have gained a final award from the third year of gymnasium. However it has now been proposed by the Commission for Admission to Further Education (KU) that all lines of upper secondary school, including the two-year ones, should rate equally for purposes of higher education admissions.

The Commission emphasize that a student's choice of studies on leaving comprehensive school should not prejudice his freedom of choice later on.

This proposal applies to general admission only. Certain subjects will continue to require qualifications in one or more subjects.

At present this remains a proposal. A government decision on new admissions rules is expected during 1971. The Commission propose that the new regulations should come into force as from the autumn term 1973, i. e. when the first students leave the new upper secondary school.

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PAPERS PRESENTED AT THE NATIONAL WORKSHOP ON COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION (WASHINGTON, D.C., JUNE 15-17, 1971).

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ABSTRACT - THIS DOCUMENT IS A COLLECTION OF FIVE PAPERS PRESENTED AT THE NATIONAL WORKSHOP ON COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION. THE PAPERS ARE: (1) "THE ROLE OF INDUSTRY IN A COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION SYSTEM" BY JOHN CONNORS, (2) "IDENTIFICATION, DEVELOPMENT, AND IMPLEMENTATION OF ELEMENTS IN EFFECTIVE COMPREHENSIVE PERSONNEL DEVELOPMENT SYSTEMS" BY DON JAMES, (3) "HOW TO IMPLEMENT CHANGE" BY LAWRENCE WALSH, (4) "A STATE MODEL FOR PROFESSIONAL PERSONNEL DEVELOPMENT IN VOCATIONAL EDUCATION" BY DARRELL PARKS, AND (5) "WHAT IS THE PERSONNEL DEVELOPMENT SYSTEM FOR VOCATIONAL AND TECHNICAL EDUCATION" BY JAMES MCCOMAS. (JS)

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THE ROLE OF INDUSTRY IN A COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION SYSTEM

A Paper
Presented At The
National Workshop On Comprehensive Vocational
Education Personnel Development And
Utilization

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THE ROLE OF INDUSTRY IN A COMPREHENSIVE VOCATIONAL EDUCATION PERSONNEL DEVELOPMENT AND UTILIZATION SYSTEM

Introduction

It was J. M. Rice, usually credited as the first person to note and write about what eventually become known as the progressive movement in American schools, who asked something like 80 years ago whether more talent or more training was needed to improve the illogically pursued and even harsh teaching that was being done in schools throughout the United States. After some study of the matter he decided that more training, broader training of teachers was needed and that school development and the development of school personnel needed some assistance from the concepts of scientific management. To quote Mr. Rice: ". . . . the school is as the teacher, and consequently the advancement of the schools of any particular locality means practically the elevation of the standards of its teachers."

The above statement, circa 1893, would, Dr. Albert Yee of the University of Wisconsin says, "be a truism but for a continuing lack of implementation." Dr. Yee, in a 1969 article written for the journal, Educational Technology, proposes that we all turn to in an attempt to eradicate Rube Goldbergian systems from the process of professional preparation of teachers. Just as did Mr. Rice in 1893, Dr. Yee asks

today for the introduction of systems management into the business of educating teachers, of carrying them to the level of true professionals in their craft. He calls for (1) an effective screening function to determine who will be admitted and who will not be admitted into the teacher training system; (2) a diagnostive function to enable teacher trainers to discover what are the needs and interests of teachers-in-training (something the writer does not see being done today in the production line which turns out teachers); and (3) a predictive function which will allow for a reasonable estimate of a student's probable success as a teacher.

Those three functions, collectively, Dr. Yee calls his input component. In his article he goes on to describe further an operations component that provides development of a product "by manipulation of the input according to a purposive design," an output component that would provide "release and distribution of the system's products for use by others," and a feedback component "to supply control and guidance to the other components." Yee then summarizes: his input component would deal with the screening, selection and orientation of students; his operations component would be concerned with the teaching-learning operations, mainly on campuses of teacher training institutions; the output component would provide extensive clinical experiences in schools and close relationship between student, school personnel and teacher educators; and, finally, the feedback component would presume a continuous evaluation of sytems processes and student progress.

Dr. Yee's premise in all of this is that the systems approach for some years has been an effective one in analyzing, developing and bringing as close as possible to perfection the organization and machine systems in modern industry and business, in governmental operations, and in scientific and technological projects. He suggests that it should be applied also to educational operations. In this he agrees with at least two other exponents of the systems approach in education: R. M. Gagne, editor of a 1965 book, Psychological Principles in System Development and H. Lehmann, author of "The Systems Approach to Education" in the 1968 edition of Audiovisual Instruction.

Having spent the past fifteen years in industry where, indeed, the systems approach has been effective, and having spent at least that much time in education where I have observed evidence of the breakdown in efficacy of time-worn teacher training methods, I can certainly agree in principle with Dr. Yee's proposal for the introduction of the systems approach to professionalism in teacher training. The position which I shall take, however, in this paper will veer less toward the matter of the basic problems of teacher development and more toward consideration of problems associated with the professional development and advancement of teaching personnel who have already successfully survived or successfully avoided the Yee systems plan.

There are probably many reasons why industry as a whole and industrialists as individuals should have concern for and should support the concept of a comprehensive development system for personnel in vocational/industrial education. Unfortunately, there are probably just as many reasons why industry and industrialists seldom evidence the expected level of concern or the expected level of support for CPDS. Not the least of these reasons is that hardly anyone in industry anywhere has the remotest idea of what is involved in this movement. I spoke to no less than 50 people in business and industry prior to the preparation of this paper -- 50 people representing at least 35 separate organizations. These were people from organizations who regularly use the products of vocational schools -- some utilize the teachers in summer programs. Yet no one had ever heard of CPDS. My quick survey extended the length of the eastern seaboard and to locations as far west as Pittsburgh, Chicago and St. Louis.

So the introduction to this paper must emphasize the fact that after many years of lip service to the task of developing a close business-industry/industrial-vocational education alliance, neither side seems yet to have found a way to break the communication barriers which prevent effective mutual assistance. However, recognizing that there is concern within industry for the concepts that CPDS seems to embrace and that vocational education personnel seem to want and need the concern and support of industry, perhaps this paper may in some small way pry open a few doors to the arena of mutual assistance.

Can We Be Partners?

An issue of ASTME Vistors, the journal for manufacturing management, of a year or so ago contains an advertisement which is a picture of a newly-constructed bridge. However, the two parts of the span extending from both shores of the river it crosses fail to meet at the center. The east-to-west portion of the span is shown about six feet below the west-to-east portion. Two groups of construction men are shown standing at the end of each portion with quizzical, concerned expressions on their faces, and one of them is puzzling over the blueprint that obviously led to the development of this unique magnificent -- nevertheless useless -- structure.

This picture of failure -- failure which was the result, obviously of the well-intended efforts of the bridge workers going in both directions to implement the work of each other -- came to my mind as I began preparation of this paper. With the picture of the step-up (or down) bridge and the subject of the paper in mind, I began to see the desired vocational education and business-industrial partnership as somewhat analogous to that of the two groups of bridge builders whose objectives were obviously just enough at odds with the requirements of the situation to have created failure. A bridge with a six-foot step in the middle has to be considered as something less than an effective traffic artery. If you're driving an automobile or a truck -- or pushing a baby carriage -- it doesn't make much difference whether the step is up or down, it's still an impediment to one's achieving his objective of getting from one side of the river to the other.

When we speak of the concern or the nature of the concern that industrial firms or groups of firms should have for CPDS or of the role which industry should play in a comprehensive vocational education personnel development and utilization system, we are indicating, I believe, the presence of or the value of some kind of partnership or alliance between industry and vocational education. For years it seems that the existence of such an alliance has been taken for granted. I propose, however, that if it exists at all it's a rather tenuous one. I propose that neither group has ever done as much as it could either to show the importance or necessity for the alliance nor to promote it with significant vigor. I propose that industry cannot or will not play the role expected of it in the vocational personnel development system until or unless a way is found for it to understand better what that role is or should be. I propose that what is called for if industry is to play its expected role effectively is, indeed, the creation of a strong, mutually sought-after partnership between business and industry on the one hand and vocational education on the other.

It is not my intent in this paper to try to show that no evidence of partnership exists. But there certainly is evidence all around us to show that the partnership is not strong enough to establish industry as much more than a silent, almost non-participative partner. That being so, both sides must accept some of the censure for the condition. Throughout the country there are oases of common partnership effort here and there -- but much

more is needed. Educators must look at the problem in its correct perspective. Business men and industrialists have myriad problems of their own in association with the development of personnel and the effective utilization of manpower, it cannot be expected that they will automatically turn attention to the solution of similar problems elsewhere. But there are basic, existing, impelling reasons why business and industrial leaders should be interested in the creation of a strong partnership with vocational education in the area of CPDS. To name a few of these reasons -- industry uses the products of the vocational education system; industry, therefore, must have a continuing concern for the quality of instruction in the system; industrialists and their employees have sons and daughters enrolled in vocational programs, hence a personal concern for the overall quality of the teaching cadre must exist; and, finally, business and industry in today's world can seldom afford to assume a head-in-the-sand role on any issue relating to the common good. Withal, then, the partnership is something than not only might be deemed important of accomplishment, it also appears to be warranted by virtue of common interests.

How then do we set about establishing a type of alliance which will lead to industry's demonstrating a willingness to assume it's appropriate role in CPDS and other systems related to the implementation of quality with vocational/industrial education?

Leadership

For longer than I care to remember I have watched educators in the vocational system and industrialists trying -- almost desparately at times -- to organize and implement within their own ranks efforts to develop people, to utilize them effectively, to provide job satisfaction, and to insure goals achievement. Each group, it seems to me has been resolutely unaware of the other. Each has seen itself as a motivator within its own parameters. Each as build half of the aforementioned useless bridge to take man into a heralded future on the opposite shore. And now in the year 1971 vocational educators and industrialists have apparently succeeded, albeit unintentionally, in completing a bridge to partnership only to discover that their common goals are really at the jointure of two spans that have missed the objective by about six feet. Why? -- Let me propose that the missing ingredient that might have effected jointure of partnership effort by this point in time has been effective leadership -- something which, indeed, must have been lacking too in the efforts of the two groups of bridge workers in the advertisement.

It may well be too late for us in industry today and for you people in vocational education today to find leaders in our respective ranks who can raise or lower our bridge spans by six feet. But we had better be willing, I believe, to turn to the task of combining our efforts to develop leaders who can and will effectively guide the efforts of those who will take on the task of building our bridges in the future.

I believe that the quality in man most needed to bring about effective partnership between education and industry today and the quality most significantly absent in our world today is leadership. In industry and in education today leadership has become a concept identified all too often with a person's status -- the position of the organization box in which his name appears. Leadership seems to have lost its identity with the requirement to influence people to accomplish results. In the academic world I don't think that the concept of leadership has ever been sufficiently emphasized. As a member of the academic community for quite a few years I often felt that the aspect of leadership was overtly sublimated to the routine of orderly procedure, especially in the area of vocational education where too often in my day the instructor's background and lack of personal developmental drive left him easy prey for anyone whose objective was to stamp out leadership and creativity. Just as many of you, I have been a vocational/industrial teacher -- I have been a secondary school counselor and I have taught in a university. So I speak from the firing line when I say that I believe that we in education have not been sufficiently concerned over the years with the importance of our responsibility to develop leaders.

A partnership which today's climate demands and just isn't getting is the partnership of education and industry oriented to the task of developing and utilizing leaders. Wherever we look today there's a need for more effective leadership. In government, industry, education, in professional groups, in student groups -- in society, in general -- the paucity of indi-

viduals willing and able to assume a leadership posture is appalling. I suppose that I could tick off here any number of examples of our need for leaders but I don't want to write a sermon here. Instead, let me ask you to consider, as educators or friends of the educational systems of our nation, the importance of interlacing our efforts to form a strong education/industry alliance with a strong, continuing emphasis on the concept of leadership.

Across industry in general for some time now there has been a driving effort to overcome earlier shortsightedness in the matter of developing leaders. Practically every business and industrial concern in the land has as part of it's personnel program an emphasis on the growth and development of its employees. Not the least important phase, indeed, in all of these programs is concern for the development of individuals who can effectively take over at some point in time and at some particular level responsibility for leading people, influencing them to work toward established objectives, and develop within their organizations a motivating climate which might induce others to seek an opportunity later to develop as leaders.

Some years ago in industry we took a strong look at the concept of leadership. Unfortunately we found, as did Dr. Eugene E. Jennings, of the University of Michigan, back in the late 50's that the word "leadership" was too often applied only to describe a variety of activities such as the work of

club chairmen, society presidents, scoutmasters, playground supervisors, politicians, etc. Jennings said in 1961 that if you'll consider the common understanding of the subject you'll find an enormous variety of traits presumed to describe leadership -- "the list being so long that, for all practical purposes, it describes practically nothing." As a matter of fact, he says, "a half century of research on the subject has not produced a single personality trait or a set of characteristics that can be utilized to discriminate between leaders and non-leaders."

If those of you in the field of vocational education today are going to be truly a part of a partnership with industry in the development of men and women who we may expect to take leadership responsibility within our own bailiwicks as well as in society, it's important that you emphasize to those in the development process the concept of involvement. Involvement, that is, with a purpose. Many people today, under the guise of leadership effort, get involved alright -- but in a limitless number of projects and causes simultaneously. Thus, becoming only partially involved in any one project or organization the person thusly involved never has a chance to exert his full potential. Our young people today, students, teachers, and industrial employees -- all of them, not just the radical sophists -- need to be impressed with the importance of coming to grips with situations -- not just criticizing their existence -- and of playing active, agressive

roles in those situations. You may want to say that that is exactly what too many of them are doing now. But I'm saying that, just as in our present adult society, not enough of them are putting on the mantle of leadership or even seem willing to do it. Too many are satisfied to stand by -- just as we adults do -- and hope that the "bad" leadership will wear itself out and that everything will soon be quiet again. As Jennings says, however:

> "It is only through active participation in molding events with a sense of direct responsibility for their consequences that one can achieve the personal strength necessary to live in harmony with the pressures of the organization without being absorbed by them."

In industry today it's the person who is willing to get involved actively that we need. I'm certain that that is true in the field of vocational education -- else why would we be concerned at this time about something such as a comprehensive personnel development system. For some years in the industrial world -- and I'm sure there has been an analogous situation existing in vocational education -- the words executive and leader had been too seldom synonymous -- primarily because we had found it difficult to locate people who were dynamic. Efficient people? -- Yes, we had them. But people with dynamism, people willing to meet head-on the harshness of the real word? -- No; they were too few in numbers. Why? -- Most likely

because we had made the comfortable existence away from the life stream too enticing. For some years now we have been attempting within industry by means of some effective personnel development programs to turn this situation around. And we're achieving some results; -- therefore, it might seem that vocational education could benefit from some of our experiences. Why reinvent the wheel?

There still exists, unfortunately, in our schools, in our churches, yes, even in some of our industrial training systems, too much evidence of emphasis on the comfortable aspects of a middle-of-the-road existence. Part of the reason, for example, that the efforts of minority groups to find a place in the sun upset so many of us terribly is that those efforts disturb our complacency. I find less bias and prejudice in this world than I do evidence of downright laziness -- a ho-hum attitude about anything that is disturbing or anything that requires a leadership attitude.

The jolt of the emerging space age in industry forced us to revamp significantly our reliance on the old tried and true systems of training, production, quality control and profit seeking. We had to in a very few short years not only come up with new methods, more efficiency, better quality and more effective training systems but also with a positive approach to the development of leaders who could assume responsibility for the new approach. Think for a moment, if you will, about how difficult it has been

in your business, education, to effect much needed changes in recent years. Think for how many years educators -- yes, probably you and I -- had been perfectly satisfied to pull ancient, outdated lessons, projects, and ideas off-the-shelf rather than fight for the right to experiment, to change, to rid ourselves of the obsolete. The problem of leadership in the academic world never struck me so directly as it did about a year ago when I sat as an industrial advisor to the vocational/industrial "leaders" of a large eastern city. The same old concepts were being mulled over at that meeting that I had heard discussed 32 years earlier when I was a new teacher in a vocational system -- and the concepts were 50 years old then. Over and over again I have heard vocational education people ask industry to help them in any way that industry could possibly offer assistance. Time and again I have seen industry offer help to the vocational education people -- the kind of help they were able to give -- only to see the assistance politely but firmly refused, usually on the basis of program irrelevancy. So the two groups have sulked -- have failed to use their leadership propensities to seek out ways of mutual assistance. As a matter of fact, industry has fared the better because at least it gets a useable product from vocational education regularly. What, essentially, does vocational education get with similar regularity from industry?

I'm always a little concerned when I attempt to promote the importance of the subject of leadership before any group. There's always the

thought in my mind that I at some point in the persuasion process may begin to sound much as a crusader. In industry -- and, I'm willing to wager, in education also -- there are many would-be leaders -- executives who crusade for a reincarnation of the "independent spirit." They give speeches at sales meetings, at seminars, appear appropriately at public meetings, identify with the best of everything. -- Oh, yes! they even write books. But the very noise they make belies their sincerity. I hope sincerely that the noise I'm making here about the need for people in vocational education and industrial people to extend ourselves to the utmost to grow leaders for tomorrow doesn't have a hollow ring. I hope that I can help to convince all of you here today that we have a task as educators -- that industry has a responsibility -- that both groups, as partners, must attempt to develop leaders for our age and for the future who will recognize their responsibilities to overcome the self-inadequacies and alienations that we and our predecessors have allowed to develop as affluence and its partner, ennui, have become prevalent in the land.

Listen to a man who some ten years ago tried to answer the question: "Who will be our leaders in the future ages?":

> ".... (scientific) attempts to determine exactly the traits of a leader have resulted in complete failure. In spite of this we all have a crude but amazingly efficient sensitivity to the essence of leadership and to the existence of great leaders.

We can recognize (these rare men) even though their characteristics cannot be scientifically measured. The tendency today is to deny (them) any psychological room, let alone social status and organizational prestige .... "

" .... it's not that we cannot recognize our leaders today, but rather that we no longer value them as highly as we once did."

It seems to me that we are existing today in a society wherein the all-important individual sense of direction is lacking or missing. The tendency seems to be generally, to avoid leadership responsibility. My generation in business, industry and education has certainly contributed heavily to this tendency. Your challenge as indicated leaders in vocational education and mine is to zero in on an effort, as Jennings says, "to revive the individual's unique powers of purposive striving and his courage to assume and sustain great risks." As members of a society that cries out for effective leadership we need to become part of a movement dedicated to a regeneration of the concept of leadership.

Present vocational/industrial education leaders, I believe, have a unique opportunity to join in this movement with industry and to be successful in developing other leaders within your ranks. May I propose at this point that a significant role for industry to play in the CPDS movement could

well be the identification and the promotion of the principles of leadership within the ranks of vocational education personnel. Industry has been studying the subject of leadership intensively for some years and has been associated in this research with many institutions of higher learning. Managers and training officers throughout business and industry could be excellent resource people to vocational/technical school personnel to conduct workshops and seminars on the subject of leadership. Over the past nine or ten years I've had occasion regularly to work with vocational teachers both in and out of the classroom. My impression is that a significant number of these teachers need some help in the development of leadership qualities which must be requisite for the professional status which they occupy.

If there is any area of endeavor which might involve a commonality of purpose between vocational educators and industrial people it is the promotion and development of strong, effective leadership within those related communities, the academic world and the world of business and industry. I submit that vocational educators should call upon industry for help in this area of concern. Such help is of a type that industry can provide and would be interested in providing. But educators are going to have to ask for it very likely, inasmuch as industry is probably not aware of education's need in regard to leadership.

CPDS and Industrial Success

As I indicated earlier, industry uses the product of the vocational educational system. That fact alone represents a substantial reason why industry should be involved in and concerned with the personnel development system employed within the ranks of vocational teachers. Industry is fully aware of the fact that there is a significantly high correlation between the quality of its own products and the capability of the producers. To find a similarly high correlation existing between the broad ability of graduates of the vocational system and the professional ability of the educators in the system would certainly not be surprising in any sense.

To the degree that it can contribute to the development of academic people you may generally be assured that industry will contribute. For example, industry can react more positively to a request for help in training teachers in leadership concepts or in technical areas than it can to questions such as: "How many machine shop graduates can you hire over the next four years?" Industry has generally hedged on an answer to such a question because the vagaries of employment needs in most modern industries almost defies a reasonable answer. However, come to industry and ask for assistance in training vocational teachers in almost any area and industry will respond quite positively. That is something it's capable of doing and doing well.

I can provide an example of how educators can easily turn off industry's enthusiasm for helping. It concerns a situation where an industry, although not asked to contribute, felt that it had the facilities to provide assistance in a situation involving a vocational education problem. Several years ago, you will recall, schoolmen everywhere became concerned about the high rate of drop-out from secondary schools and plans were devised not only to slow down the rate but also to bring youngsters back to school. One large corporation here in the east offered to its local vocational school system a proposal involving, without cost to the system, a plan for bringing youngsters suspected of being potential dropouts into its training area, exposing them to the benefits to be derived from completing their education, having them tutored by technical people from the manufacturing and engineering ranks of the corporation, and providing them with opportunity to work occasionally on industrial equipment. Without any investigation at all of the potential value of such a proposal, the local educators rejected it on the basis that the problem of dropouts was one for the school system to solve. The proposal had even included a plan for updating vocational teachers technically and in terms of leadership training and that, too, was rejected as not feasible in view of the fact that most teachers wouldn't have time for such involvement.

I mentioned earlier having sat as an industry advisor at a meeting in a large city of vocational teachers and industrialists where the problems discussed were the same as those I had heard about some 30 years earlier. In the course of that meeting no less than twelve proposals were made to the schoolmen -- proposals that indicated specific areas wherein industry could assist in the development of vocational personnel working in the system. It has been over a year since that meeting took place and not one call for assistance has gone out to the industries represented at the meeting. In short, at the meeting educators said: "Help us here." -- Industry replied: "We can't do quite that, but here's what we can do ---." And with that the dialogue came to an end. And, unfortunately, that's the way it has been -- except for rare occasions of cooperation -- for as long as I can recall.

Despite the failure, usually, to effect jointure, industry is, indeed, interested in vocational education and is concerned with the problems associated with the growth and development of vocational personnel. It has to be, as I say, if for no other reason than that it uses regularly the vocational school product -- young men and women who must make up to a significant degree the cadre of effective technical specialists within industry.

There are many things that industry can do to assist in the tasks of providing effective development programs for vocational school personnel. But these things cannot be accomplished through haphazard contacts between schools and industry. I recall several years ago that a Maryland county

attempted to establish a summer internship program for vocational school teachers in industry. A fine paper program was drawn up involving what was identified as a joint effort by a school system coordinator and an individual industry's training officer. Many companies in the area enrolled in the plan and took on anywhere from one to ten vocational instructors for summer training. Industry paid the instructors for hours worked. However, once the instructors were on the job that was the last anyone saw of the school system's coordinator and the full responsibility for the welfare of the people in the program fell upon already overworked industrial training people. Traditional lack of follow-up on the part of school officials has often put a damper on industry's enthusiasm for such programs.

School systems cannot expect to accomplish anything constructive in the way of developing it's professional staff simply by dumping them on industry for a summer period. Industry is very conscious of the tenets of an effective training plan -- selection, training, and follow-up. When the training sponsor -- the school system -- fails to recognize the importance of all of these phases of a training plan, industry's enthusiasm is apt to be turned off rather quickly.

So I make a strong appeal here for emphasis on a business-like, dedicated effort on both sides when industry and vocational school personnel are planning, executing and evaluating mutual involvement in CPDS programs. I

caution you that industry over the years has become somewhat wary of involvement because of what has seemed something less than total dedication on the part of school people in the past in the matter of following through on personnel development programs. Such caution from your point of view may be unwarranted. Be that as it may, however, industry is wary and needs to be courted carefully and with evidence that it's involvement is necessary and professionally appreciated if it is to become an integral part of your people development programs. Again I emphasize the fact that industry has enough of its own problems along this line and can quite conscientiously rule out involvement in anyone else's if it has any doubt at all about the efficacy of the program it's being asked to be a part of.

Where Can Industry Cooperate?

I do not see that industry everywhere can be equally helpful in every area of effort involved in the improvement of vocational education personnel. Certain kinds of industries can provide assistance that others can't. Large industries can provide broader assistance than small ones. But small industries can often provide a very specifc kind of help. Industries totally involved in government-funded projects are often limited in the amount or kind of help that can be provided because of security regulations. And so on ---. Therefore, the acquisition of cooperation from industry can be somewhat complex. Vocational personnel cannot simply approach industry broadly with a request for help. You must know your industry -- study it -- under-

stand the extent of its ability to get involved. And -- above all in this day and age -- don't ask for the contribution to be totally on the part of industry. Selection of teachers and other personnel to be involved must be done with care so that industry isn't expected to have to deal with your problem people!

Most industries are able in one way or another to contribute to the development of vocational teachers. Summer hire programs can often be developed within companies whose production activities involve the type of work that is related to the teachers skill. Here again, however, a word of caution is necessary. Too often summer hire programs develop into little more than an opportunity for a teacher to implement his annual income. If that is the intent, let it be so -- but don't let that sort of employment have the label of training or development attached to it. Development programs must match selection with development opportunity, must provide training related to the need, and must have follow-up (evaluation) that will indicate whether the training effort was effective, needs revamping, and what steps in the development program should follow. Again I emphasize that this industrial phase of CPDS has to be approached with the same care and the same amount of planning, execution and follow-up that is involved in the teacher's basic training progarm.

Supervisors in vocational education systems can probably receive help from a broader spectrum of the industrial world than can any other

single group. Practically every industry today has a full-blown, effective in-house supervisory training program that involves sessions in leadership, communication and motivation. Industrial instructors from industry are usually available for direct service to vocational school systems or they are available as instructors in adult continuing education programs in junior colleges, colleges and universities. Many such institutions now offer courses that were designed by industrial managers or trainers and offered -- some for credit -- by the institutions with industrial personnel as instructors.

Within industry we have found that most problems that are identified by supervisors fall under the three generic headings: leadership, communication and motivation. Very likely the same is true of problems that develop within the ranks of vocational supervisors. I teach an evening course in industrial training and supervision at a state university, and I find that the areas of interest for teachers and industrial people to be much the same insofar as these three topics are concerned. As a matter of fact, several years ago I had a class composed entirely of vocational supervisors. I used during that term a program that had been devised for industrial supervisors with a significant amount of success.

Another area of interest insofar as the development of vocational personnel is concerned and one in which industry can make a unique contribution is that of evaluating an appraisal of performance. I can remember that years ago "performance appraisal" was almost a dirty word in academic circles. I'm sure we've come a long way since those days toward under-

standing that everyone doesn't contribute to the same degreee, or to the same degreee at all times -- nor, perhaps, is everyone capable of equal contribution to objectives. If everyone were it would be rather difficult for us to identify leaders, supervisors, executives, school superintendents, department directors, program coordinators, etc.

We in industry believe firmly in the value of trying to find the best man for every job. We think that we do a reasonably good job of selection. But with all of the effort we expend in that direction we still select a lemon or two now and then for important positions. It can't be emphasized enough that an appraisal program is a must in any people organization if the fault of poor selection is to be avoided. So here is an area where industry has had years of excellent experience followed by good results. You'll find us quite willing to provide some help here -- help, I'm sure, that could be used.

I personally haven't seen very much evidence of effectiveness of industry involvement in internship or externship programs. But I should guess that some industries could provide quite a bit of help in either. I'm sorry that my experience will not permit me to comment adequately on this particular phase of CPDS.

Action Steps

Unless we consider an action step or two a position paper is hardly more than a series of unrelated or slightly related discussions. What should

we do about my comments? Let me suggest the following:

(1) We have had this workshop now and have made CPDS in vocational education a matter of some discussion among representatives of key elements in the vocational personnel development system. We came here to examine CPDS as an "interlinking, interdependent and organized whole requiring comprehensive planning, management and analysis to optimally meet the personnel needs of vocational and technical education programs." (Mr. Edwin L. Rumpf's letter of April 27, 1971 to workshop participants).

We're anticipating that the workshop participants will devise steps of action for the improvement of the system and its elements.

I propose, indeed, that those action steps be devised, announced, and that the force of implementation be placed behind them. Let's not, as so often happens after workshops of this kind, all go back home saying what a great experience it was. CPDS will not benefit from our having been here unless we have some follow-up. I'd like to suggest then that we have a small blue ribbon committee representing the elements of education, government and industry here today meet sometime soon to evaluate the action steps spelled out during this workshop and to plan for expansion of CPDS as

appropriate.

It would be a shame, in my estimation, to waste the efforts of the talent present at this workshop by having it operate only as a three-day discussion group.

(2) I should like to suggest that once such a blue ribbon committee has made its evaluation and suggestions to participants, we all make the effort locally to get the same kind of involvement in the consideration of CPDS as we've had here on a national basis. After all, the local scene is the action scene.

(3) Since I am the industry representative on this workshop program and since I have indicated industry's willingness to contribute to the success of CPDS, I hope sincerely that each of you will in your own areas try to get your local businesses and industries involved in whatever unique way they can contribute. Industry is and must be a partner in CPDS if it is to be a totally successful effort. Don't please, keep us at arm's length.

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IDENTIFICATION, DEVELOPMENT, AND IMPLEMENTATION OF ELEMENTS IN EFFECTIVE COMPREHENSIVE PERSONNEL DEVELOPMENT SYSTEMS

(Position Paper for
National Workshop on Comprehensive
Vocational Personnel Development and Utilization)

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INTRODUCTION

It is indeed a pleasure to have the opportunity of presenting this paper at this National Workshop on Comprehensive Vocational Personnel Development and Utilization. I had the privilege of joining with a planning group for this workshop some months ago and would share with you my initial question to Miss Mary Marks and Dr. Bruce Blackstone at whose invitation I came to Washington for the planning meeting. I immediately asked them what a college president who is only administratively related to the vocational education programs at his college could contribute to the planning of the National Workshop on Vocational Personnel Development and Utilization. They both had a very ready and very meaningful answer when they indicated that while the rest of the persons at the planning meeting were involved in vocational education, I would represent the viewpoint of administration, that can either support or fail to support the efforts of those in vocational education itself. I immediately agreed that they were right in wanting to include such a perspective and hence used the same rationale when I was so kindly invited to prepare a position paper and present it to this National Workshop today. Thus I stress at the outset of my observations that I am not in vocational education and have never been directly involved in the programs in your field. However, I would immediately indicate that I am directly involved in the administration of vocational education through my responsibilities as president of a state college in view of the fact that vocational education is a very important part of the academic program of our College and a very important academic and vocational service that we as a state college are rendering to our state. Thus, I am delighted for the opportunity to discuss the elements of a comprehensive personnel development system as such a system would relate to vocational education personnel development and utilization. I would certainly hope that my observations and remarks would be as appropriate in other areas as well for I am really exploring a comprehensive personnel development and utilization system that should apply in many areas of our endeavors to educate our students of today and to prepare them to meet the societal needs that exist.

I. Identification

A. Elements in System (description of components)

1. Philosophical Elements

While I recognize that as we talk in terms of a personnel system we are first thinking in very practical terms of organization, but we also obviously are speaking in terms of the personnel that make up that organization. Thus, I cannot move ahead to the organizational elements of such a system until I have mentioned briefly my deep concern for the philosophical elements that must be present.

Why the system? I am often intriqued in our modern day world where system and utilization and productivity are stressed (I might add that I believe very firmly in these principles and their importance) but sometimes the reasons for the system itself are lost sight of. Let me look first at these reasons, or the philosophical elements, of such a system.

a. Persons

In my way of thinking, foremost in the raison d'etre for a system of personnel development is, as the name implies, the development of persons. The identification, the education and the utilization of persons is foremost as the goal of such a system. The identification of the talents of persons, the development of those talents, and then the effective utilization of the persons who have thus made such an achievement are certainly the desired ends of this system about which we are speaking. Those programs or those organizational structures that ignore this basic truth are on the wrong track, I believe. Inherent within our colleges and universities, within our high schools or within any of our educational institutions is a fact that each one of us, whether we are teacher, administrator, staff member or whatever, exist for the purpose of creating the best environment and the best programs for educating persons. When bureaucratic red tape and the policies in effect get in the way of that goal, then I feel it is about time they change.

b. Needs of Business and Industry and Society in General

Certainly the training of individuals without regard to the needs of society makes little sense. Witness our current problem in placing many of our students and our graduates this year, especially in some areas. At my college in Connecticut, and this story is repeated throughout the country, we have found many of our graduates, especially those in teacher education, still looking for positions, whereas two years ago most of our graduates had a choice of one of three or four different positions. I believe this is but temporary and yet it is certainly something that any system of personnel development utilization must take into account.

We find certain areas of society grossly understaffed and historically speaking have been understaffed for some years. While I certainly cannot agree with forcing young people into a particular profession just because

the need is there, I believe very firmly that any personnel system must fully recognize and fully inform the students of the needs or lack of needs as they embark on and pursue their educational programs.

c. Aims of System

Perhaps I am really combining a. and b., but I feel a restatement is essential in defining the philosophical elements of this system. We must always keep before us the aims of the system--why the system?--in other words. While organization for organization's sake may be interesting on paper, and it may consume a lot of time and energy in its promulgation and development, I can only defend and support a personnel development system when I first of all establish the aims of the system and then build the system to carry out those aims. What is the aim of the personnel system I am speaking about today? As stated above, it is to create the environment and the opportunity for the development of persons in conjunction with the needs for those skills and talents within society itself.

2. Organizational Elements

As we begin to define the organizational elements of this system we have to include all of those organizational elements that relate directly or indirectly to the aims and goals of the system. It provides a complex network of organizations for sure, but the complex society in which we live rarely allows a simple answer or a simple organizational pattern to accomplish a purpose.

It appears to me that there are four primary areas of the organizational elements of the personnel system for vocational education.

a. Educational Institutions

I am going to name the obvious here and yet I feel it essential to review for our thinking just which educational institutions we are talking about as a part of our personnel system. I believe we can start with the elementary school, limited though the vocational education opportunities may be at that level. I would emphasize its importance, though, and think not just in professional but in personal terms; my own two sons are in the first and third grades and though they are learning reading, writing and arithmatic, they are also already beginning to learn limited vocational education concepts and skills. When we move to the junior high school level or middle school level, we find full blown vocational education programs in effect. Perhaps this is one of the most important stepping stones along the way to channel youngsters into vocational education programs at a higher level. Certainly, in my generation the first real exposure to vocational education came at the junior high school level. As we move ahead to the high school level, we begin to see the divisions into the various programs of college preparatory, business, general

education, vocational education. In the State of Connecticut we also have the vocational high schools which are doing a superb job in taking the high school youngsters with particular talents and desires in the vocational area, and providing them training at that level. Moving then beyond the high school level, we find the elements in our system include many areas of college, university, technical college and community college experiences. Again, referring to my own State of Connecticut, we have four technical colleges in the state that are serving the very vital need in the whole vocational education program. As I have mentioned earlier, at my own college, which is one of the state colleges, we have a very strong and viable vocational education program through the fourth year level. Though the colleges and universities throughout our fifty states differ a great deal, certainly, these become the professional component of the development of our vocational education personnel. Thus, the educational institutions provide the programs and the personnel for the training of those moving ahead into vocational education in all phases.

b. Agencies-Departments-Boards

The state agencies, departments, boards, etc. are not only very essential but very influential members of the personnel development system. The State Departments of Education not only are involved in most states with the entire range of public secondary and elementary school experiences, but in some states move on to higher education and are very much involved in that area as well. Again, using my own State of Connecticut as an example, the technical colleges of our state as well as the vocational high schools are directly under the State Department of Education. Boards of Trustees set policies for colleges and universities and thus are an integral part of the system. Other agencies within the state include State Coordinating Agencies. These bear any number of names from commissions to Board of Regents to Boards of Control, etc., but in all cases are vehicles to expedite the coordination of programs across institutional lines.

Beyond the state level there are, of course, the many federal agencies that are a part of our system. Some of the federal agencies have direct involvement, others indirect. But, many influence strongly the effectiveness of the system of personnel development and utilization and even the direction of the system itself.

c. Funding Sources

Money may be the root of all evil as the old saying goes, but we also hasten to affirm that money is that which allows us to carry out the programs we are trying to promulgate. Thus I could not help but seriously include as an integral part of the organizational elements of any personnel development system a separate category involving the funding sources. These funding sources range all the way from the local community in the case of the public secondary and elementary schools, to the state legislatures in the case of

institutions of public higher education, and on to the federal agencies in the support of many aspects of higher, secondary, and elementary education. The involvement of these funding sources can strengthen or weaken, continue or alter, support or tear down the personnel development system that might be in effect. Thus, an integral part of the personnel development system includes the funding sources for its implementation.

d. Business and Industry

With both direct involvement through in-service training programs and indirect involvement in receiving the product of the system, business and industry share an essential part of a comprehensive vocational education personnel development system. Their ability to assist in the training and educational programs and their needs and desires for the personnel output must be brought into clear focus as a vital input to the structure of the system.

Now looking at these various organizational elements I would include one other element which is basically the focal point of this paper, namely, some kind of an organized plan. We may call this the state plan, a system plan, or whatever name seems applicable. But in any case this plan is an attempt to provide meaning to all of the organizational elements that fit into this system. While I will be discussing later in this paper the development of a plan, I cannot help but comment at this point that such a plan is far more than the brainchild of one agency or one administrator, for it must be a collective response and agreement on the part of the various members of the system.

B. Inter-relationships Between Elements

Hopefully, the state plan to which I have just referred is the key to inter-relationships between the elements of our system. This state plan should be a blueprint for the working relationship that should exist in order for the system to move forward as a whole and not move in isolated spurts from one element to the next. Now this state plan must concern itself with several areas of inter-relationships.

1. Institutional Inter-relationships

There are any number of institutional involvements that are essential, such institutional involvements going vertically from elementary to secondary to higher education and horizontally within secondary and higher education. For a vocational high school and a regional high school to be completely uncoordinated and unconnected makes no sense if we are talking about a comprehensive system. For a technical college to be completely unrelated to a state college where both have vocational education programs, makes equally little sense. And yet in how many of our states do we have a plan that has solved these inter-institutional relationships to the point

that a comprehensive system for personnel development exists, rather than a series of separate systems.

2. Educational Inter-relationships

Along with institutional inter-relationships, the educational inter-relationships are vitally important. The articulation between the various programs and the various academic institutions certainly must be clear and complete if we are to talk about a comprehensive development system. I have a strong feeling now that articulation is not only unclear but quite often nonexistent.

As an example of this need, one of the major points of educational articulation that concerns many of us today is between the community college and the four-year college or university. With the transfer programs that are available, a lack of articulation between these two elements of the educational world work as a tremendous disservice to the student. The same certainly is true within the area of vocational education.

If I may cite a positive example, giving full credit to my colleagues at my own institution! Our four-year vocational education program has very clear articulation with the two-year technical college programs in the State of Connecticut. I feel this is of vital importance as you find many of the technical college graduates coming on into our four-year program and moving smoothly and consistently along toward their baccalaureate degree.

With the mobility of the student population and the greater variety of opportunities available through such mobility, the inter-relationships between curricular programs must be carefully considered and constructed.

3. Local-State-Federal Relationships

With the input from the local, the state and the federal level in any comprehensive personnel system in the development and utilization of both persons and opportunities, a careful network of inter-relationships must exist. I am afraid we all have seen the examples where the local moves in one direction, the state in another, and the federal in another, and yet basically we are still trying to accomplish a coherent and cohesive product as the end result of our system. Articulation between the local, state and federal levels is certainly an important part of the system about which we are speaking.

4. Political Inter-relationships

While local, state and federal relationships may involve the political, I was primarily referring a moment ago to the agency and administrative relationships on these various levels. Indeed, the inter-relationships within the political scene are vitally important if we are to accomplish a

comprehensive system, inasmuch as it is state legislatures which are not only funding but quite often mandating particular programs. As we well know, funding and mandating of particular programs also comes from the federal level. The political inter-relationships with the institutions and with the goals of the system are thus vital. How often do we see a comprehensive system developed and a comprehensive plan put into operation, only to find that bits of legislation for political reasons and especially in favor of a few local constituents run completely awry of such plans. Let me cite an example, if I may, again referring to my own State of Connecticut. The community college system has carefully worked out a plan for the development of the community colleges and for the siting of any future community colleges. In our last General Assembly session two new community colleges were mandated into being by the General Assembly, both of which ran counter to the established plans of the Community College Board itself. Obviously, this is not an isolated case. Using again my own state, we were very fortunate in having the political leaders and especially our Governor see the strong need for vocational educational programs, even to the point that he placed within the budget recommendations, particular positions for our vocational educational programs at our college apart and above from any other faculty positions that we might receive.

I might liken the inter-relationships and their importance to a chess game. Each man in the chess set has a different role to play, but as any chess player knows, it is the knowledgeable manipulation of the inter-relationships of these men on the chess set that wins the game.

Thus, I would like to move aside for a moment from the necessary inter-relationships to identify briefly what I feel are principles of these inter-relationships that are essential to our system. May I identify three "C's."

(1) Coherence

The various elements of the system must have coherence in their goals and in their purposes if the system is to succeed. With one element pulling here, another element pulling there, another element moving in one direction and yet another element moving in another, the system soon falls to pieces, if there was any system to begin with. Coherence is an essential principle of a comprehensive system if it is to succeed.

(2) Cohesiveness

This means basically the same as coherence according to Webster's Dictionary and yet I want to mention this as a second "C" on my list of three C's for principles of inter-relationships. Cohesiveness can be defined as causing to cohere, and thus I would further identify this principle as the

force that creates coherence and maintains coherence in the system. Basically, what I am saying is that you can have different elements of the system that are of like nature, so to speak, but that does not create the force that causes them to stick together in their purpose and in their endeavor.

(3) Cooperation

The third "C" basically emphasizes the other two, namely, that any comprehensive system that has merit finds all elements within the system in cooperation one with another. As we all know, cooperation sounds like such a simple concept but perhaps one of the very difficult ones to put into actual practice. And, of course, it goes without saying that cooperation is more than just verbal consent that can be reached around a conference table and then go no farther.

There is a fourth "C" that I might mention, though, with some trepidation. I will be dealing with it later in this paper, so will touch it only lightly at this moment. That fourth "C" is control. This is a word many do not like today and yet it is something we have to live with if anything is to be accomplished. I often find myself amused when I hear the comments of those today who rally against the establishment and against authority, and carry forth the slogan that "no one can control my destiny." This might be nice to think about, though I will be very frank to admit it is not the kind of a world in which I want to live. I treasure the security that comes from leadership's control of things that help provide a better way of life for me. I feel comforted by the fact that I have law enforcement to protect my rights and government control and expenditure to grant me some of the privileges and opportunities that I have in this nation. So I do not speak of the word control in perhaps the same vein that some at least in our society use it.

I am bringing in the concept of control in view of the fact that fine though mutual cooperation is, the freedom of elements within the system to cooperate or not to cooperate can make or break the system. How much control and what kind of control are questions that must be answered for a system to work.

C. Complexity of System

It goes without saying that any such comprehensive system that we are talking about is extremely complex in every way. One cannot involve educational institutions, local, state, and federal agencies, political and governmental bodies, business and industrial organizations without having a very complex system and a very complex set of working relationships. And as I mentioned earlier, it is not the complexity that concerns me as much as allowing that complexity so to overwhelm us that we no longer can see the system or its goals or aims. Such overwhelming complexity can also, it seems to me, because of its sheer weight bog the entire system down and bring it to a standstill. Maybe what we need to learn to do is to find a simple

route through a complex maze. The complexity of the maze is essential but it does not preclude the fact that a simple route may be found to go through it.

Complexity also is a fact of our system in that an over-simplification would destroy not only some of the elements of the system, but some of the essential inputs to its workability. It would always be nice, obviously, if we in education could exist apart from politics. Though I maintain that I, as a college president, must be non-political, I fully recognize that many of my actions have strong political implications. It would be nice for us in education not to have any worries or concerns about funding sources and merely be responsible for going about our own business. We all recognize that that would be worse than hiding our head in the sand and trusting that someone will come along to bail us out. It would be nice if we could do everything on the local level with local control and not have those bureaucrats in the State House or in Washington getting involved. But that would be like saying we can solve all of our own problems at the local level without any other assistance, and further implying that obviously those people at the state and federal level have never been at the local level, which we know is usually not the case.

In any case, we know that we cannot exist in isolated pockets in unrelated endeavors. A comprehensive personnel development and utilization system is complex by virtue of its very nature and by virtue of the wide scope of its involvements and concerns.

II. Development

A. How to Determine the Elements in the System

Rather than use repetition here, may I refer back to the earlier portion of this paper which deals with the organizational elements of the comprehensive system. It includes four areas: educational institutions, agencies and departments, funding sources, and business and industry. It seems appropriate to me to take such organizational elements of the system in general, and then apply them to the specifics of one's own situation. Let me use my own state again as an example.

We have in Connecticut many public schools throughout the entire state at all levels from elementary through high school that offer elements of vocational education programs, if not full-blown programs themselves. We also have a series of vocational high schools that include specific vocational programs as terminal high school programs for students. These high schools by the way are producing excellent young men and young women to go into the various fields of vocational occupations.

We also have, as I mentioned earlier, four technical colleges in our state that have both terminal and transfer programs in the vocational field.

Many of the students going to these technical colleges move immediately into their chosen field after finishing the two-year program, but many others move into the state colleges, the universities or in many instances into engineering programs that carry them on through the fourth year and even the graduate levels. We also have vocational educational programs in our colleges and in the universities.

Specifically in our state we have a State Department of Education which maintains jurisdiction over the vocational high schools and the technical colleges and we have separate boards of trustees for the state colleges, the community colleges and the state university. All of these boards have liaison with the Commissioner for Higher Education, which is the coordinating agency for all of higher education in the State of Connecticut. Thus, these are specific educational and agency elements within the personnel system that exist in our state.

Further, of course, we have the several funding sources, namely, the local communities, the State of Connecticut through the General Assembly, and, of course, the federal funding sources

that enable us to develop personnel in the vocational education field. All of these elements could be identified by name and by function and must be so determined if we are to build a system. Such elements of a system can be not only determined but easily charted as you will note I have done later in this paper. The chart I have included introduces only the general elements of the system, but individual names of institutions, agencies and groups could of course, easily be inserted.

B. Strengthening existing elements or inter-relationships.

Obviously, in any comprehensive system or in any state that is in the process of trying to develop such a system, there are already many elements existing. It seems to me the first step then in development of a comprehensive personnel development system is to strengthen the existing elements and the inter-relationships. May I suggest several ways in which I feel these can be strengthened.

1. Regionalization of effort.

I am firmly convinced that in many areas regionalization of school systems is the essential answer to providing opportunity in areas such as vocational education for all students who so desire them. We all know the problems of the local school system in rural areas especially, where there is neither money nor talent to develop particular programs or to provide the quality education essential. The same thing is true, of course, within the inner cities as the people of greater affluence have moved out into the suburbs and left the core of the inner city with severe financial difficulties. Regionalization also provides for a greater utilization of expensive equipment and expensive instruction.

Now I know there are many problems and many controversies concerning regionalization vs. localization. I do not intend to go into those here in this paper, but would suggest strongly that regionalization of schools is one way of affecting what I believe would be a great strengthening of some of the elements of the system about which we are speaking.

2. Simplify lines of control.

As I drew a sketch of a chart of lines of control and inter-relationships within the State of Connecticut, I produced a maze of lines and a maze of boxes that seem to resemble a patchwork quilt more than a neat jigsaw puzzle. Such a patchwork quilt might look very attractive and diversified on paper, but it may not produce the complete picture that the jigsaw puzzle can when all the pieces are fitted together. Or putting it in other terms, when there are too many fingers stirring the pot, it sometimes boils over. Too many areas of control with no one particular person or

agency with authority quite often limits the system rather than strengthening it.

May I suggest particular simplifications of lines of control that I feel are essential in many states.

Specific examples would include first of all the simplification of governing structures. I might suggest immediately that I obviously do not have the answer on this. I think all of the 50 states are striving for such answers of simplifying the governing structures of institutions and systems. Connecticut in 1965 felt the answer was to establish a Commission for Higher Education to coordinate all of public higher education. Rhode Island in 1968 felt the answer was to establish a Board of Regents over all of education from elementary right through the Ph. D. level. Other states have found many other answers. I am firmly convinced that there can be a simplification of some of the governing structures with which we are faced and that the effectiveness of the system which we are here discussing will be enhanced by such simplification. I think we all at one time or another feel like we are reporting to many masters and are wearing many hats. Maybe that's all right as long as we can keep the separate parts distinct and yet also keep them together. I am not so sure, however.

Perhaps what I should clarify is that I do not necessarily mean the reduction of the number of governing structures, but a simplification of the relationships between them. We come right back to our word articulation which is as essential between elements of the governing structure as between elements of the educational programs that I have already mentioned earlier.

Another aspect of the simplification of lines of control involves the whole concept of centralization vs. decentralization. As mentioned above, this is one of the major questions in the governance of higher education in the 50 states. How strong should the central governing body be or governing bodies, and how much autonomy should rest within the individual institutions. The range for higher education runs all the way from the strong centralization of New York State and the State of California to a complete lack of centralization in some other states. Obviously, no one answer is perfect for all states, as we would all recognize. However, I think there are certain principles that are always applicable, and I would stand on these principles as the basis for any system.

They include the concept of the centralization of policy-making and the decentralization of administration. Let me use my own college as an example of what I mean by this. I feel strongly that the Office of the President and the top administrators as well as the elected Faculty Senate becomes the centralization of the policy-making arm of the institution. Within the given policy then I feel the administration of that policy should be decentralized as much as possible. There are many decisions that should and must be made

by the Vice President for Academic Affairs that should never involve the President. There are many decisions and responsibilities that should be carried out by the Academic Dean that should never involve the Academic Vice President, and so on. Of course, I could move that example outside of the institution as well. I believe strongly that boards of trustees set policies but do not administer. I believe strongly that branches of state government should set policy and parameters but should not administer. I am sure all of us could give examples where top state officials are involved in the approval of very minor expenditures or examples where presidents of institutions are involved in matters of administrivia. Thus I would affirm that to develop a meaningful comprehensive personnel development utilization system these principles of centralization of policy and decentralization of administration not only can apply, but should apply.

3. Simplify Lines of Funding

I recognize this may be an unpopular concept to set forth because perhaps we are all playing the game at one time or another of going to various sources of funding in order finally to get the amount of funds we feel essential to carry out our program. I well recognize that it is sometimes the combination of the local, the state, and the federal funds that enables us to get the job done. However, I feel that for a meaningful comprehensive system, the lines of funding have to be simplified if we are to be able to carry out the policy decisions, not only in vocational education, but in all other areas as well. I face this as a college president in finding many lines of funding coming into the institution from many sources, and basically altering to some extent the direction and the thrust of the institution without such alteration actually being a policy decision. We can well cite, of course, the problem that has existed in Federal funding of individual grants in major universities throughout the nation and the alteration of emphasis and programs within the institutions that have come as a result.

I, also, on the other hand, fully recognize that it is because of these separate fundings that some of our major programs in institutions have blossomed in short order. Thus, I am not indicating in any measure a cutting-off of various funding sources, but I do advocate strongly a simplification of the lines of funding, or perhaps a better statement is a coordination of the lines of funding.

4. Strengthen Ties Between Education and Industry.

Perhaps education has for too long existed in the "ivory tower" stage, a stage which I believe has disappeared very rapidly over the past several decades, much to the benefit of higher education. In any case, education, I believe, has too often either ignored or little developed its relationship to the world outside of the campus. We are learning very rapidly in these troubled days, the importance of education within the whole realm of society and its major problems of race, poverty and crime, and

are affecting tremendous lines of contact and support in these areas. We have also for some years, in the Vocational Education area, maintained lines of communication with the world of industry. I would emphasize here, however, that if we are to strengthen the existing inter-relationships, this is one of the very vital areas that not only needs further strengthening, but further strengthening would provide a far more effective comprehensive personnel development system.

Let me cite as an example, again, that which is closest to me, namely, my own College. Last fall as our Division of Technology was in the process of completing a new program in Industrial Technology, which was designed primarily to prepare young men and young women for middle management positions in business and industry, they called a general meeting to which were invited leaders in business and industry throughout the greater Hartford region, which is our Regional area that we serve. A most fruitful discussion and input from these men to our own faculty resulted from this meeting and the program itself, we are convinced, is much stronger because of this liaison. Further, of course, we have not only their input but their interest in the program, and as a result, the ties that have been established will bear much fruit for both the college, for our students, and certainly for the men in business and industry.

5. "Status" Improvement

I cannot depart from this topic of strengthening existing elements in inter-relationships without speaking to an area that affects not just vocational education, but many areas of our educational world. Somehow we must alter or eliminate the status symbols within our society and within our educational institutions of one area versus another. All of you who are vocational educators have consistently run across this, I am sure, where certain areas within your educational institution seem to be prestigious and "pure", versus others that are supposedly of lesser value and are "practical." I have sat through many Faculty Senate meetings at the several institutions I have served, as I am sure all of you have, where the battle between the practical and the theoretical, or the vocational or professional and the liberal arts, has broken out. Thus, with such differences of opinion within our own faculty it is no wonder that the differences of opinion range throughout society as a whole. Perhaps what we need to do in our American society is dignify more the product of one's hand and one's talent, and place it of importance also along with the product of one's mind. After all, almost all of our areas of endeavor are a superb combination of both, for one who has skills with his hands can best use them when he has development of his mind, and vice versa.

III. Implementation - How to Improve or Establish a Comprehensive Personnel Development System.

May I suggest the following steps in establishing a comprehensive personnel development system. While I will be speaking in general, I think the obvious implication for vocational education personnel development, or for that matter any other area of personnel development, will be obvious.

A. Identify aims and goals of the system.

As I stated earlier in this paper, I think the immediate base for the establishment of any system must be the identification, and clear identification, of the aims and goals of the system.

Again I use my own College as an example:

Several years ago as we had faced tremendous growth in both numbers and in the complexity of the institution through many new programs and new areas coming into being, we felt a complete reorganization was essential for us to accomplish our goals. Thus, we immediately began on what I have listed here as step 1, namely the identification of the goals of the institution. In the case of Central, we have evolved from the Normal School background to the Teacher's College and now into a multi-purpose institution, and over these years and through this growth have changed from solely a teacher education institution into one which has perhaps 70% of its students in teacher education, and 30% in Liberal Arts, Business and large numbers now moving into our new Industrial Technology Program. Thus in looking at the reorganization and the attempt to develop a comprehensive system for the College, we set as our aim, the continuing strong emphasis in teacher education and the preservation of those areas within our organization that preserve these strengths, but with a full awareness of the growing area of Liberal Arts and the departmentalization and department majors necessary, a recognition of the growth of our business area eventually into a separate school of business and the same for the Industrial Technology eventually into a separate school of Technology. Thus, our aims included the kind of a system that allowed for these changes to take place naturally without requiring another revamping of the system itself, and allowed for the narrower interest of the department without detracting from the broader interests of several departments in one area. Accordingly we now have a structure with groupings of related departments in divisions and grouping of divisions into separate schools. An example, for instance, would be the area of the Social Sciences. We have five different departments in the Division of Social Sciences. The several departments can promulgate their specific majors in the Liberal Arts programs but the divisional structure preserves the broader spectrum of the Social Sciences for the teacher education programs The same is applicable in our Division of Technology, which includes the separate departments of Vocational Education, Industrial Education, and eventually Industrial Technology.

B. Identify Sources of Training

A clear identification of the various sources of training is the first practical step for establishing a comprehensive personnel development system. This identification, of course, must include not only those sources of training now in existence, but perhaps those that should be. Inclusion of the elementary, junior high school or middle school, senior high school, vocational high school, college and university, technical college and graduate school programs all become a part of the sources of training within a personnel development system. These sources of training will vary, of course, from state to state and will assume many combinations.

C. Identify Departments, Agencies and Boards Involved in the Policy Decisions.

These various groups will include local school boards at the local community level, state boards of education, boards of trustees over institutions of higher education, coordinating commissions or boards, boards of regents, etc. These form the policy-making bodies affecting the institutions providing the educational media for the system.

D. Identify Sources of Funding.

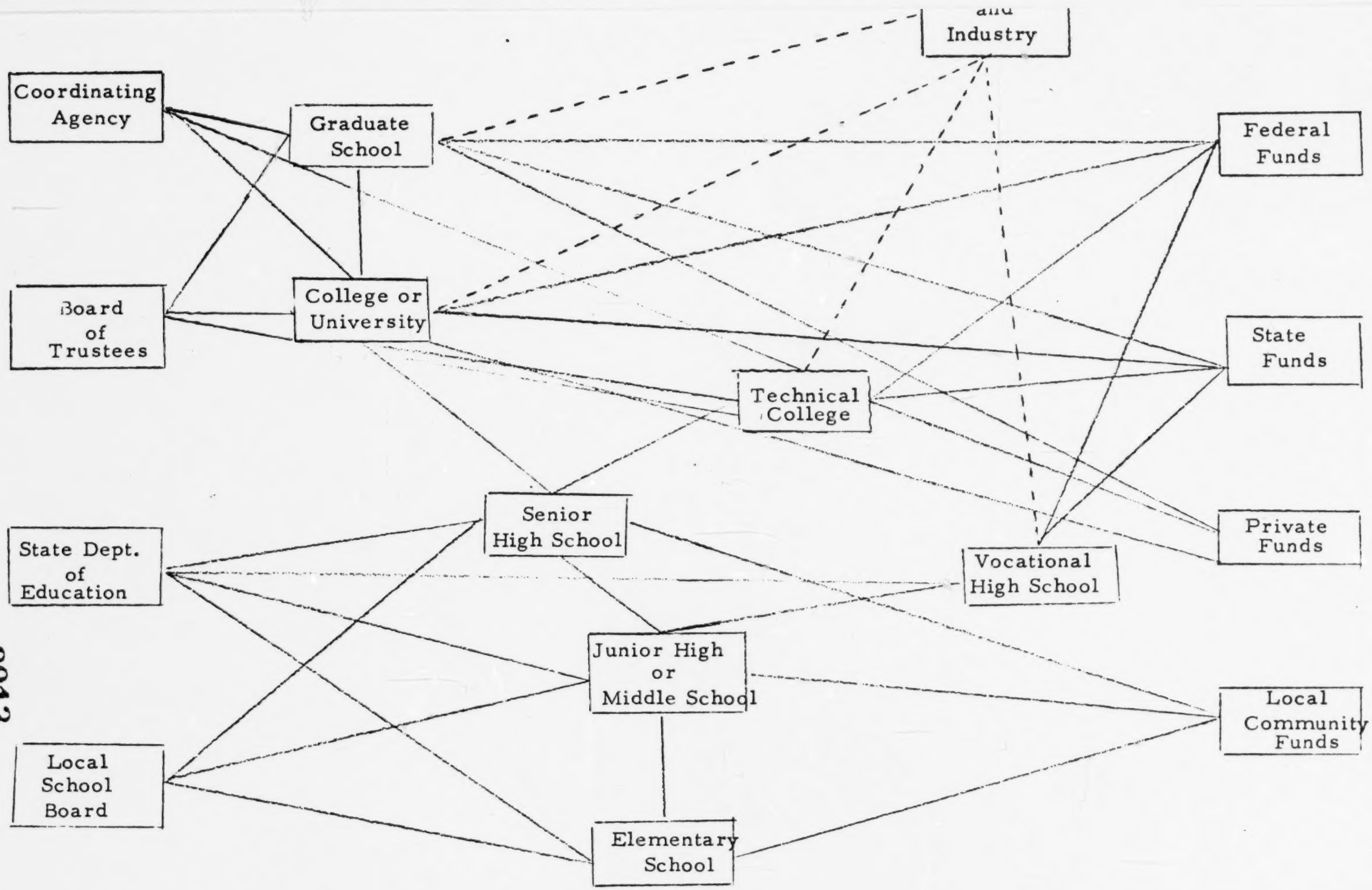
These sources include funds obtained from the local community, state funds, federal funds and private funds from various areas, including business and industry.

E. Identify the Segments of Business and Industry that are Both Directly and Indirectly Related to the Personnel Development System.

The relationship with business and industry is, of course, two-fold in that business and industry provide the in-service training opportunities for an area such as vocational education as well as being the recipients of the products turned out through the vocational education programs. The value and the necessity of business and industry involvement in such a system is a very obvious one, I believe.

F. Establish the Lines of Inter-relationship of All of the Above.

This, of course, becomes one of the very difficult aspects of the development of a comprehensive personnel development system. A relatively easy task is to identify the various elements of the system; the very difficult task is to establish the proper inter-relationships so that the system has coherence and effectiveness. As noted earlier, a chart of all of the elements of the system with the lines connecting the various elements becomes a most fascinating array of lines and squares. How these various elements work together is obviously the secret of the success of the system.


and
Industry
Coordinating Agency
Graduate School
Federal Funds
Board of Trustees
College or University
State Funds
Technical College
Senior High School
Private Funds
State Dept. of Education
Vocational High School
Junior High or Middle School
Local Community Funds
Local School Board
Elementary School

I would suggest strongly in the area of vocational education that one of the means of establishing the kinds of inter-relationships that are essential would be the formation of a vocational education policy board for a state. This policy board, I believe, should be made up of persons from the various elements within the system and should have as its primary aim the setting of the goals of the system, the setting of the policies on how to meet those goals and the encouragement and actual activity in the providing of the funds for the various elements of the system.

Perhaps such a policy board or similar structure exists in some states. In many, I am sure it does not and it is only by the informal discussion and coordination among the various elements that any sense of a system can exist.

G. Management of the System.

Once again we come to the problem of control. Perhaps the easiest way to make a system work is to have a system of complete control so that various elements of the system do not have the opportunity to stray out of the straight and narrow and thus upset the workings of the system itself. However, as you and I both know, such controls not only cannot exist, but should not exist in the kind of a system about which I am speaking. When you engage all of the elements in a system as complex as this, which elements represent so many different areas and so many different segments, there can be no one line of control, but there will be many lines of control. Sometimes these lines are conflicting and obviously such conflicts must be resolved.

So, therefore, what I am talking about as far as the management of the system is a management not by control but by persuasion. I have always maintained that the most effective administrator in a college or university today is one who is the most able persuader. The president of a college does not dictate to his faculty nor to his students what they should do, nor obviously does the president of a college dictate policy and procedures for the operation of his institution. Rather he attempts to provide leadership through persuasion and through working with the faculty and the students and his fellow administrators as well as with the external forces such as the board of trustees, the state legislature and the general public. I believe in the system about which we are talking, the same management by persuasion is essential.

Certainly a policy board which I am suggesting could operate through this principle of management by persuasion. Obviously, there are elements of control in the very matters of funding, the matters of educational policy of institutions, etc., but persuasion becomes the most viable element in maintaining coherence within a system.

IV. Principles of a Comprehensive Personnel Development System.

The purpose of the establishment of any system is, of course, to facilitate and strengthen the input, the program and the output and to do so with the greatest efficiency and utilization of resources and personnel. Thus, any system to accomplish these ends must be based on certain principles. May I suggest four principles which I feel are absolutely essential for a comprehensive personnel development system.

A. Flexibility.

To put it in popular terminology, the system must have "give and take." A system with built-in rigidities may work for the moment, but I cannot conceive that it can be lastingly effective or efficient. Carefully worked-out procedures and inter-relationships between elements of a system under given conditions may be highly impressive and highly workable at one time and under one set of circumstances, but time and circumstances both change and change rapidly, especially in our world of the 20th Century, so that what may have been effective yesterday, may be completely ineffective today, and what may have been an expediter today may be a stumbling block tomorrow.

There are too numerous examples to mention, and at all levels. Two examples that will strike home to all of us here would include the policies and procedures of a particular institution that may have been most acceptable and most workable when that institution was simple in its organization and small in size. Those same policies and procedures may be totally ineffective as the institution has become multi-purpose and has grown in both size and complexity. The perusal of the catalogs and policy handbooks of institutions such as the one I represent that have so greatly changed in both size and scope over the past several years reveals the kind of flexibility that is necessary and that I am emphasizing. Another example, of course, that hits home to all of us would be the various state and federal agencies with which all of us in the public sector especially deal. Many of those agencies may have been structured and engineered for one time and one purpose, both of which may have changed radically without the corresponding change in the agency itself.

In any case, I would argue strongly that any comprehensive personnel development system that can be effective over a long range of time must have a very viable flexibility built within it.

B. The System Should Serve and not Control the Various Elements Within It.

One of the standard cartoons of our modern world of Technology is of the machine controlling the man. Many of the futuristic tales of how

the world will be 2,000 or 10,000 years hence, sometimes carry the same theme of the system or the society making automatans out of the individuals. We can be thankful that these are yet only in the realm of fancy or humor.

I would positively affirm a basic principle of any meaningful comprehensive personnel development system would be that this system is created only to serve the goals desired and not to control. If the system allows the greatest utilization of the resources, the greatest development of the personnel, the most efficient and productive use of funds, then the system is serving. Contrarywise, if the various elements exist for the system and if their goal is to strengthen the system, not the product, then the system is controlling. I believe firmly that the latter is not only undesirable but unproductive.

C. The System Should Enhance Development, Not Impede.

Perhaps I am saying the same thing above, but I feel it important to express it differently in this way. We all are faced with systems or agencies or institutions or things which impede the very development they supposedly are to enhance. We may call it bureaucracy, we may call it red tape, but whatever we call it, we are faced with such stumbling blocks time and time again. Repeating the same principle in other words, the system should never get in the way of the goals desired, but should actually be behind and pushing toward those goals.

D. The System Must Allow For Its Own Self Remodeling.

Change is the way of life for all of us whether we like it or not. Change is the way of life for our society and for our nation. In fact, as a recent author has so clearly stated, that change has perhaps become one of the basic problems in the human psyche of today in that we cannot physically or emotionally cope with the rapid and extensive changes that are confronting us. And yet change is that which we must recognize and adapt to as readily as possible.

A system must have the same adaptation. There must be self-regenerative and self-remodeling elements within the system, so that as the conditions change, as the elements vary, as the goals and aims are modified, and as the supportive funds are varied, the system can undergo these changes through adaptation, so that it continues to accomplish its purpose and serve its desired end.

Conclusion:

This paper has dealt with four major areas involved in a comprehensive personnel development system, namely the identification of the system, the development of the system, the implementation of the

system, and the principles underlying such a system. As stated at the outset, these observations are coming not from one who is a vocational education instructor, or administrator, but from one who is an administrator in an institution that includes Vocational Education. Thus my observations and remarks have necessarily had to be more general in the area of a personnel development system than specific in the area of a personnel development system for Vocational Education. I firmly believe though that the principles about which I have spoken are equally applicable to vocational education as they are to other areas with the same needs for such a comprehensive system for the development of the personnel needed.

HOW TO IMPLEMENT CHANGE

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Development and Utilization
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HOW TO IMPLEMENT CHANGE

Nothing is surer than death and taxes according to an old adage. To this we might add a third certainty - change. Change has always been with us-for without it we would be a dead people on a dead planet. It is part of our nature to resist change as we resist death and taxes. But the pace of change is quickening, and nowhere is this more evident than in education in general, and vocational and technical education in particular. Therefore, a conference devoted to the development of a comprehensive personnel development system including methods of implementing change is timely.

People cope with change in different ways. Some try to ignore it, pretending things are just as they always have been and always will be. Some resist it, preferring things not as good as they could be for fear they might be worse than they are. Some seemingly accept change with an easy, false enthusiasm and make a pretense of acting. Some welcome change and seize it as an opportunity to design and create a better future. The latter group are the leaders who are willing to take risks in the hope of real gain, and who realize that lengthy inaction only courts certain disaster.[1]

PRESSURES FOR CHANGE

We scarcely need to be reminded that all is not well with the schools. In fact, most of us would have difficulty identifying a period in which there was so much political criticism and lack of public confidence in education. It's not the purpose of this report to expound on the nature and causes of our educational malaise. However, just to gain perspective and to underscore the need for action, let's identify some of the forces that are storming the bastions of the present educational establishment.

1. <u>The Inner-City Communities</u>. There is increasing evidence that large numbers

of students in the urban school system acquire very little knowledge or information in return for 10 or 12 years of attendance. By "very little knowledge" we mean in reading achievement, scientific and academic progress, and also in vocational education. The causes, we are told, include a lack of money, a tenure system that allows experienced teachers to flee the most-troubled inner city schools, poor and rundown facilities, segregation, high student mobility, the inability of many parents to participate in the schooling of their youngsters, and a tense, even hostile environment with few job opportunities for the unskilled. This is leading many black communities to challenge the power structure of the system-even to demand full control of their schools.

2. Students in Suburbia and on the Campuses. Despite that new plant set on an attractive campus, education in suburbia and in the colleges is far from tranquil. Students are questioning the value structure of society, and they view the school as part of a system designed to perpetuate much of what they consider wrong with our values-our competitive ethos, nationalistic chauvinism, undue emphasis on thrift and savings in a world of material abundance, the right to accumulate a large estate, self-advancement (presumably at the expense of others), and faith in social progress. The relentless pressures of social conformity and college preparation equal in emotional brutality the physical tensions faced by the urban student trying to survive in the ghetto.

In place of these values, many suburban students would substitute humanitarianism, internationalism, rationalism, social welfare, social accountability, public service, social order, and aesthetic values.[2]

3. Student Control. The natural outgrowth of the questioning of values is the students' demand for more control of their school system, a trend particularly

evident in the colleges. These students may be labelled "radicals", but many of them are bright and articulate. What they claim to find in the classroom is suppression, irrelevance, uncaring, inhumanity, manipulation, and the systematic stultification of most of what should be promising in young people. The more extreme of this group, a sizeable minority, question the relevance of the entire enterprise of formal education. They question the ability of a system so out of tune to adjust. Therefore, they would go even beyond student control-they would dismantle the present education system and reconstitute it along basically different lines. In this endeavor they have support from some noted theorists, writers, and educators in and out of the present system.

4. A Competitive School System. Under this system, the students, parents, and community would turn the tables on the system's officialdom, including administrators and teachers. Heretofore the student found himself in the competitive jungle, with his progress compared with his peers using norm-referenced criteria. The educational voucher, with strong support from certain community leaders, and funding from the OEO as well as the USOE, symbolizes this force. Now the administrators and the teachers are put in a competitive position with other public and private schools. They allegedly must either produce or lose their pupils-and their funding.

5. Educational Alternatives. Not all is just talk about establishing a dual school system-or a number of alternatives to the present system. It might be comforting to report that these alternatives have failed, but such is not always the case. There is some solid evidence of achievement in such "second chance" centers as a residential MDTA center in Ohio, in the Job Corps, in the street academics, and in the Freedom Schools, in the experimental universities, and in the so-called "free" universities. These alternatives are expensive. To survive, they will have to perform well their

mission of teaching the hard-to-teach and hard-to-reach. But these schools are receiving funding from a surprising number of public and private sources. The public sources tend to be government agencies other than the USOE, a disturbing fact to many teachers and professional organizations affiliated with the establishment which the USOE represents.

6. Less Money, More Accountability. I suspect we have seen the end of the day when seekers of educational funds could justify their requests by simply talking about the number of students to be served, or by citing the cost of books, staff, materials, equipment, and space to be acquired. Today they must be prepared to answer questions that focus on results obtained from resources used. Educational accountability means that the professional educators who operate our schools will increasingly be held responsible for what children learn or fail to learn. The Elementary and Secondary Education Act of 1965 marked the high point of "innovative education". Without question, these innovations did produce notable results, particularly in reading, but there is some evidence that a majority of students (two out of three) were not helped at all.[3] Therefore, the remaining one-third that were helped by ESEA came at a high price ($1 billion a year for Title 1 alone.) Impatience with results (a disadvantaged child didn't gain that status overnight-it took generations), and an insistence on measurable progress probably marks the end of ESEA-type funding. New programs will likely be adequately staffed, and monitored at both the state and federal levels.

Steps to Change

If we don't have to look far for change pressures, and if we can agree that a degree of educational reform is sought by parents, promised by certain of the education acts, and desperately needed by students, how do we go about getting something changed?

To create change, we have long had four steps: (1) research, (2) development, (3) dissemination, and (4) implementation. Each of these steps deserves some examination, but first, let's take a closer look at the so-called science and art of change itself.

THE SCIENCE AND ART OF CHANGE

To attempt to make any kind of educational change is to attempt to give a different position, course, or direction to another professional or group of professionals who share the common human trait of tending to resist the unknown or the untried. The science of change revolves closely around those four classical steps-research, development, dissemination, and implementation. But even if and when the need for change is established, using accepted scientific methods, man must be sold on it for change to endure.

We can threaten man with corporal punishment, if a change is not made. We've seen political examples of this, where a dictator rules by decree. Closer to home, we may have tried this with our own children. The appeal of this type of communication is its directness and speed. Unfortunately, the appeal is too often short-lived.

We can present the most scientifically valid arguments for change, documenting each step, to the point where intellectual man should accept the position. But unless there is a deeper commitment than the intellect alone, man has a way of rationalizing himself right out of the change.

Some feel we need to communicate with social man. By gaining group acceptance, there is a strong force for conformity; and conformity we may get-as long as somebody is looking. But people have a way of going through the motions to gain social acceptability without making an inner commitment to change, which they may be resisting.

The only lasting commitment to change must come from an emotional

commitment, preferably supported by a scientifically valid set of data. An emotional commitment is just another way of saying that the education profession must be sold on the need if we really want to make a change and make it stick. This is especially so since many people, even professional educators, feel threatened and insecure. In some way or other, the officer or agency for change must build into the planning a provision for alleviating faculty anxiety and insecurity.

Davis[4] likens a work environment to an air-filled balloon. When a finger (with represents change) is pressed against the exterior of the balloon (the organization), the contour of the balloon visibly changes at the point of impact. Here an obvious pressure representing change has produced an obvious deviation at the point of pressure. What is not so obvious, however, is that the entire balloon (the organization) has been affected and stretched slightly. The whole organization tends to be affected by a change in any part of it. This comparison illustrates that change is a human relations as well as a technical problem. The officer or agency planning change should make plans to restore and maintain the group equilibrium and personal adjustment which change upsets.

SHOW VISUAL 1

Making things even more complicated for the change makers is the difficulty of anticipating how people will react to change. A changed situation is interpreted by each individual according to his attitudes. The way he feels about the change then determines how he will respond to it. People's attitudes are the key, and attitudes are sometimes nebulous, often hidden, and usually slow to shift. It is literally true that people sometimes do not know why they do or say something. They do not know their own feelings, much less someone else's. Feelings are not a matter of logic. They are neither logical

nor illogical, but they are entirely different from logic. They are nonlogical. Feelings and logic are different just as inches and pounds are different. For this reason, logic alone is an ineffective way to try to modify feelings because it does not get at them directly.

Managing change is both a science and an art. Both are needed. Take one away, and change becomes unmanageable. The first two of the steps to change (research and development) provide the scientific base for change. Managing the last two steps (dissemination and implementation), comes much closer to an art.

IDENTIFYING AND EVALUATING THE FORCES FOR CHANGE

Who are the agents for change-those individuals or groups who can successfully manage the science and art of establishing new directions and inculcating new values and attitudes? What can each do best and in what environment? What are their limitations? How can each be used to effect change?

My particular taxonomy of change forces begins and ends with the individual classroom teacher, for it is here that theory and models end, and practice begins. A whole galaxy of potential change forces spin around that individual teacher.

Each of these forces has varying degrees of capability in working with the first three elements of change-research, development, and dissemination. To implement change, each force needs to work at what it can do best, respecting the contributions of the other members of the galaxy. No one force

SHOW VISUAL 2

has all the answers, and no change happens until that teacher at the center implements it.

Students as a Force for Change

Elementary school children in the fifties and sixties sat still so the teacher

could teach them. The teacher stressed factual course content. He followed the curriculum guide and the textbook at a standard pace. Differences in learning styles were largely ignored as was the need for alternative media. If the student couldn't keep up with the class, he was expected to study "harder" or to admit he was lazy. Everybody was to be prepared for the test at the same time, and the test was all-important. Grades were largely determined by how well the memory worked, and high grades meant you would succeed and go to college. Low grades meant you were stupid, of little value to society, and probably destined to be a service station attendant. Goals were established by the teacher (who may or may not have articulated them).

A generation of students took this educational regime through elementary school, on into high school, and, for at least 30% of the original group, right on into college. They are graduating from college now, and a disturbingly large number of English majors are pumping gas. Would-be engineers are on assembly lines. Prospective social workers are on welfare. The United States is an enormously productive economy, even in recession times, offering 21,741 different jobs to a record 82 million workers. Careers are looking for people, and people are looking for careers, but the two forces frequently don't meet. In short, the general education plan for all (including post-secondary degrees) has worked for some, but is a hollow promise for others.

As a change force, students are now taking a more active role as disseminators. Many obviously lack contact with R & D; therefore, they sometimes fail to come up with much worth disseminating. But can we blame them? They feel something is tragically wrong with the system including much of what is now disseminated in the name of college entrance requirements, as well as the way it is disseminated. They are communicating to the teacher the need for more teacher-pupil planning. They are demanding more attention to their

personal needs. They are questioning the sincerity and dedication of teachers who refuse to come out from behind the attendance record or the lesson plan and face them in so-called "rap" sessions.

This is all having a profound impact on the teacher. For some, the student change force is a threat. Students are regarded as cheeky, and lacking respect for authority, all of which only serves to heighten student-teacher hostility. For others, the student change force is bringing new insights into the role of the teacher.

The aim of a good teacher is to become unnecessary. I suspect that not many teachers can bear to admit this, and perhaps that is why not many are really outstanding. But there are some-who implement student change forces because they are open to change. Their attitude shows it. They make a sparing use of the lecture method. Instead they are open to individual student confrontation and communication. They listen for the student's meanings and respond as best they can and as honestly as they can. They find time for this, perhaps through less telling, and more listening and interacting. It takes an innovative, even courageous teacher to leave himself open to this kind of fluid environment, particularly when he may lack the psychological training, or the stamina, or the willingness to expose himself to this "think on your feet" atmosphere. It takes an emotionally secure teacher who is willing to trade a part of the security of the textbook and the lecture for such personal confrontations. I say "a part of the security" because such a teacher-leader must still manage to satisfy the sometimes stultifying number of state laws, college entrance requirements, local mandates, and achievement tests prepared by outside groups, any one of which is reason enough for a teacher to claim, with some validity, that the more open, receptive learning environment is too demanding.[5] The fact that you and I know of teachers who are creating this

kind of learning environment is the remarkable thing. Nothing happens until it happens in the classroom; therefore, in the final analysis, educational change begins and ends with the classroom teacher. All other change forces are merely fingers pushing against the balloon. When, and only when, the teacher accepts change, and adjusts to a new configuration, have we arrived at that last step in change adoption. Some teachers have an almost intuitive sensitivity to the need for change and can adapt to student change forces using their own inner resources. Others, and I suspect most, require varying degrees of exposure to outside-of-the-classroom change forces.

School Administration as a Source for Change

The teacher's first and most frequent contact with a change force outside of his classroom is no further than his school administrators. With the possible exception of students, the administrator excells everyone in disseminating the forces of change, including rules and regulations (federal, state, and local), and in overseeing and attempting to secure implementation. The local administrator hires the teacher, establishes goals and criteria for measuring the teacher's performance, motivates the teacher, compensates the teacher, and is a bridge between district, state, and federal levels of school administration.

A good administrator, like a good teacher, is knowledgeable and involved. He is knowledgeable about what he can legally do; about what his students' and teachers' requirements are. He is sensitive to the needs of the forces of change on either side of him. To be knowledgeable is no easy task in these times.

He is involved when he shows that he cares not only about rules and regulations (which he must) but also about motivating and encouraging his staff. In short, he is a leader who is literally in the middle of the ring. It's a tight and uncomfortable spot. The pressure is always there, and the

demands are high. It takes perspective when opposing forces use his office as the focal point of a squeeze play. That we have so many truly outstanding school administrators who are knowledgeable and involved, surrounded as they are by inadequate budgets, community pressures, referendum defeats, cutbacks, and lack of staff is the truly remarkable thing. Perhaps it takes adversity to bring out the best in people.

There are a few administrators who can't stand the heat. Some have sense enough to get out of the kitchen; others hang on, immersing themselves in "law and order" issues, such as seeing that fires are not set, that one student does not knife another, that children are not pushed down a flight of stairs, that drug traffic is controlled, that vandals are apprehended. This is not to deprecate the importance of maintaining "law and order." It is vital and without it, there is terror rather than education. But I question the administrator who complains that he has time for nothing else but putting out fires in order to keep the system operating at a tolerable level. In my opinion, such an administrator has lost his value as a force for change.

School administrators can be used to effect change when they maintain close contact with teachers and students, when they are fully aware of what they are legally empowered to fund and implement, when they have the courage to try a new course, and when they have the experience to develop a fundable proposal. More administrators are employing a project proposal writer whose job it is to prepare the path for change. Such a path could lead to the use of state and federal funds to implement new methods, to a form of performance contracting.

SHOW VISUAL 3

There are additional change forces at other levels of school administration, including city administration housed at the board of education and state supervision housed at the State Department of Education. It is beyond

the scope of this paper to evaluate these change forces and to assess their impact on the teacher. This could be, and I believe is, the subject of other position papers presented at this national workshop. It is my observation, however, that the farther you move out of the local school and away from the classroom teacher, the weaker is the influence of school administration as a force for change where it counts-in the classroom.

Teacher Education as a Force for Change

The question is not whether teacher education is a force for change, since it is, but to what extent teacher educators know what they want to change, and the extent to which they choose to limit their service to preservice teachers.

A basic problem is the fact that some of the best basic research into learning has not been done in the colleges of education, which one would consider to be the logical source of educational research, but in the departments of psychology in the universities. This has created a considerable communications barrier. Happily, this condition has been alleviated somehwat in recent years, as it has become respectable for other researchers to associate with their colleagues in the colleges of education. Historically, basic research in learning has not been a strength of teacher education.

It is the development of change, and more specifically, the disseminating of change information and techniques that form the backbone of teacher education service.

Not that all is secure in these two areas, either. Like much of higher education, the teacher educators have been challenged to produce a curriculum that is more relevant to today's teacher and a methodology that extends beyond classroom lectures and practice teaching. The overriding problem is to define what it takes to be a competent teacher, and then to establish methods, a style, and a system to lead the student teacher from where he is to where we want him to be in terms of his ability to perform in a desirable learning environment.

(A model will be suggested in the next section devoted to Managing Change.) Therefore, let's leave temporarily the matter of curriculum and the teacher's terminal performance objectives, and turn to some current practices in teacher education that tend to inhibit the ability of this force to develop and disseminate change.[6]

As schools of education grow, some tend to formalize routine to the point where the routine becomes an immovable ritual. This is difficult to avoid in a large community where a routinized behaviour is necessary to prevent the chaos of uncertainty. The large monlithic corporations face the same problem: How do you live with rules, regulations, and procedures without stifling initiative and receptivity to change? The corporation must occasionally purge a declining market and profit position with new management, or seek a merger partner, or at the extreme, seek the temporary refuge of bankruptcy or liquidation. Teacher education has its own form of success criteria, not measured by share of market or profits, but by a return on its investment of public and private funds in the preparation of competent teachers. To the extent that teachers are under attack, so must teacher education share in the responsibility.

Another problem is a tendency for the teacher education "in" group to engage in nest-feathering and self-protection. As rank and tenure are granted, it is only too natural to want to consolidate power, to preserve the old methods that have worked well in the past, and on which the tenured professor has established his security. Small wonder it is that teacher colleges tend to set educational goals for their students and then proceed to admit as students those who already most nearly meet these goals before entrance, and why colleges tend to serve only the most promising students, leaving to other educational institutions the job of aiding the unreceptive. This minimizes risk from potential troublemakers or should we call them forces for change?

Pressure for change almost always stems from the dissatisfied-from individuals who think that an institution is less than it should be. Unfortunately, the dissatisfied are almost never the tenured and privileged insiders. It's the outsiders that initiate, and the insiders who react.[6] When, and only when, the pressure for change becomes so intense, when the present position becomes untenable, when more may be lost by attempting to preserve the past than accommodating the present, that true change occurs. We would compile a rather lengthy list of changes that have occurred due to campus unrest-open admissions, curriculum changes, and black studies, to name a few, that would not have occurred without student pressure. What's wrong with a system that lacks the sensitivity to make changes before it is forced to?

In my opinion, teacher education needs an incentive system designed to encourage change. Such a system would reward individuals and schools for initiating change that produces meaningful results. Such a system would need to be based on an easy-to-administer, and easy-to-measure cost-benefit analysis.

Beyond this, a way must be found to reduce the insidious effects of ritualism and privilege by encouraging an open dialogue with the newer, untenured teachers and with students. Perhaps a leaf should be taken from the corporation's book where there is no such thing as the security of a tenure system. The individual in the corporation bases his security on performance, buttressed by monetary reward, and such corporate forms of security as pension plans, stock options, profit sharing, and at best, an employment contract rarely extending beyond five years. This creates a climate for change.

The individual and the corporation can survive only so long as both can design and produce competitively priced products or services based on a current market need. I emphasize <u>current</u> market need, for there is nothing static about an open, competitive market in a technologically advanced society. The

corporation cannot service if it's hands are tied by excessive ritualism or rules of conduct based on yesterday's standards. Many feel the railroads would be in a less dismal position if both management and labor had been more alert and receptive to a changing transportation market, rather than excessively preoccupied with ritualism and privilege.

Thus far we have considered the impact of teacher education as a change force on the preservice teacher. There are some who say this is the only route to effecting real change. Begin with youth, and establish the kind of learning environment we need. The in-service teacher may be too old or set in his ways to be able to change. Such thinking is, at best, terribly time consuming. At worst, it is fatalistic, wasteful of human resources, and reveals an unwillingness to make an effort.

But much of teacher education, as it presently operates, has a dim change impact on the in-service teacher, and especially the teacher who has completed his coursework and research for his terminal degree. After this, there is an occasional workshop, a professional meeting, perhaps even a limited amount of postgraduate study.

A recent EPDA paper suggests that teacher educators find new ways of reaching the in-service teacher, not solely by offering courses at the college (or even at an extension center) but by having the teacher-educator join the faculty of the schools, and especially the problem schools, as a practicing clinician while still enjoined to the university. A radical proposal? Perhaps. But I can't think of a better climate for change. It would put the teacher educator out on the firing line, where if he can produce he will gain followers such as no classroom lectures, however brilliant, ever produced. This teacher educator will have turned the tables on ritualism and privilege by exposing himself to great risk. But the rewards are great. Now

the teacher educator can act while the options are still open. I don't know how a person can claim to be a leader without this continual exposure to risk.

Legal and Political Forces for Change

Can we legislate change? Can Congress create an education act, the Federal Register spell out the operating policies and guidelines, the state's produce a one-year and five-year plan, and we have change? There are ample examples of worthy attempts to create change using this route. The Vocational Education Act of 1963, the Amendments of 1968, the Manpower Development and Training Act of 1962, and the Elementary and Secondary Education Act of 1965 are perhaps the most notable and closest to our efforts in vocational education.

These historic acts have produced change, and there can be no question of this. In the last ten years, enrollments in vocational education have doubled, new vocational services have been identified and developed; the older services have grown and, in some cases, redirected their efforts in keeping with changing manpower requirements. New methods have been introduced or expanded to bring realism to vocational education, including simulation, directed work experience, and cooperative training. New equipment is on hand. New or enlarged facilities have been erected. We have done an outstanding job of changing the facilities and procedures. What I am not so sure we have done is really changed the learning environment. We are sometimes challenged to document the benefits realized in return for the costs incurred. It's here that we may be vulnerable. We think our legal-political system has produced changes, but can we measure results?

In his message to Congress in March, 1970, President Nixon said:

> American education is in urgent need of reform. We must stop letting wishes color our judgments about the educational effectiveness of many special compensatory programs, when-despite some dramatic and encouraging exceptions-there is growing evidence that most of them

> are not yet measurably improving the success of poor children in school. We must stop congratulating ourselves for spending nearly as much money on education-$65 billion a year on all levels-when we are not getting as much as we should out of the dollars we spend.[7]

Strong words! It would be an oversimplification to attribute them to an administration that has inherited and must now support the array of education acts of the 1960s, most of which were not of its making.

These words do underscore some of the limitations of legal and political change forces. The aid may be temporary. "What the government giveth, the government can taketh away" according to the old saying. The aid may not be implemented by the reformers, as in the case of the ESEA.[8] The administrative staff may not be adequate. There may be a disinclination to monitor the program; laws and traditions may favor local control. Finally, unless these legal and political forces have their systems and procedures confirmed by media and methods from the education industry and in intrinsic changes in the teacher education community, no amount of laws and money will do the entire job. In summary, legal and political forces are excellent catalysts for educational change, but true reform at the classroom level requires a delivery system that this change force has lacked.

In my opinion, it will take a new form of accountability and an improved system of delivery to fully harness the legal and political forces of change.

Professional Groups as a Force for Change

It would be presumptous of me to attempt a full analysis and evaluation of this change force when Dr. Graham is presenting a paper on this subject.

It is not difficult to see the enormous impact a strong professional association can and does have. We need such groups, for in numbers there is

strength, not only as a lobby with the legal-political change forces, but as a force for internal change and reform. The professional groups may indeed be the best way to reach and change the in-service teacher through the impact of literature, research, and professional meetings.

But no professional group is so effective as to deserve a whitewash. Too often the evils that befall parts of teacher education-ritualism and privilege-creep into the proceedings. Are these associations, so often controlled by college educators, able to tolerate, even encourage open criticism, and open rivalry? Are they willing to broaden the privilege franchise to include a nonprivileged class? Or is the association controlled by the oldest members of the group who continually rotate in and out of the key positions? Such associations keep inbreeding high. Newcomers are not permitted much influence. Younger members are made to feel that they are incapable of making correct educational decisions until they have much, much more experience. Are proposed writers and leaders carefully screened by the standing committees before their writings or appearance are approved, lest such upstarts propose any changes that might upset and confuse the profession, lower standards, or otherwise threaten to upset the golden age of the past?

The Community as a Force for Change

The community is a diverse, often disorganized group of parents, school board members, employers, and citizens and voters. In the past their voices were all but mute. But times are changing. As indicated earlier, parents and laymen are demanding a stronger voice in the educational power structure. Thus far most of the demands of community groups have centered on the control of the hiring, firing, and transfer of teachers. This has predictably created some confrontations with teacher's professional organizations. A more profitable alternative might be for a board of education to organize a community

inquiry for the purpose of reviewing or creating a written philosophy for the schools in their district. This could redirect the laymen's efforts into assessing whether the teachers and administrators were directing their efforts toward these publicly determined ends. In short, the lay community is now a force for change, but it could be an immensely more powerful force if its energies were first concentrated on the creation of a design, to be followed by the dissemination of a plan to achieve this design.

The employer has long been an enormous force for change. He has an operational design, and he effects change through his participation in co-operative training programs, in apprenticeship programs, and as a member of the school advisory committee. So successful has this force been that some employers may be overwhelmed with school coordinators seeking training stations while others are scarcely contacted. The Amendments Act has put a renewed emphasis and funding behind cooperative programs. Certain out-of-school programs such as the NAB, JCBS, and a diversified assortment of work experience are all putting the onus on the employer to develop job skills, and, in some cases, job readiness too.

In recent years, the employer has become such an enormous force for change that he has felt the pressure for carrying a heavier load as a partner in the education process. Is there a limit to what he can reasonably be expected to assume as a partner in vocational training? A still deeper question, beyond the scope of this paper, is to determine under which circumstances and to what extent the employer can deliver a superior program of vocational education.

The Education Industry as a Force for Change

The education industry has traditionally viewed it's role as a disseminator of information. In the days when each educational publisher produced a few text-books each year, and the leading ones tended to form the backbone of the curriculum guide, everything was neat, orderly, and unrealistic. The educational publisher was often the last to receive the word on the implications of

educational research, and this was a shame, for they have always been in a key position to design and implement new learning systems. We can no longer afford to wait 20 years, the traditional time lag between the development of a research prototype and its implementation in the classroom. There must be better communication between the research groups and the commercial publishers in the business of education. But, beyond this, the educational publisher must redefine his own role to determine how he can best serve as an effective agent for change-and, hopefully, with a reasonable expectation of making a profit in the process. This is no enviable job. It entails far more risk than most publishers would care to admit, and it's small wonder that many educational publishers are unwilling or unable to invest their full resources in the educational technology that is now developing around us.

My remarks will focus on the education industry's capacity to effect change through the design and dissemination of learning systems, but the industry's capacity to make change is by no means limited to learning systems. It also includes teacher education, school system management, academic performance contracting, on-the-job performance contracting, and commercial school operation. In a sense these latter capacities are all related to the design and development of an efficient learning system, for without this, those other capabilities would be empty promises.

SHOW VISUAL 4

The fact is, it takes a lot more than an author and an editor to produce a vocational learning system. It takes a whole new array of resources to get into this game called educational technology. What are some of the capabilities required? The more obvious ones are:

a. developmental research

b. an understanding of behavioral psychology

c. subject-matter competence

d. equipment competence but machine independence

e. broad marketing operations

f. systems analysis experience

g. money to invest over a long period of time

h. good management.

The Education Industry's Capacity for R & D. Strong research departments have been one of the strengths of many of the industrial firms that have entered the educational business, while bona fide research has been notably absent in educational publishing. How important is it to the applicational of technology to vocational education? Our view is that pure research, which here would primarily be research in learning itself, need not be done by the business firms themselves, but that they must be prepared to do a great deal of developmental research towards the creation of specific products or systems-or to give it a less dignified designation, experimental product development. Given the objective of creating an innovative learning system, the early steps would include at least the following:

1. research in learning, on which new instructional strategies can be based;
2. experimental applications of this research in the form of methodologies, e.g., graded versus ungraded primary education, or other changes between the teacher and the learner;
3. experimental products to implement the experimental strategies, e.g., programmed books;
4. research to develop entirely new types of products, e.g., computers to apply programmed instruction;
5. subject-matter on skills analysis to determine the content of units of

instruction, or what to teach and in what sequence, to whom;

6. the production of models for field testing;
7. add evaluation under conditions that approximate the real world of education.

Of these seven steps, the first two and the fourth come closest to being true research. The first two are clearly the responsibility of educational researchers in universities and other nonprofit organizations associated with education; and while we wish more power to any business firm that undertakes them, this may not be the best allocation of resources for either education itself or the stockholders of the companies involved. The fourth step could well be the responsibility of university research groups, but in fact has largely been carried out by business firms. The most expensive research towards new types or educational products has been in the computer field, most of which has been done and paid for by the computer manufacturers, particularly IBM. (Consider, of course, who would have paid if computers for education had the same priority as jet engines for defense or air buses.)

None of the other steps can realistically be called research. Instead, they are either basic decision-making to determine the scope and sequence of instruction (which is largely but not entirely the responsibility of educators), or else experimental product development and testing (which is largely but not entirely the responsibility of business). Thus, it appears that the capacity to do pure research is not of critical importance to the companies pursuing educational technology, but that the willingness and ability to experiment and test is critically important. Some firms have this ability to a greater degree than others, and some clues as to their relative abilities can be seen in the degree to which they have been willing to create new product lines that have the potential to make their own proven and successful product lines obsolete.

The Education Industry's Capacity for Dissemination. The power of the education industry to disseminate new applications of R & D work in vocational education is very great, and in fact, remains the chief means by which new techniques for teaching and learning reach the teachers and students. Properly used, this dissemination or marketing capability can make an important contribution to education. The problem is to influence it without controlling it.

Schools, colleges, and other educational institutions are entirely free to buy whatever teaching and learning systems they consider best suited to their particular needs (subject only the limitations of local economics and occasional forms of local censorship). Any attempt by a national agency to influence or control these local buying decisions would clearly be a violation of our policy of state and local responsibility for public education. Therefore, it may be more effective to influence the sellers than the buyers, and we suggest that this can be done through the development of standards for both the development and representation of education products.

The need for selection criteria was not so great when the choice of teaching-learning materials was limited largely to textbooks. All teachers have used textbooks as students and taught from them as teachers and have a generally adequate frame of reference with which to make wise selections. However, newer and less conventional forms of teaching and learning materials and systems present teachers and schools with the problem of making choices without adequate frames of reference. Teachers who know what to look for in textbooks find it difficult to evaluate programmed materials, and even more difficult to decide whether or not equipment-based learning systems are appropriate to the needs of their students.[9] Thus, the development of the new instructional technology carries with it the growing need to help educators make wise purchasing decisions.

We feel that the best solution to this problem is for the producers of

vocational education materials and systems to develop standards for the evaluation of their products, and for education institutions to insist on being given the data derived from field testing. Ideally, each new instructional program should be designed around a carefully developed set of behavioral goals; that is, each program should be accompanied by goals that state what learning it plans to facilitate, for what kinds of students, and under what conditions. Then each program should be tested in actual classrooms during its formative stages in order to measure its effectiveness and to determine how it can be improved. Then the detailed statement of behavioral objectives and the field-testing data should be written up in a technical manual. The manual would help potential users determine how closely the objectives of the program match those of the school and students for which it is being considered, and the data would provide reasonable evidence as to its effectiveness under specified conditions. Technical information of this type is commonly provided by the publishers of standardized educational tests, and there is no reason why it cannot be supplied by producers of instructional systems. Some, in fact, are beginning to do so.

This approach to evaluation would help the producers to maintain quality control and the schools to make intelligent buying decisions. Further, because it would be a form of self-policing, it would leave both educational companies and schools with a maximum of independence. It would avoid the pitfalls of using some central agency to monitor either the production of instructional systems or the purchasing decisions made in education.

However, it is unlikely that this ideal state will be reached in the near future. The cost of evaluation is so high that education companies may be slow to undertake it on the scale suggested here, and the technical problems of

evaluation are probably beyond the present competence of all but the most sophisticated producers of instructional systems. Therefore, it would be highly beneficial if some combination of pressure and assistance could be applied to the problem; and we see this as another highly useful function of this workshop.

MANAGING CHANGE

What is the present state of the art of managing change? It might be helpful to first identify some of the change levers and change tactics which have been employed. Next we can turn to that model of the competent teacher in an effort to measure our present position against where we want to be. Finally we will suggest certain strategies for closing that gap between where we are and where we want to be. The latter will be a suggested plan for communicating with the disseminators and the implementers in the hope of gaining a favorable acceptance of change.

Where We Are Now

Perhaps our present position can best be described as aware. Educators are aware of problems. Efforts have been made to identify them-: functional illiteracy in too many of our young school dropouts, lack of job preparation, inadequate social skills, little emotional preparation for the transition between school and work, inadequate housing, poverty, and prejudice. Add to this an inadequate manpower delivery system, an outdated curriculum, antique teaching methods, and a shifting value system, and we have the perfect climate for change.

Not only have efforts been made to identify the problems, but also solutions to these problems have been proposed, some in the form of new education acts, some in the form of new educational designs.

The new education acts are now well known to each of you. You have heard about or assisted in the development of most of the new designs, too. Early efforts at a new design may have been more panaceas than honest-to-goodness solutions. A decade ago we were told that we could individualize instruction (and make it more relevant, too) if we employed a variety of

audio-visual aids -- filmstrips, motion pictures, and recordings. Later came the teaching machine and programmed instruction. Do you remember the claims? Programmed instruction was the solution for all, including students who had left school and wished to upgrade their skills. For a time, teaching machines were sold door to door, and large home-study schools embraced the concept. The various education acts and their money attracted the hardware merchants in the middle sixties and we saw an amazing variety of equipment suddenly appear in the schools -- projectors, labs, carrels, transparencies, controlled readers, even computer terminals for computer-assisted instruction. By itself this educational hardware is neither useful nor wasteful. With a plan such as the following model, such hardware could be implemented in a

SHOW VISUAL 4

true learning system. In such a system, the teacher becomes a true director of learning, free to diagnose, evaluate, make decisions, select alternatives, and interact with the learner on the highest level of intellectual, esthetic, and ethical objectives that are the essential ingredients of a humanistic curriculum. Without a plan, or without some detailed homework and planning before the equipment is purchased, the hardware is an isolated device. In such an environment, some teachers see the hardware as a threat to their job security; to some the machines conjure up images of cold and impersonal machines manipulating our children as they manipulate rats in a laboratory: to others the machines are a haunting reminder of Huxley, Orwell, and others who painted a frightening picture of humanity at the mercy of machines. Emotional reaction? Perhaps. But is it any wonder that you can find too much of this hardware collecting dust in a remote closet?

As we neared the close of the 1960s, we experimented with modular scheduling, individualized programmed instruction, smaller classes, larger classes, homogeneous grouping, educational parks, performance contracts, and educational vouchers, to name a few. Innovation is all around us. Or is it? Is this innovation really reaching and affecting the classroom teacher and encouraging a different student-teacher environment? Or is much of this an overemphasis on externals, without any real innovation getting through to change teaching attitudes and learning styles? It's perhaps too early to make this judgement. The fact is, efforts are being made, and this is good. My fear is we are making efforts (disseminating change) sometimes without benefit of a clear-cut design; and even if a design exists, without adequate research to even suggest the new design has a reasonable chance of success.

Where We Need To Be

If the classroom teacher is at the heart of any real change, and if we must reach that teacher before change can be implemented, just what does it take, or in more proper behavioral terms, what are the performance requirements to be a competent teacher in today's learning environment? In my own review of the literature, and research and observation, I would identify six essential competencies-some vary, very old-some relatively new. Time will not permit a full discussion of this competency model. This visual sums it up.

Show Visual 5

1. Competency in the Subject Matter
2. Competency in Classroom Administration
3. Competency in Program Management (Show Visuals 6 and 7)

4. Competency in Managing a Learning System

5. Competency in Making Instruction Relevant (Show Visuals 8 and 9)

6. Competency in Accountability (Show Visual 10)

How to Win Acceptance of Change

If it weren't for people, we could get so much done. Ah people! Without them, there would be no need to get anything done. Therefore, if you want to make change, you had better recognize human nature for what it is. People can be for you or against you as an agent for change. It all depends on your approach. People need to be influenced, even sold on the need for change, before they will want to accept it. How do you go about winning such acceptance? Here are 12 accepted methods for successfully effecting change.[5]

1. Establish a change shelter. Set up various controls and pledges to protect employees from economic loss from change, and consequently, from the decrease in status and personal dignity which sometimes results from economic loss.

2. Share the benefits of change. Permit teachers and administrators to share in benefits which result from change. This approach uses positive motivation to counteract negative resistance. For example, some performance contractors have used incentive pay, and other have used trading stamps as a method of sharing with the instructor a more productive teaching-learning environment.

3. Communicate. Once change is determined, it is essential to communicate the details and the reasons with everyone on the staff. People tend to fear that which they do not understand. The full story, both bad and good, about the change should help quiet their anxiety. Before change can be fully accepted, both logical and emotional reasons for the change must be understood

and accepted by those affected. Even though change will affect only one or two in a work group of ten persons, all of them need to know about the change in order to feel secure and maintain group cooperation. The sad thing is that communication is often weakest at the very time when the change agents are attempting to implement change.

4. Change sparingly. Sometimes the experts and technical specialists get carried away with the need to introduce change. Some of it may be vital; some of it may be trivial and unnecessary. Individuals can tolerate only so much change, and if they are bombarded with irritating small changes, they will be less apt to accept major changes.

5. Involve teachers in the planning stage. Such involvement accomplishes several things. It helps those involved to understand the need for a proposed change; it gives teachers confidence that the agents of change want to work with them; it may improve the design of the change plan, because it uses the ideas of those most acquainted with the operation of the classroom; it helps those affected to feel that they had a part in setting it up (change is easiest when the pressure for change comes from within the group); it sometimes stops poor change plans; it broadens the outlook of teachers who are a part of a larger administrative unit.

6. Keep the need for change impersonal. Stress the problem rather than the personal opinion. People tend to resist the change agent who says "I have always felt teachers should not be permitted to leave their classrooms during study periods, and tomorrow it will not be allowed".

7. Introduce the change as a trial. "Let's try this and see how it works" rather than "do this" involves teachers in proving the effectiveness of an idea. The change agent avoids giving the impression of arrogance or taking a cavalier approach.

8. Watch your timing. When a group is already upset and insecure, its resistance to change tends to be greater also. At these times even trivial changes may cause overt resistance.

9. Involve the union early. Most teacher's unions support the idea of technological change as a matter of policy. But that doesn't mean they will necessarily "buy" change unless they are involved and sold on it while options are still open. Where union-management relations are sound, the union sometimes assists in reducing resistance to change.

10. Sell parents. Change plans have failed because this step was overlooked. Use the media to communicate with parents. Give them all the details. Invite their reaction while the plan is still in the design phase and when there is time to make adjustments.

11. Sell the community. If the change takes money (or if the local newspaper is covering it) the voters will form an impression of the change. If the impression is positive, your chances of support are enhanced. If communication with the community-at-large is poor, don't be surprised if the referendum does down to defeat. Even if no additional money is at stake, trouble can still arise, simple due to a lack of information.

12. Sell the students. If student-teacher planning is sound, student involvement in the intended change is sound, too. After all, the change is intended to benefit them, either directly or indirectly.

Teachers tend to resist change because it upsets their patterns of adjustment and threatens their security. Their resistance is primarily due to the formal and informal social adjustments they must make, rather than to the technical aspects of the change. The agents of change will make greater headway if they attempt to restore and maintain the group equilibrium and personal adjustment which change upsets.

(End)

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VI

A STATE MODEL FOR PROFESSIONAL PERSONNEL DEVELOPMENT IN VOCATIONAL EDUCATION

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TABLE OF CONTENTS

Section		Page
I.	Rationale for a Model	1
II.	Goals of Model	5
III.	Variables of Model	9
	A. Program Variables	9
	B. Target Population Variables	9
	C. Quantities to be Served	11
	D. Activity Variables	11
	E. Resource Input Variables	11
	F. Agency/Institutional Input Variables	12
IV.	Design of Model	12
	A. Principles Relating to the Role of the State Department of Education in the Development of Professional Personnel for Vocational-Technical Education	13
	B. The Coordinator for the Development of Professional Personnel for Vocational-Technical Education	16
	1. Administrative Duties	17
	2. Supervisory Duties	19
	3. Reporting Duties	19
	4. Consultative Duties	20
	5. Coordination and Evaluation	21
	C. A Coordinating Council for Professional Personnel Development	21
	1. Purpose of Council	22
	2. Authority of Council	22
	3. Composition of Council	22
	4. Operation of Council	23
	D. A Master Plan for a Statewide Professional Personnel Development System for Vocational-Technical Education	23
	E. Implementation of the Model	24
V.	Summary	28
	Appendices:	
	Appendix A - Goals for Vocational-Technical Professional Personnel Development	31
	Appendix B - Common Components of Vocational-Technical Professional Personnel Development	32
	Appendix C - Vocational Education Projected New Teacher Needs, Ohio, 1971 - 1975	37
	Appendix D - Guidelines for Establishing Cooperative Relationships Between the State Department of Education and Vocational-Technical Professional Personnel Development Agencies and Institutions	38

Table of Contents (Cont'd)

Section | Page

Appendix E - Criteria for Appraising a State Program of Vocational-Technical Professional Personnel Development. 42

Appendix F - Appraising Institutional/ Agency Programs for the Development of Vocational-Technical Professional Personnel 43

Bibliography. 44

A STATE MODEL FOR PROFESSIONAL PERSONNEL DEVELOPMENT IN VOCATIONAL EDUCATION

I. Rationale for a Model

Since the passage of the Vocational Education Act of 1963 and the Vocational Education Amendments of 1968, vocational education has experienced phenomenal growth. The thrust of this legislation has provided new impetus which has caused vocational education to undergo a massive state of transition. New programs, improved facilities, more sophisticated equipment, expanded research efforts, and the initiation of exemplary programs have resulted from these legislative acts.

In addition to the impact that such legislation has made, as mentioned in the preceding paragraph, these same legislative acts

> ...have made it necessary to adopt a new concept in vocational teacher education. A more contemporary nomenclature should be applied to this overall area of professional development. A Smith-Hughes nomenclature can no longer apply to the diversified area of preparing professional personnel in occupational education. A contemporary nomenclature must be an umbrella term which covers the pre-service and in-service of all occupational personnel whether they be instructors, supervisors, administrators, or counselors.[1]

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[1] Professional Development in Teacher Education. An EPDA Assessment Project, Vocational Education California State Department of Education in cooperation with the U.S. Office of Education, Bureau of Educational Personnel Development, Sept., 1970.

The design and implementation of a professional personnel development system in Ohio is essential if program growth is to continue at the presently projected rate. Such a system must address itself to the following points:

A. A program that provides for the preparation of all occupational personnel including instructors, supervisors, administrators, counselors, teachers of the disadvantaged and handicapped, and teachers in the primary grades who have a responsibility in the development of career preparation and attitudes on the part of youths in these lower grades;

B. An in-service program which provides the latest and up-to-date knowledge and understanding of new methods and new factors affecting education. This is an extremely important point in view of the rapidly changing nature of the economy and manpower needs;

C. A program which establishes and maintains an effective and positive relationship with business and industry, local schools, and the designated state agency which is responsible for the maintenance of minimum standards in vocational training programs and vocational teacher education programs which receive federal funds.

The State Board shall provide for such training (both preservice and in-service) as is necessary to provide qualified personnel meeting the requirements of the State plan pursuant to 5102.38. Such training shall be sufficient to provide an adequate supply of qualified teachers and other

personnel, including those capable of meeting the special educational needs of the disadvantaged and handicapped persons in the State.[2]

D. A program which provides for graduate study and coordinated research projects which relate to local, state, and national vocational education problems and issues; and

E. A program which arises directly from the cultural needs of people in a demanding, rapidly changing technological society to which it is ultimately accountable.

If the above points are accepted as valid and worthy of consideration in the design and implementation of a contemporary vocational-technical professional personnel development system, the implications for professional personnel development training programs are numerous.

A coordinated statewide vocational-technical personnel development program is complete, relevant and aimed toward the needs of society. Programs fragmented among and within university and college teacher education agencies should not and cannot be permitted to exist and function unto themselves. They must recognize themselves as being a part of a bigger community with a definite and vital contribution to make.

A second implication is that existing vocational-technical personnel development institutions and agencies must perceive their roles much more comprehensively than ever before. That is to say, in many aspects,

[2]Federal Register, Volume 35, No. 91; Section 102.9(a) p. 7339.

vocational personnel development involves more than a somewhat narrow discipline orientation which may, in fact, be delimiting to a product prepared through such an approach, especially personnel preparing for advanced leadership positions (e.g., state and local administrators) who need an in-depth perspective of the total program.

This second implication lends itself to a third, that of the necessity of establishing and maintaining an integrated approach to vocational-technical personnel development within an institution. Not only would such an approach provide for a more comprehensive program on the part of teacher candidates, but such an approach would provide a means for organizing the "critical mass" of talent and resources needed to cope with current and emerging problems in the development of vocational-technical professional personnel. Such an approach would also minimize duplication of course offerings and related services.

A final implication, based upon a new conceptual approach to vocational-technical personnel development, suggests the need and role for advisory bodies for vocational-technical personnel development programs. Such an idea is not new to vocational-technical education generally, and, in fact, this same idea is advocated but seldom employed by vocational-technical personnel development programs and departments. Such advisory bodies should include representatives selected from alumni, local school administrators, business and industry, the general public and the cooperating state department agency. Such a body could serve as a sounding board for new and emerging concepts and programs, provide a communication channel for assessing the effectiveness of existing programs, and assist in identifying needed changes and/or adjustments in current practices.

In summary, vocational-technical professional personnel development programs are confronted with some pressing issues. There seems to be little question as to the importance of their role in the vocational-technical education process, their contributions are vital to the further expansion and growth of vocational-technical education. The issues of the day focus upon its structure and the execution of their duties and responsibilities.

A vocational-technical professional personnel development program, if it is to be successful, cannot function in isolation. It cannot take comfort in past accomplishments, although there are several notable ones. Contemporary vocational-technical personnel development must dedicate itself to a new, more comprehensive concept; a team approach that can and will adjust as program needs and emerging trends dictate. Such an approach requires some changes. It is to that end that a systems design for the development of vocational-technical professional personnel must be committed if optimal program efficiency and effectiveness are to be realized.

II. Goals of Model

If a state model for professional personnel development in vocational-technical education is to be comprehensive in nature, it seems only logical that the design and implementation of such a model be guided by a set of carefully developed and clearly stated goals for which the model is designed to meet.

An illustration of some suggested goals for a professional personnel development model, along with a cursory explanation of each is presented in the following points.

A. To anticipate and project the needs and/or demands for vocational-technical professional personnel

It is imperative that any professional personnel development model have as one of its primary components a means of determining short-range and long-range needs. Such a component is essential, not only because of its influence and effect upon the design of other model components, but because it also dictates future programming and budgetary needs and provides sufficient lead time to plan for such needs. This is in direct contrast with the more common and universal approach of designing programs for the development of professional personnel to meet an immediate and critical need, often without sufficient consideration given to programming considerations due to a lack of sufficient lead time.

B. To assure an adequate supply of competently trained professional personnel which is commensurate with either existing and/or projected needs

This goal is closely allied with the first goal in that the number of personnel being trained should closely correlate with the needs which have been identified. The design and implementation of a means for realizing the accomplishment of such a goal would imply the need for developing and maintaining a data bank which could relate the number of various professional personnel in training, the program area or function for which they are being trained, and the date when they will be available for employment. Such a data bank would also provide insight regarding the foci of personnel recruitment efforts.

C. To optimize the efficiency and effectiveness of a professional personnel development system

The realization of this goal would necessitate programming for the development of professional personnel in vocational-technical education that minimizes duplication of program offerings which may be common among two or more vocational program areas. Programming would also be effected that would capitalize upon the strengths of particular staff personnel who possessed in-depth understandings and talents, to extend across program areas within a given professional personnel development institution or agency.

Another dimension closely related to this goal would be a mechanism that would provide for the appraisal of professional personnel development programs.

D. To identify and coordinate in-service activities of professional state administrative and teacher education personnel

As vocational education continues to grow and expand, and as intrinsic and extrinsic factors affecting programming become more prevalent, the constant need for communicating with and updating university and state leadership personnel in vocational-technical education becomes increasingly more apparent. A comprehensive professional personnel development model must incorporate this particular facet as one of its goals.

E. To assure, to the extent possible, geographic availability of both pre-service and in-service professional personnel development activities

In an attempt to tailor programs to the unique and critical needs of a particular locale, and to entice and encourage the involvement and participation of pre-service and in-service vocational-technical professional personnel, efforts should be directed toward regionalizing program offerings to the extent possible. A professional personnel development model can perform a catalytic function in fulfilling this goal.

F. To provide for the coordination of EPDA sub-projects and activities

Professional personnel development activities funded, in part or entirely, through the Education Professions Development Act have impacted significantly upon the preparation and/or upgrading of professional personnel in vocational-technical education. One important goal of any statewide model for professional personnel development in vocational-technical education must assure that sub-projects submitted for approval in conjunction with the EPDA program are complementary and an integral part of the statewide professional personnel development effort.

G. To coordinate policies and standards for the certification of professional personnel among the various program areas, and with the Division of Teacher Education and Certification in the State Department of Education and cooperating professional personnel development institutions and agencies

A final goal of the model should be that of providing for consistency in the design and administration of policies and standards governing the certification of professional personnel.

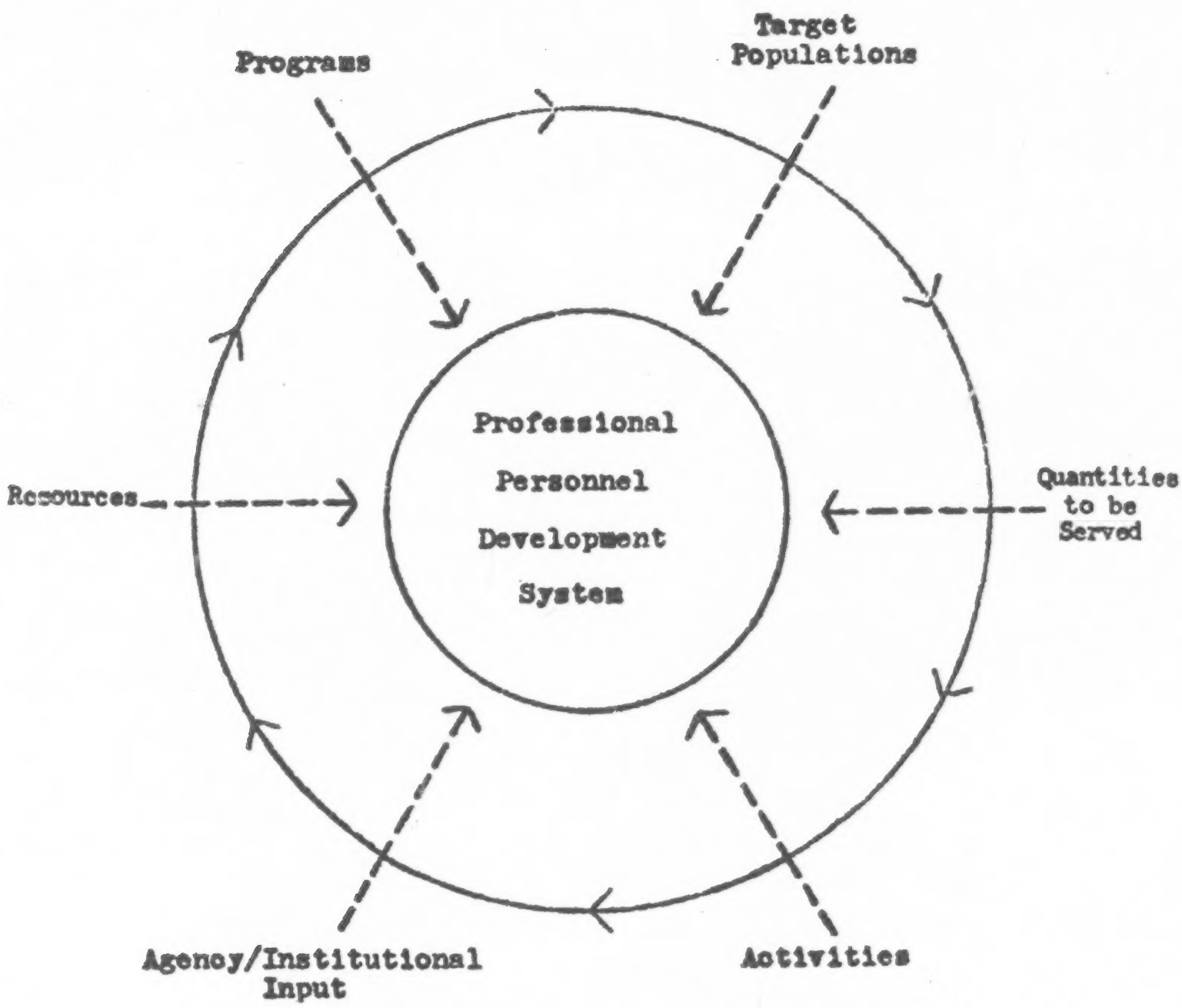
III. Variables of Model

Any statewide model for the development of professional personnel for vocational-technical education must assume a high degree of flexibility in view of the numerous variables which are involved. Although any discussion relative to such variables will be limited in this section, it is important that such variables are recognized and taken into consideration in the design of a professional personnel development system.

A. Program Variables - Vocational-technical education has long been known to provide preparatory and upgrading instruction across a wide spectrum of occupational areas. Although much time and effort has been directed toward identifying the common elements which are appropriate and applicable in the preparation of all vocational-technical professional personnel, the fact still remains that there exist some unique elements which are important in the preparation of selected professional personnel. A professional personnel development model must recognize such differences and provide for them.

B. Target Population Variables - Most programs which have addressed themselves to preparing vocational-technical professional personnel have focused primary attention upon the preparation of teachers without sufficient attention being directed toward providing programming specifically for supervisors, administrators, teacher educators and guidance personnel. If such programs were

VARIABLES OF A PROFESSIONAL
PERSONNEL DEVELOPMENT SYSTEM
FOR VOCATIONAL EDUCATION



in existence, they were generally lacking in sufficient depth to adequately prepare personnel for such leadership roles. A comprehensive professional personnel development model must provide for a stratification of populations to be served, and plan objectively for each population grouping.

C. Quantities to be Served - This particular variable merely reiterates one of the goals discussed in the preceding section. Any model for professional personnel development must possess the characteristic to adjust to ever-changing supply and demand factors. Such adjustment must be one of relative quickness in order to meet immediate and/or unanticipated emergencies or crises regarding the need for/of professional personnel.

D. Activity Variables - The nature of the professional personnel development activity relates specifically to whether such an activity is short-term, intermediate, or long-term. Such a variable(s) could also be illustrated as pre-service, in-service, or graduate programming. These variables reflect directly upon additional factors of consideration in their design and implementation, including the group to be served, the availability of input resources including staff, budget, facilities, and time of offering to mention a few. Any professional personnel development model must reflect sufficient flexibility and adaptability to adjust the activity variables as supporting factors change.

E. Resource Input Variables - Especially where a professional personnel development model for vocational-technical education

is highly dependent upon the financial appropriations of state and federal agencies, such a model must not be so rigid that it cannot adjust to and fluctuate regarding financial resources. Such a model must be so designed. Other resource input variables include staff personnel, facilities, equipment and time.

F. Agency/Institutional Input Variables - Conflicting differences in philosophies and objectives on the part of cooperating agencies and institutions involved in the application of a professional personnel development model is also an important variable in the design of such a model. Such differences are most often apparent between state department agencies whose major responsibility involves the administration of vocational-technical education programs in a state and colleges and universities who have been assigned the responsibility for the development and training of vocational-technical professional personnel. Any such model design must recognize such differences, if in fact they do exist, and employ the necessary techniques to resolve or compromise them.

IV. Design of Model

Throughout the preceding discussion, reference was continually made to a MODEL for the development of vocational-technical education professional personnel. The ensuing model has been developed in light of numerous points and factors of consideration drawn from that discussion.

A. Principles Relating to the Role of the State Department of Education in the Development of Professional Personnel for Vocational-Technical Education[3]

In the initial design of a model for the development of professional personnel for vocational-technical education, consideration was directed toward the role of the state department in the preparation of such professional personnel. The following principles were employed in defining that role:

1. Long-range planning under the leadership of the state department of education is necessary in the development of an effective statewide program of professional personnel development.
2. Planning in professional personnel development should involve continuous participation of all groups in the state concerned with the quality and size of the teaching force.
3. Exercise of the planning function should consider the relationships of professional personnel development with other aspects of public education.
4. Research is prerequisite to planning and is a necessary concomitant of significant leadership activity in professional personnel development.
5. Research carried out or sponsored by the state department of education should be appropriately directed to the solution of problems and the improvement of conditions affecting education in the state.

[3]Adapted from "Responsibilities of State Department of Education for Teacher Education" (Washington: Council of Chief State School Officers, 1954), pp. 1-19.

6. Research in accreditation and certification should be planned and carried out in a unified program.
7. Under the leadership of the state department of education other organizations in the state concerned with teacher education should be encouraged to share the state's total responsibility for research in professional personnel development, accreditation, and certification.
8. The consultative function involves the provision of (a) specific information, (b) technical assistance, (c) directional leadership, and (d) stimulation and encouragement.
9. The consultative function involves both the effective use of personnel of the state department of education and the procurement and coordinated use of other resources, both within and outside the state.
10. The exercise of the consultative function by the state department of education should involve cooperative participation of all groups in the state involved in or concerned with the education and certification of professional personnel.
11. The state department of education should serve as the coordinating agency for colleges and universities preparing professional personnel in the development, improvement, and evaluation of their programs of professional personnel development.
12. The state department of education should make information and guidance regarding professional personnel supply and demand available to institutions preparing such professional personnel.

13. The state department of education should assist in making professional personnel development institutions more keenly aware of the special needs of professional personnel in schools.
14. Services of resource persons should be made available in developing programs of professional personnel development.
15. The state department of education should assist in providing opportunities for both laymen and professional educators to participate in the design of the professional personnel development program.
16. The services of all the professional staff in the state department of education should be enlisted in the improvement and in the coordination of professional personnel development programs.
17. The state department of education should give leadership in the selective recruitment of professional personnel.
18. The state department of education should give leadership in coordinating the placement of professional personnel.
19. The state department of education should provide for the exchange of information, ideas, and attitudes among individual citizens, organizations, teachers, and administrators.
20. The state department of education should promote the public relations program in terms of confidence and mutual understanding.

21. The state department of education should endeavor to explain to the interested public, school boards, school administrators, and professional groups, significant factors in enlisting and retaining teachers in the profession.

22. The state department of education should encourage the legislature to establish and maintain colleges for the education of teachers wherever and whenever necessary to assure an adequate supply of well-qualified professional personnel for the schools of the state.

23. The state department of education should exercise leadership in providing opportunity for able students to find the necessary financial means to complete a teacher education program.

B. The Coordinator for the Development of Professional Personnel for Vocational-Technical Education

A key component of the model for professional personnel development in vocational-technical education is that of a coordinator or director of such a program. This individual would have the responsibility and authority to provide the necessary leadership in the design, implementation and administration of a statewide system for professional personnel development in vocational-technical education. The person fulfilling this function would be an employee of the state department of education and his specific duties and responsibilities would include the following:

	Percent of Time Allocated
1. Administrative Duties	50%

a. Give leadership and coordination to the organization, supervision and evaluation of teacher education and professional personnel development activities among all vocational program areas.

b. Serve as liaison between the Division of Vocational Education and cooperating vocational-technical professional personnel development institutions and agencies.

c. Administer the State education professions development program in accordance with provisions set forth in the Education Professions Development Act, including the following:

(1) serve as resource personnel for the Advisory Committee for the State Education professions development program

(2) serve as liaison between the Division of Vocational Education and the various institutions of higher education, local educational agencies, and other appropriate agencies

(3) serve as chairman of the cooperative arrangements application review committee

(4) identify crucial and urgent needs and establish priorities for meeting those needs in the recruitment and training of professional personnel

Percent
of Time
Allocated

(5) disseminate information regarding the State education professions development program

(6) provide assistance to any agency developing applications for cooperation arrangements regarding the State education professions development program

(7) administer the application procedures in the cooperative arrangements program

(8) assist in the recruitment of professional staff and program participants

(9) provide coordination of cooperative arrangement programs with other education professions development programs

(10) administer financial provisions and grant terms and conditions and insure the funds do not supplant State and local funds

(11) provide leadership in the development of State supervisory personnel for long-range planning relating to the State education professions development program

d. Provide leadership in the planning and conduct of a program of professional in-service education to promote and further staff development in professional personnel development programs in Ohio.

Percent of Time Allocated

e. Review and maintain relevant vocational-technical professional personnel standards in Ohio in accordance with State Board of Education teacher education and certification provisions.

f. Provide leadership in the coordination and operation of curriculum materials services in all Vocational Education program areas.

2. Supervisory Duties 20%

a. Supervise vocational-technical professional personnel development programs at the cooperating institutions of higher learning and other appropriate agencies not included within the supervision function of the individual occupational service units.

b. Provide supervisory services for programs arranged on a cooperative basis across occupational service lines.

c. Require and review such reports as necessary to determine compliance with appropriate State standards regarding vocational-technical programs and curricula, and as a means of assessing the status of such professional personnel development programs.

3. Reporting Duties 10%

a. Maintain all records concerning the professional preparation and in-service education of vocational education teachers, supervisory and administrative personnel in the State in accordance with State financial involvement.

Percent
of Time
Allocated

b. Maintain all appropriate records concerning the State professions development program which include such provisions as prescribed in the Education Professions Development Act.

c. Provide information to the fiscal officer in the Division of Vocational Education required for the issuance of vouchers for reimbursement to such institutions and agencies performing professional personnel development services in cooperation with the Division of Vocational Education.

d. Prepare such reports as are required by the Director of the Division of Vocational Education, State Superintendent of Public Instruction, and State Board of Education to evaluate the status and progress of the program and assess the effectiveness of the administration and supervision of said program.

e. Prepare the statistical and descriptive material as called for in the Annual Report required of the Division of Vocational Education by the U.S. Office of Education, Department of Health, Education and Welfare.

4. Consultative Duties 10%

a. Provide consultative services to cooperating institutions of higher learning and other appropriate agencies regarding vocational education professional personnel development programs and curricula.

Percent of Time Allocated

b. Provide consultative services at the State and National levels regarding cooperative arrangement related to the State education professions development program.

5. Coordination and Evaluation 10%

a. Coordinate the organization, supervision, and evaluation of curriculum development and professional personnel development activities among all vocational program areas.

b. Assist in developing evaluation standards and evaluation designs for cooperative arrangement programs.

C. A Coordinating Council for Professional Personnel Development

As a means of providing for input into the design, implementation, and administration of a system for professional personnel development, the establishment of an advisory body comprised of representation from professional personnel development institutions and agencies, as well as the employers of products from such institutions and state department of education officials seems desirable. Such a council would be consistent with several of the principles regarding the role of the state department of education in the development of vocational-technical professional personnel and would enhance the realization of a number of goals toward which a professional personnel development model should be directed. Specific points regarding the purpose, organization and authority of such a council are presented in the following paragraphs.

1. Purpose of Council

The primary purpose of this Council will be to coordinate and periodically appraise the vocational education professional preparatory and in-service personnel training program in terms of its effectiveness in meeting immediate and anticipated vocational education professional personnel needs.

The Council will also be responsible for:

identifying unique and emerging aspects of vocational education which have implications for teacher education;

evaluating fundamental vocational education teacher performance requirements and competencies;

identifying sources of potential teacher supply; and

assisting in formulating statewide goals leading to the development of a Master Plan for Preparing Professional Personnel in Vocational Education.

2. Authority of Council

The council will function in an advisory capacity to the Division of Vocational Education regarding the development, implementation, execution, and evaluation of a statewide coordinated professional personnel preparatory and in-service training program.

3. Composition of Council

The permanent council chairman will be the Assistant Director of Vocational Education in charge of Teacher Education and Curriculum Development.

The council body will be composed of the following representatives: One service area Assistant Director appointed

annually by the Director of Vocational Education; three multi-service teacher education representatives; one teacher educator from each of the five service areas of agriculture, business, distributive, home economics, and trade and industrial education, to be appointed and serve at the pleasure of the respective service area Assistant Directors; and two local vocational education directors and a public school superintendent appointed to staggered three-year terms by the State Director of Vocational Education.

The State Director of Vocational Education will serve as an ex-officio member of the council.

4. Operation of Council

The Council will meet semi-annually for the purpose of performing its duties and responsibilities, and at special sessions called by the chairman.

Meeting times, dates and locations will be announced at least one month prior to planned regular meetings and at least two weeks prior to special sessions called by the chairman.

D. A Master Plan for a Statewide Professional Personnel Development System for Vocational-Technical Education

Another major component of a professional personnel development system is a blueprint, or master plan, which provides direction and a basis for periodic appraisal of such a system.

Such a plan should be developed in conjunction with the coordinating council for professional personnel development and carry its endorsement.

Essential features of the plan should include the following:

- major goals of institutions and agencies preparing vocational-technical professional personnel;
- common components of a vocational-technical professional personnel development curriculum;
- projected vocational-technical professional personnel needs (annual and five-year projections by taxonomy);
- guidelines for cooperative arrangements between the state department of education and professional personnel development institutions and agencies;
- appraisal criteria for determining the efficiency and effectiveness of professional personnel development programs.

Examples of the above described features of a proposed master plan are included in the appendix. Also, the following pages illustrate a suggested sequence of events in the preparation of a master plan for professional personnel development.

E. Implementation of the Model

The implementation of a model for professional personnel development, as described herein, into a statewide system of vocational-technical education can be accomplished through a systematic sequence of events.

The initial step is that of the appointment of a coordinator for the development of professional personnel for vocational-technical

education. Such an appointment should enjoy administrative authority and responsibility and report directly to the state director for vocational-technical education.

The second step is the appointment and organization of the coordinating council for professional personnel development for vocational-technical education in compliance with procedures discussed in part C of this section. A council meeting should be called shortly after all appointments have been affected in order to acquaint it with its purpose and functions, and solicit its assistance in the further development and refinement of the model as it is being implemented.

Simultaneously, while the coordinating council is being organized, the coordinator for the development of professional vocational-technical personnel should personally tour each institution/agency campus which has responsibility for the preparation of vocational-technical professional personnel. The purpose of such a tour is to meet with professional staff and administration to better acquaint them with his role and relationship with their respective program(s). This particular step is extremely important in promoting understanding and dispelling any apparent apprehensions regarding an immediate and complete upheaval of existing programs. Such a tour also offers the coordinator insight into the condition of existing programs and an opportunity to become acquainted with any problems and concerns.

A Sequence Chart

DESIGN OF A MASTER PLAN FOR THE

PROFESSIONAL PERSONNEL DEVELOPMENT

IN VOCATIONAL-TECHNICAL EDUCATION

Prepare a rationale for a state program for preparing professional personnel in vocational education.

Appoint a statewide Coordinating Council to coordinate and periodically appraise the vocational education professional preparatory and in-service personnel training program, consisting of teacher educators, supervisory personnel, and local vocational education administrators.

Meet with Coordinating Council to:

Consider emerging and unique aspects of vocational education which have implications for teacher education
Assist in determining vocational education teacher performance requirements and competencies, and sources of teacher supply
Assist in formulating statewide goal for preparing vocational education professional personnel program objectives.

Determine statewide vocational education professional personnel needs by service area including administrative, supervisory, instructional, technical and instructional aides.

Identify teacher education problems and concerns on the part of each vocational service.

Formulate major Division of Vocational Education teacher education goals.

Identify state and institutional constraints and restraints regarding vocational teacher education, i.e. limited resources, certification standards, institutional philosophies and objectives, etc.

Prepare a master plan for teacher education with long-range projections for the development and financing of such a plan. Such a plan should include projected teacher education enrollments, programs and institutional responsibilities balanced by optimal utilization of available resources. The plan should also incorporate an organizational structure that provides for the appropriate core of common knowledges and skills in vocational education, as well as for development of the unique aspects of the area of specialization.

Review plan with supervisory staff, teacher educators and Coordinating Council and make any necessary adjustments and/or modifications.

Implement plan and periodically appraise its effectiveness in meeting the objectives and professional personnel needs on which it was based.

The next logical step is that of initiating a master plan for a statewide system for the development of vocational-technical professional personnel. Such a plan, once completed, can provide invaluable information and data for decision making regarding future professional personnel program development.

Upon completion and acceptance of the master plan by those agencies concerned with its operational aspects, it becomes the role of the coordinator for the development of professional personnel to administer such a plan in accordance with the guidelines and provisions which it sets forth.

The need for periodic review and updating of this plan by the Division of Vocational Education and the coordinating council is essential in an attempt to maintain its relevancy in addressing the problems at hand.

Funding for the entire model is sustained by the Division of Vocational Education. Such funding arrangements may include joint budget allocations for both the coordinator and each respective program area. This would provide a budget for planning and meeting critical needs common to all program areas through the coordinator's budget while individual program budget needs could be met through each respective program budget.

A second alternative would be that of the coordinator for the development of professional vocational-technical personnel to administer the total professional personnel budget through each program area.

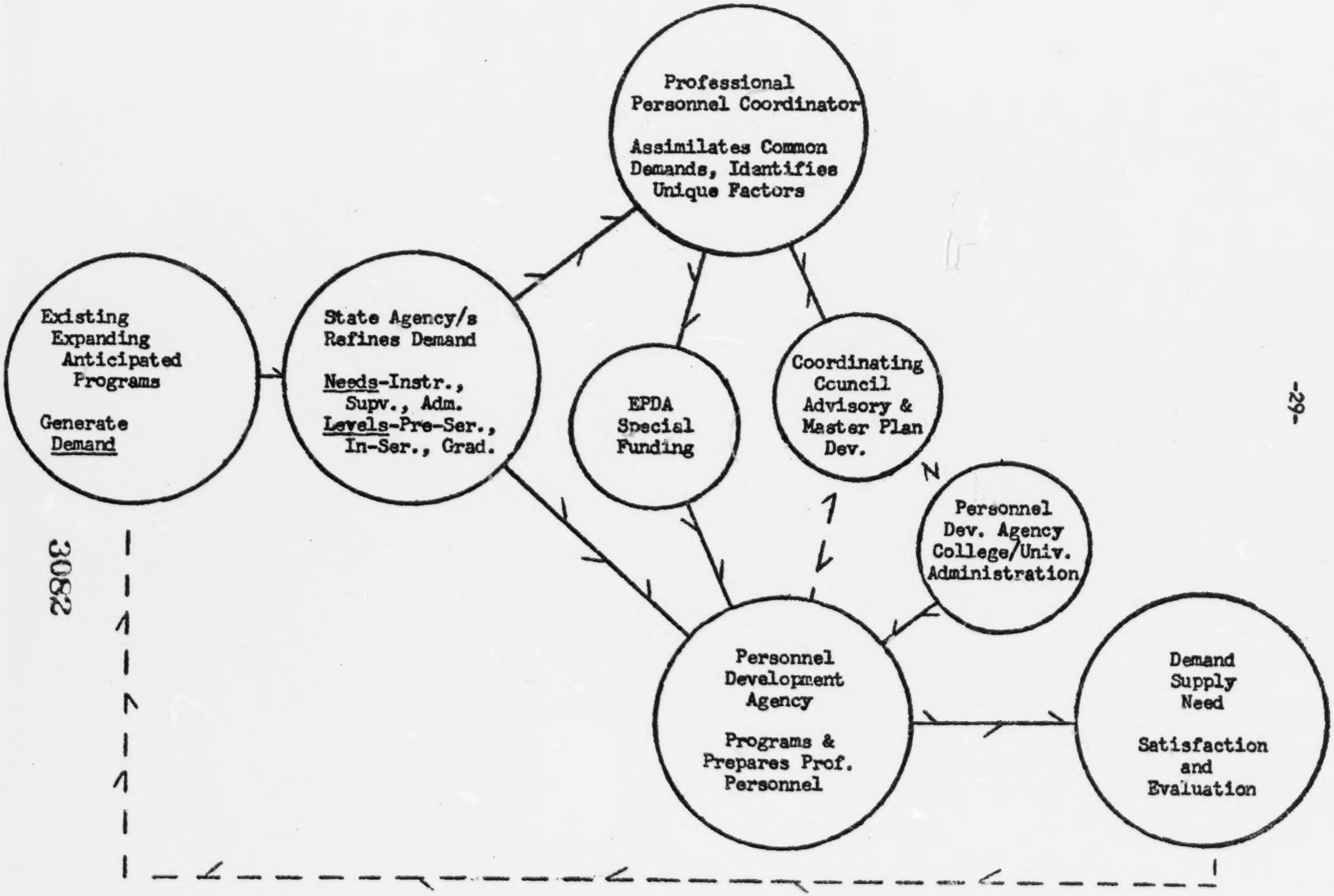
A diagram illustrating the essential components of the model and the flow of activities and events is presented on the following page.

V. Summary

The most obvious implications for improving vocational teacher education is the need for a "systemic" view. Central to this is the need for improving its capacity for systematic control, for identifying major problems, arriving at key systemwide decisions, and improving the quality of outputs. Perhaps most important is the need to improve the capacity to translate these key decisions into action programs. If all these are to be accomplished, there is a need for additional integration of the various externally oriented subsystems in vocational-technical teacher preparation into a total state system (while maintaining desired and essential linkages to the broader social, economic and political context).[4]

[4]Robert E. Taylor and Aaron J. Miller, The Context of Vocational and Technical Teacher Education, Columbus: The Ohio State University, August, 1970, p. 18.

A MODEL FOR THE DEVELOPMENT OF PROFESSIONAL
PERSONNEL FOR VOCATIONAL-TECHNICAL EDUCATION



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APPENDICES

Appendix A

GOALS FOR VOCATIONAL-TECHNICAL
PROFESSIONAL PERSONNEL DEVELOPMENT

The following goals are established to provide direction in conducting a relevant, effective and efficient vocational-technical personnel development program.

1. To provide a pre-service program which will provide proficiency in pedagogical, supervisory, and/or administrative techniques.
2. To provide a program which will be flexible to develop the occupational competencies of teachers according to their experiences and proficiencies in their respective occupational areas.
3. To provide an in-service program which is geographically readily accessible to all teachers and supportive vocational education professional personnel.
4. To provide a program which can train numbers of vocational-technical professional personnel commensurate with existing and projected needs in the respective program areas.
5. To provide a program which is flexible enough and broad enough in scope to meet the varying learning needs and styles of individual students.
6. To provide a program coordinated between occupational services and well balanced in vocational core areas and specific occupational courses so as to provide effective and efficient vocational education.
7. To provide a program which is highly responsive to meeting immediate occupational, pedagogical, supervisory, and administrative in-service needs of teachers and leadership personnel.
8. To provide an effective source of articulation of objectives and educational programs with secondary, technical, in-service, and graduate education.
9. To provide a program which will prepare instructors for the general service programs and/or specific instructional programs within a service.
10. To provide for educational preparation at the various educational levels; secondary, technical, baccalaureate, graduate and other special educational services.

Appendix B

COMMON COMPONENTS OF VOCATIONAL-TECHNICAL PROFESSIONAL PERSONNEL DEVELOPMENT

The typical vocational-technical professional personnel development program can be segmented into two basic components - those instructional units which are unique to occupational needs of the students in that service area, and those instructional units which are common to the needs of students in several or all of the other vocational service areas.

Examples of components common to vocational service areas are "Guidance" and "School and Community Relations." Each service area includes these in the curriculum. A large amount of the concepts and competencies acquired in one vocational service area may be quite appropriate in other of the vocational services.

This is not to deny the value of or need for maintaining the identity and basic functions of each of the vocational services as they are now known. In addition to meeting the occupational training needs which are unique to each service, the service area provides the student a source of identity and motivation which is quite valuable in his total educational program.

In looking towards a more effective total vocational-technical professional personnel development program, it is probably wise, not only to maintain the occupational identity, but strive to strengthen its present qualities. At the same time, where overlap and redundancy exists, it would be prudent to review the role of the common components and the necessity for them to exist as separate entities within the service area.

In reality, the coordination of common components can produce a potential conservation of resources which may become one of the most effective

means of strengthening the occupational portion of the program. Coordinating the common components may not directly make a more relevant instructional program, but it would be very logical to assume it may enhance the capability to provide more relevant instruction by more appropriate impact of resources. In addition, the following list is given as a summary of potential benefits which may accrue by appropriate coordinating common components of a vocational teacher education program.

1. Reduce redundancy of resources in common components and allow these resources to be used for a more comprehensive and in-depth offering of courses in occupational areas.
2. Build a curriculum which can more fully provide students with an understanding of the field of vocational education as a discipline.
3. Develop a better understanding among the staff of the other vocational service areas and a sharing of "in-house" ideas.
4. Provide more economical units of operation and more unified approach to planning, teaching and budgeting.
5. Define and articulate better as a vocational entity with state staff and other areas of education on campus.

Defining Common Components

A basis needs to be established to critique the present curriculum. One of the problems is the existence of a common taxonomy of curriculum component terms. The "Model Curricula for Vocational and Technical Education" is provided as an example. This can serve as a starting point to define components and provide uniformity between services and educational institutions.

CHECKLIST OF COMPETENCIES CONSIDERED ESSENTIAL TO THE VOCATIONAL-TECHNICAL PROFESSIONAL PERSONNEL DEVELOPMENT CURRICULUM

Competency Category

A. Program Planning, Development and Evaluation
   A-1 Conduct a community vocational education survey
   A-2 Maintain an advisory committee
   A-3 Plan a vocational program
   A-4 Evaluate a vocational program

B. Instruction - Planning
   B-1 Structure a course
   B-2 Design a course unit
   B-3 Plan a lesson
   B-4 Select instructional resources
   B-5 Develop instructional materials

C. Instruction - Execution
   C-1 Direct student activity
   C-2 Promote group interaction
   C-3 Apply basic instructional strategies
   C-4 Employ teacher-centered methods of presentation
   C-5 Engage educational media and resources

D. Instruction - Evaluation
   D-1 Evaluate performance of students
   D-2 Develop tests and rating sheets
   D-3 Administer and analyze tests
   D-4 Evaluate quality of instruction

E. Management
   E-1 Project instructional resource needs
   E-2 Prepare budgets
   E-3 Procure supplies and facilities
   E-4 Maintain records and filing system
   E-5 Provide for safety in laboratory
   E-6 Control student behavior
   E-7 Maintain the laboratory

F. Guidance
   F-1 Obtain background information on students
   F-2 Promote constructive interrelationships with students
   F-3 Counsel students
   F-4 Involve resource persons and agencies in assisting students
   F-5 Assist students in planning post-graduate education and employment

G. School-Community Relations
   G-1 Plan school-community relations activities
   G-2 Publicize the vocational program
   G-3 Maintain good community relationships
   G-4 Obtain school-community feedback on vocational program
   G-5 Maintain good intra-school relationships

H. Student Vocational Organization
   H-1 Establish a student vocational organization
   H-2 Advise a student vocational organization
   H-3 Participate in activities of the state and national student vocational organization

I. Professional Role and Development
   I-1 Uphold philosophy and goals of the profession
   I-2 Contribute professional service
   I-3 Advance one's professional competencies
   I-4 Assist with general school duties
   I-5 Supervise student teacher

J. Coordination
   J-1 Select student-learners
   J-2 Select training stations
   J-3 Develop training plan and agreement
   J-4 Comply with state and federal employment regulations
   J-5 Supervise student-learner's on-the-job experience
   J-6 Evaluate on-the-job performance of student-learners
   J-7 Improve related and on-the-job instruction[5]

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[5]Calvin J. Cotrell, et.al., Model Curricula for Vocational and Technical Teacher Education, Teaching Career Analysis, The Center for Vocational and Technical Education, Ohio State University, October, 1970.

Operational Procedure

1. From the Checklist of Competencies a tabulation can serve as a guide to identify those that are common to areas and those which are unique.
2. An objective analysis needs to be made by all service areas involved to determine the feasibility of combining resources.
3. An overall systems approach should be used to determine existing resources and allocating these resources to appropriate instructional areas.
   a. As an example: An instructor of one service area may have the expertise to teach the component of "advisory committees" as a core program. Other service areas may defer their counterpart of the program to this instructor.

Model of Operation

There is a lack of research evidence to define definite outcomes of coordinating the component parts of vocational-technical professional personnel development programs. Programs which have experience with coordinating common components suggest two basic considerations:

1. Individual service areas need to be involved in providing their service inputs which are valuable to the total program.
2. Total vocational education leadership needs to be provided by a coordinator to organize and coordinate the inputs of the service areas.

From these two premises the following model is suggested:

Coordinator of Professional Personnel Development - State Staff

Functions:

1. To define statewide educational needs, establish priorities and allocate the program with the teacher education program.
2. To promote and coordinate the activities of the colleges and universities throughout the state.

Appendix C

VOCATIONAL EDUCATION
PROJECTED NEW TEACHER NEEDS
OHIO*
1971 - 1975

PROGRAM AREA		1971	1972	1973	1974	1975
Agriculture		81	90	108	120	128
Business Office		330	554	608	698	597
Distributive Ed[1]		313	1067	1210	1491	1521
Home Economics[2]	a.	70	70	70	30	30
	b.	0	10	20	30	30
Trade & Industrial[3]			250	295	330	345
TOTAL		794	2041	2311	2699	2651

FACTORS USED IN MAKING PROJECTIONS:

A. Projected Student Enrollment and Additional Unit Growth

B. Teacher-Student Ratio Common To Each Respective Program Area

C. Turn Over Rate Common To Each Respective Program Area

D. Previously Trained Personnel Returning To Teaching Profession

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1 Includes OWA

2a Based upon projected enrollment in new and expanding vocational homemaking programs; specifically courses such as consumer education and family living which include boys and girls not now enrolled in any Home Economics Programs.

2b Job training Home Economics

3 Includes CWE

* Further refinement of this section of a Master Plan must include a projection of personnel needs by taxonomy and by functional responsibility.

Appendix D

GUIDELINES FOR ESTABLISHING COOPERATIVE RELATIONSHIPS BETWEEN THE STATE DEPARTMENT OF EDUCATION AND VOCATIONAL-TECHNICAL PROFESSIONAL PERSONNEL DEVELOPMENT AGENCIES AND INSTITUTIONS

In order to affect as positive a relationship as possible between the State Department of Education and cooperating vocational-technical professional personnel development agencies and institutions, it would appear that a commonly accepted set of guidelines is desirable and, in fact, essential in the establishment and maintenance of such a relationship.

Such guidelines are intended to identify parameters within which individual programs of vocational-technical professional personnel development function. They are designed for use on a total university and/or college level and should be compatible with more specific and unique cooperative and contractual provisions entered into by individual professional personnel development programs and departments and their respective service areas within the State Department of Education.

1. Approved vocational-technical professional personnel development programs shall comply with the provisions for personnel development as set forth in Section 1.35 of the existing Ohio State Plan for Vocational Education, Part I and/or comparable provisions as set forth in any such ensuing plan.
2. Colleges and universities conducting approved vocational-technical professional personnel development programs should designate individuals who can speak to and for such programs within each of their respective institutions on matters and concerns that are universal in nature. Such an individual should also have vested in him the authority to exercise administrative decisions in regard to those universal matters and concerns.

3. The initial and continuing approval of vocational-technical professional personnel development programs should be based upon a set of minimum program standards which take into account such factors as curricular content, professional staff qualifications and competencies, counseling services, facilities, supportive curricular content areas, instructional materials and learning center provisions, library facilities, laboratories, administration and geographic location. Such minimum standards would be consistent with those included in the State Master Plan for Vocational-Technical Professional Personnel Development.

   The standards will have been developed cooperatively by representative vocational-technical professional personnel development staff and State Division of Vocational Education personnel for the purpose of assuring a uniformly competent and qualified vocational-technical teacher candidate as well as provide a mechanism for controlled and balanced growth and expansion of such professional programs across the state.

4. All approved vocational-technical professional personnel development programs within a college or university should submit an annual plan of operation to the Division of Vocational Education which includes a statement of intent in the training of vocational-technical personnel as well as the procedures for developing, conducting, and evaluating proposed programs. Continuing approval of such vocational-technical personnel development programs would be dependent upon the annual updating of such a plan.

5. All colleges and universities conducting approved vocational-technical professional personnel development programs supported in part by State and/or Federal monies, should enter into contract with the State Department of Education regarding the conduct of such programs. Such

contracts should specifically state program provisions and services to be rendered for the specified dollar amount to be reimbursed. Such contracts should relate to baccalaureate and graduate programs only while separate contracts should be prepared for in-service training activities.

6. Statements of policy should be developed and agreed upon between the Division of Vocational Education and cooperating colleges and universities regarding specific staff duties, responsibilities, and employment provisions as they relate to vocational-technical personnel development program professional and supportive staff. A clearly defined, written understanding should be filed regarding such duties, responsibilities, and employment provisions with both the respective program service area within the State Division of Vocational Education and the cooperating professional personnel development agency.

7. Duties and responsibilities of itinerant teacher educators and other professional personnel development staff, working in close relationship with teachers, supervisors and administrators in the field should focus primarily upon the needs and improvement of such professional personnel. Decisions regarding program administration and supervision as they relate to the State Division of Vocational Education should be the sole responsibility of each respective program area supervisor, although teacher educators and others could and should be called in occasionally for their counsel on matters directly or indirectly affecting teacher performance.

8. Vocational-technical professional personnel development programs should submit to periodic self-directed and cooperatively conducted program appraisals involving the State Division of Vocational Education

in accordance with appraisal criteria defined and endorsed by the Coordinating Council for Professional Personnel Development as incorporated in the Master Plan. Such a review would address itself to strong points, areas needing strengthening and needed changes and/or adjustments in the respective professional program areas.

Appendix E

CRITERIA FOR APPRAISING A STATE PROGRAM OF VOCATIONAL-TECHNICAL PROFESSIONAL PERSONNEL DEVELOPMENT

Appraisal criteria must be applied to the total vocational-technical professional personnel development program within the state. Such criteria will not only assist in determining the present status of a statewide system for vocational-technical personnel development, but may also provide direction in either the establishment or refinement of such a system. Some suggested criteria include:

1. The state program of vocational-technical professional personnel development is based upon comprehensive planning.

2. The state program of vocational-technical professional personnel development is coordinated among occupational service areas.

3. The state program of vocational-technical professional personnel development is coordinated with the total state program of vocational education.

4. The state program of vocational-technical professional personnel development provides for supplying the demand for vocational teachers, local directors, local supervisors and guidance personnel.

5. The state program of vocational-technical professional personnel development makes provisions for prospective and in-service vocational teachers to acquire needed competencies in the occupation in which they will be or are teaching.

6. Vocational-technical professional personnel development programs are accessible to prospective and in-service vocational teachers, local directors, local supervisors, and guidance personnel.

7. The state program of vocational-technical professional personnel development makes provisions for conducting research and implementing research findings.

8. The state program of vocational-technical professional personnel development makes provisions for developing and disseminating instructional materials.

9. The state program of vocational-technical professional personnel development provides for systematic evaluation of vocational-technical professional personnel development programs.

Appendix F

APPRAISING INSTITUTIONAL/AGENCY PROGRAMS FOR THE DEVELOPMENT OF VOCATIONAL-TECHNICAL PROFESSIONAL PERSONNEL

A statewide system for the development of vocational-technical professional personnel is comprised of individual institutional/agency components. Such a statewide system can only be as strong and/or effective as each component which contributes to the ultimate realization of the system's goals. To assure the prevalence of quality institutional/agency programs of vocational-technical professional personnel development a concerted attempt must be made to appraise such programs in terms of their efficiency and effectiveness. Some suggested aspects comprising a comprehensive appraisal of a vocational-technical professional personnel development program are:

1. Philosophy and objectives
2. Recruitment and selection of students
3. Student counseling and guidance
4. Curriculum
5. Field or laboratory experiences
6. Student evaluation and placement
7. Follow-up of graduates
8. Non-credit in-service education
9. Graduate education
10. Instructional materials
11. Research and development
12. Staff selection and personnel administration
13. Organization and administration of the department.

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What Is the Personnel Development System for Vocational and Technical Education*

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There are many hazards in pursuing a theme such as the one we now have before us at this conference. While there are fragments in the literature which relate to the development of professional personnel in vocational education, there is none which would seem to provide a unitary overview. The terms themselves provide an opportunity for perceptual and philosophical differences. The word comprehensive suggests an almost unlimited boundary and may be cause for debate, for what one may consider to be a comprehensive program another may consider to be narrow and limited.

Personnel could include professionals, para-professionals, clerical and supporting, and student personnel. The word development suggests to me further growth beyond where one may be at the present time. Development leads toward a goal or goals but once reached does not necessarily mean closure, but indeed may lead to new goals after the achievement of those already specified.

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*A paper presented at the National Workshop on Comprehensive Vocational Education Personnel Development and Utilization, Sponsored by BAVTE, USOE, Statler-Hilton, Washington, D. C., June 15-17, 1971.

System is a word that now has multiple meanings. To the young radical it means that which now exists -- the establishment. To others it suggests something which is visible; has logical consistency; has defined goals and objectives; and works in a unitary and harmonious manner toward those goals and objectives. Further, a system suggests some structure or framework which helps to provide outcomes, many of which are predictable.

Common Expectations but Different Priorities

Agreement could be reached by those involved in and affected by a personnel development system in vocational and technical education as to common expectations, but the emphasis and priorities would be different, depending upon those viewing the system. My observations may be somewhat oversimplified, but from past experience I would conclude the following:

A. Student -- highest priority would be upon the daily satisfaction he or she receives from what is being learned coupled with the anticipated career satisfaction that is perceived.

B. Teacher -- highest priority often centers around student needs and technical competence.

C. Teacher educators -- highest priority often is on curriculum planning, development, and implementation.

D. State vocational supervisors and administrators in the past have placed the two highest priorities on technical competence and compliance with state plans and federal law and policy.

Such oversimplification could cause us to conclude that teacher educators are not concerned about technical competence and that state supervisors are not concerned about curriculum planning and development. Such a conclusion would be in error. In fact, within the last three or four years we have seen state department personnel assuming more responsibility for program planning and development. Certainly program planning and curriculum development in vocational and technical education are of little use unless the teacher can help teach basic and supplementary skills which are essential for the student to enter gainful employment in an occupation. However, more is needed than basic manipulative skills. For while this part of one's education is perhaps seemingly most relevant, it is also likely to be the first part of one's education to become obsolete.

I cannot help but observe that in some states there may be a conflict with state supervisors' expectations for priorities regarding technical competence of teachers and how state departments are organized and structured to enhance that competence. Perhaps I shall speak more to this point later.

The Status of Personnel Systems

The status of personnel development systems in vocational and technical education is characterized by fragmentation, discontinuity and in reality a frequent lack of comprehensiveness. Some contributing factors to the status of such programs are these:

1. Vocational and technical education is in transition. State departments have undergone considerable reorganization, federal legislation has expanded program opportunities, and funding has increased. USOE also has experienced a number of reorganizations and a number of commissioners of education. Urban problems and high unemployment have emerged and have become more pronounced.

2. Objectives of a comprehensive program for vocational and technical education at the various levels (elementary, secondary, post secondary, etc.) have not been clearly defined. Take a typical ~~university~~ department of vocational education at a university level as an example; its faculty can clearly describe its programs and role, but few departments can be identified that have determined the specific objectives of a comprehensive departmental program.

There are several vocational departments which claim to have comprehensive programs. I do not know about all of them, but I would suggest that most of the curriculum inputs are on a module or unit basis frequently in a service area linked with other modules of other service areas. I am suggesting that many comprehensive program courses are on multiple vocational service basis rather than a skill and principle basis which exploits the relationships with as many vocational services as are appropriate for that principle, skill, or ability. Effective articulation is often missing from current programs.

3. There is a lack of definition of needs at the post bachelor's level in vocational and technical education. I am suggesting that there is a striking similarity of undergraduate programs and curricula in vocational and technical education. However, very little state or national planning has been done to organize masters degree programs. Many of the present masters degree programs may suggest they are designed more for the convenience of the faculty and the university than a focus on priority needs of vocational personnel.

4. Too much (single) dependence has been placed upon undergraduate and graduate vocational education programs to serve as the personnel development system. Indeed these have a major role to play, but such a system must encompass more than the university.

5. Teacher education in vocational education has not operationalized an effective plan to involve business and industry in a personnel development system. State departments of education as well may not have found a way to involve business and industry.

6. There is an absence of joint planning by vocational teacher educators and vocational state department supervisors and directors. There is a high degree of interaction and cooperation between these groups, but USOE would be investing wisely to fund the development of two or three models for statewide planning of comprehensive programs which would include extensive involvement of these two groups as well as significant others who ought to be involved.

7. Personnel systems often are planned on a short-term and unrelated basis. Longitudinal planning with a sufficient time period for planning and development is needed. Timely, but often unrelated topics and programs are the rule more than the exception. (Short-term efforts generally yield short-term results.)

Dimension of a personnel development system for vocational and technical education should give consideration to the following:

A. Philosophy, purpose, and nature of vocational and technical education. Frequently something happens to vocational teachers over a span of time. In some cases the gap widens between what they say their philosophical beliefs, attitudes, and values are about vocational and technical education and their teaching behaviors. A personnel development system should consider the need for a periodic redefinition of the nature, purpose, and philosophy of vocational and technical education.

B. Leadership should be considered a component for personnel at all levels. We practice very little of what we know about the change process and the adoption of new educational practices. Most teachers today are being asked to adopt someone else's curriculum or teaching strategy. Ways must be provided for involving the vocational teacher in curriculum planning and development.

Many state department leaders have been able quickly to reorganize their administrative and supervisory staffs with far more ease than we have at the university level. Much of the reorganization we have been seeing

has been accomplished almost by the stroke of the pen and without any systematic personnel development system. The change of one's title often has little change in his or her skills and activities. We expect too much in such cases if we do not provide an opportunity for such individuals to prepare for these new roles.

Much has been written in administration about the resolution of conflict. Leadership in vocational and technical education today is faced with the politics of confrontation. It is imperative that vocational teachers, supervisors, and administrators have skill and experience in the resolution of conflict situations. However, what should emerge as a higher level skill in the dimension of leadership than conflict resolution is the ability to avoid needless conflict. As we accept more of the responsibility for personnel development systems in vocational and technical education for urban schools, we will experience more conflict. I am convinced that very few of us would survive in a high urban setting. Most of us who are 40 years or older at this conference were children of parents who placed a high value on hard work and pulling one's self up by one's own boot straps. While many of us grew up during the depression and may have had some firsthand experiences with poverty, it is very wrong to equate the poverty of the 30's with the poverty of the 70's.

Leadership today in vocational and technical education necessitates that one have considerable knowledge about a total program of education.

C. Technical Competence and Humanization. Educational leaders who are calling for education to be more humanizing are quickly criticized by those who feel that technical competence is valued less. One cannot and must not ignore competence in an age of technology and specialization. Surely the creativity and inventiveness which helped us to develop such a vast technology could be focused upon applying technology in a more humanizing way. Competence and technology are not to be feared for what they can do to man; for it is not what machines can do to man but rather what man does to man through the use or abuse of technology that becomes the issue. I do not know of anyone in vocational and technical education who would want to lead a campaign to stamp out competence! Certainly any personnel development system in vocational and technical education should include some focus on competencies needed, but these should go beyond physical and manipulative skills. I believe that for most in vocational, elementary, secondary, and post-secondary education programs competence is assumed. I believe what many are saying is even if a student is highly skilled and knowledgeable about a specialized field, we must expect more than this from the educational process and from those who are products of that educational process.

D. Values and Career Development. We have just touched on values. Rokeach* has indicated that when those values which are most

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*Milton Rokeach, Beliefs, Attitudes and Values (San Francisco: Jossey-Bass, Inc., 1970).

central change then a greater number of other values are likely to change. Vocational and technical education has not found effective ways to cope with the changed values and attitudes toward the world of work, especially the hard work ethic.

A university chancellor in our own university system recently stated that we are over educating our population. He felt that a high school education and in some cases limited post-secondary education were sufficient to effectively perform in many of the positions which now are demanding a college education. (Many may hold such positions not necessarily in support of vocational and technical education but in support of elitism in education.) We know too little about career value formation and how it can be modified. Counselor education was recently criticized for its failure to help individuals make career choices--at least it was given little credit by those counseled as to impact upon career choices.

Any personnel development system in vocational and technical education should focus upon career development theory and career orientation. Attitudes and values about the nature of the world of work and systems of analysis and classification should be considered. Some plan for the involvement of parents should be included in the educational process and especially in career choices. How many guidance programs do you know where there is a comprehensive strategy to involve parents in working with their children, the guidance counselor and the teacher in studying and identifying career choices? The more parents know

about career development and career opportunities available to their children, the more help they should be able to provide teachers and counselors in assisting students to make career choices.

It is paradoxical that there now is greater support and encouragement for vocational and technical education than in the last two decades. Yet, the attitude still prevails in many quarters that vocational and technical education is good for everyone else's children.

Individual values and prejudices. I have been so bold as to say that many of us would be ineffective educators in urban poor, or for that matter, rural poor environments. Schools and their teachers, including vocational teachers, have often expected too little from the poor.

> So pervasive is the measure of negative feeling toward low income families in our culture that it would be strange if such prejudice did not serve to lower the classroom expectations of many inner-city teachers. . . . For example, Becker found that the amount of work and effort teachers require varies inversely from the student's social class. (The least being expected from the poor.)*

Strom cites Rosenthal's experimentation with the self-fulfilling prophecy. He secured two groups of psychology students to teach laboratory rats to run a maze. One group was told the rats were "maze

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*Robert D. Strom, The Urban Teacher: Selection, Training and Supervision (Columbus: C. E. Merrill and Co., 1971), p. 2.

dull." The other group was told their rats were "maze bright." Throughout the testing period, the group who was told that their rats were "maze bright" got significantly better results than did the other group.

Personnel development systems in vocational and technical education must focus on individual, political, economic and social values. Many find it difficult to understand the hostility and militancy of the black. I found recently that well educated professional people who live in the same and neighboring subdivisions as I do were amazed that a black found it difficult or nearly impossible to buy a home in this same area. First, only a couple of realtors would willingly show homes to blacks; secondly, the black would likely have to settle for a higher discount rate for his loan and third, he would find it difficult to secure a loan. Finally, he might even find the house that had been advertised as sold or removed from the market.

Have you ever stopped to question how well vocational and technical education would fare with revenue sharing and decategorization of funds; or how well would it fare if all funds were dispersed under elementary and secondary education? Such changes certainly have political and educational implications and I am not sure that vocational educators are prepared to cope with them.

Cost analysis of vocational programs and systems for making comparisons within education is an economic factor which will get more and more attention. What are we getting for our money? How will the

personnel development system help to answer this and related questions?

E. Alternative Curricula and Programs. A personnel development system in vocational and technical education should have as one of its primary aims the development of an understanding of a comprehensive program and alternate curricula and programs. It should be stressed that all vocational personnel should have some idea as to where and how a vocational program fits into a total program of education.

Personnel development systems at the state level should seek to develop some definitions which everyone can understand and use. I find in our own state some disagreement between community colleges and technical institutes as to what constitutes technical education. Certainly the need for experience and expertise in planning should have been implied as we considered leadership earlier. Planning and finance are interwoven, and it is important that they be concomitant considerations.

F. System Should Seek Input From Those Being "Developed." Greater skill and expertise are needed in securing input from personnel as to what their technical and professional needs are. The old approach of making an educational diagnosis and presenting a prescription in the absence of the person for whom it is prescribed just won't work very well.

A personnel development system in vocational and technical education should afford an opportunity for vocational supervisors, administrators, and teacher educators to gain expertise in helping others in problem identification and the setting of priorities. There is considerable doubt

that in-service education efforts will be successful unless those "being developed" have some part in providing input and have some control over the direction they are going.

G. Institutional Relationships. A few years ago, it was not uncommon for state vocational supervisory and administrative personnel to lock themselves in their offices and, in a somewhat secretive approach, develop a state plan, secure its adoption, and then announce its contents somewhat on the same plane as mosaical law! Other agencies, i.e., teacher education, local schools, community colleges, etc., would have their plans somewhat circumscribed. Fortunately, there have been many positive changes made in recent years. While there are good working relationships between and among most vocational personnel in most states, there seem to be very few models for statewide planning in vocational and technical education. What is needed in the way of leadership by USOE is not a single plan, but some promising alternatives.

Related to statewide planning is program articulation. We are naive if we assume that all vocational and technical education is taking place in public schools and institutions of higher education. We have multiple systems which have developed and some which may develop in the future. A personnel development system must include some approaches which will help federal and state vocational and technical education leaders to coordinate and articulate all programs toward common goals and objectives.

Finally, and perhaps most important of all these considerations, we must ask ourselves why we need a personnel development system. Such a system must have a direct relationship with the students to be served and the programs they are pursuing. Unless the changes of behavior of professionals in vocational and technical education have direct or indirect influence in changing student behavior, the system should be challenged.

VT 014 218
ROSS, RALPH W.
A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA.

OKLAHOMA STATE DEPT. OF VOCATIONAL AND TECHNICAL EDUCATION, STILLWATER. DIV. OF RESEARCH, PLANNING, AND EVALUATION
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IDENTIFIERS - OKLAHOMA

ABSTRACT - THIS PROGRAM EVALUATION GUIDE WAS PREPARED IN ORDER TO IMPROVE THE ACCOUNTABILITY OF THE DEVELOPMENT OF VOCATIONAL EDUCATION PROGRAMS. USING A STATE-DIRECTED APPROACH TO EVALUATION, THE GUIDE DISCUSSES THE IMPORTANCE OF THE FOLLOWING CHARACTERISTICS: (1) PURPOSE, (2) INVOLVEMENT OF LOCAL ADMINISTRATORS, TEACHERS, STATE DEPARTMENT STAFF, TEACHER EDUCATORS, RESEARCH PERSONNEL, AND THE STATE ADVISORY COUNCIL, (3) OBJECTIVITY, (4) VALIDITY, AND (5) MOBILITY. SECTIONS OF THE COLOR-CODED GUIDE INCLUDE: (1) EVALUATION UNIT OBJECTIVES, (2) VOCATIONAL EVALUATING PROCESS FOR OKLAHOMA, (3) SYSTEM PROCESS CYCLE MODEL, (4) TEAM VISITS PER STAFF, (5) THE TEAM CHAIRMAN, (6) PROGRAM EVALUATION QUESTIONNAIRE, AND (7) MONTHLY EVALUATION SCHEDULE. (JS)

VT 014 218

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A Guide for State-Directed Evaluation of Secondary Vocational Education Programs in Oklahoma

DIVISION OF RESEARCH, PLANNING, AND EVALUATION
STATE DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION STILLWATER, OKLAHOMA

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A GUIDE FOR STATE-DIRECTED EVALUATION OF SECONDARY VOCATIONAL EDUCATION PROGRAMS IN OKLAHOMA

Ralph W. Ross

Division of Research, Planning, and Evaluation

Oklahoma State Department of Vocational and Technical Education

PREFACE

With increased emphasis on accountability from national, as well as state and local levels, the State Department of Vocational and Technical Education in Oklahoma has concentrated its efforts to improve and expand the accountability of its programs by utilizing the resources of the Division of Research, Planning, and Evaluation. Because of increased emphasis in this area, Dr. Bill Stevenson, Head of the Research Division, working closely with Dr. Francis Tuttle, State Director of Vocational and Technical Education, established the Evaluation Unit in August of 1970. At that time, the name of the division was changed to the Division of Research, Planning, and Evaluation.

The material contained in this guide is a state-directed approach to evaluation of secondary vocational and technical programs. Let it be said that it is only one of the several methods being tried by other states. A great deal has been written by people that are credited to be knowledgeable in evaluation per se. Arguments for local self-evaluation have considerable merit but when studied closely, also disclose weaknesses.

The state-directed approach in Oklahoma will combine the following characteristics: purpose (based on the stated objectives included in this guide); involvement (includes local administrators and teachers, state department-staff, teacher educators at Oklahoma State University and Central State University, research personnel, and State Advisory Council members); objectivity (separation of supervisory and evaluation activities); validity (validation of evaluation instruments through sound research); and mobility (a characteristic that must be considered if any system is to effect improvement in all vocational and technical programs within a reasonable period of time. In Oklahoma that period of time is five (5) years.) It is felt that the method we have chosen is best to accomplish this goal.

An additional effort will be made to provide evaluative services for those administrators of comprehensive or area vocational-technical schools who discern the need for an evaluation of their secondary vocational and technical programs during the current school year.

Ralph W. Ross, Coordinator
Evaluation Unit
Division of Research, Planning, and Evaluation
State Department of Vocational and Technical Education

TABLE OF CONTENTS

	Page
Evaluation Unit Objectives	1
Explanation of Program Areas	2
Vocational Evaluating Process for Oklahoma	4
I. Provisions in the State Plan	4
II. The Evaluation Process	4
A. Phase One - The Initiation Phase	4
B. Phase Two - Distribution Instruments	5
C. Phase Three - On-Site Evaluation	5
D. Phase Four - Synthesis	6
E. Phase Five - Refinement	6
System Process Cycle Model	7
Staff Code	8
Team Visits Per Staff	11
Who Will Serve on Evaluation Teams	14
The Team Chairman	14
Why Should Evaluation Be Given Special Attention	14
Total Number of Secondary Programs by Division and Number To Be Evaluated Per Year	15
By County Program Evaluation Schedule for School Year 1971-72	16
Summary Evaluation Questionnaire "Core Instrument"	17
Program Evaluation Questionnaire	28
Monthly Evaluation Schedule	Blue
School-Programs-Teams Schedule	Green

3117

EVALUATION UNIT OBJECTIVES

The Evaluation Unit is an integral part of the Division of Research, Planning, and Evaluation. It has been designated by the State Director of Vocational and Technical Education as the unit responsible for designing evaluation instruments and initiating and coordinating all evaluative activities for secondary vocational programs in Oklahoma. The Evaluation Unit's objectives are as follows:

1. To promote and assist with the improvement of occupational education programs at the local level.
2. To provide the State Department of Vocational and Technical Education the necessary data upon which planning of occupational education programs can be based.
3. To provide the State Advisory Council of Vocational and Technical Education data on evaluations of Vocational and Technical programs.
4. To assure accountability of Federal and State Funds allocated to local programs of occupational education.

EXPLANATION OF PROGRAM AREAS

Regular Vocational Programs

Ongoing vocational programs listed in the seven categories below that are not in the Special Program classification shall be evaluated once (1) every five (5) years. State staff shall assist the Evaluation Unit in the evaluation of these programs. The following divisions constitute the whole of regular ongoing programs:

1. Vocational Agriculture Education
2. Home Economics Education
3. Trade and Industrial Education
4. Technical Education
5. Business and Office Education
6. Distributive Education
7. Health Occupations Education

Exemplary Vocational Programs

Exemplary programs funded directly through the U.S. Office of Education must be evaluated by an outside agency (not connected with the organization responsible for supervision of the programs). The Evaluation Unit shall assist the State Supervisor of Exemplary Programs in contracting with an outside agency for evaluation of exemplary programs and in supportive activities. A preliminary report of the evaluation of exemplary programs must be in the U.S. Office of Education before the contract year has terminated.

Special Vocational Programs

Due to the funding procedure for special vocational education programs, evaluation shall be conducted yearly. The Evaluation Unit shall assist State Supervisors that are charged with the supervision of these programs until such time as the evaluation of Special Programs becomes the responsibility of the Evaluation Unit. This assistance would be in the form of developing evaluation instruments and serving on evaluation teams. The following are considered in the category of Special Vocational Programs and Special Services:

Special Vocational Programs

1. Cooperative Vocational Education (CVE)
2. Coordinated Vocational Education Training (CVET)
3. Exemplary Programs
4. Disadvantaged and Handicapped Programs

Recommendations:

It is the recommendation of the Division of Research, Planning, and Evaluation that the responsiblity for coordinating the evaluation of Special Programs be given to the Evaluation Unit for the school year 1971-72.

VOCATIONAL EVALUATING PROCESS FOR OKLAHOMA

I. EVALUATION OF SECONDARY VOCATIONAL PROGRAMS

WHAT PROVISIONS IN THE STATE PLAN ARE GIVEN FOR EVALUATING PROGRAMS?

A. Part I - Section 1.51 Program Evaluation, states in part: The State Board of Education, through the State Director of Vocational Education and the vocational education staff members, shall make an evaluation of each local vocational education program and/or its separate division at least once per year. This evaluation shall encompass the educational program, its staff members, the service provided by the program and staff, and the activities related to this program, such as advisory committee, administrative, and vocational youth organization.

B. 1.52 (a) The evaluation instrument shall contain parts so that the following items can be scrutinized:

1. Program Philosophy
2. Instructional Program
3. Program Coordination
4. Equipment
5. Facilities
6. Student Testing
7. Vocational Youth Organizations
8. Curriculum Planning
9. Teacher Preparation
10. Program Guidance and Counseling

II. THE EVALUATION PROCESS

A. Phase One - The Initiation Phase includes the designing of a system for A State-Directed Method for the Evaluation of Secondary Vocational Programs in Oklahoma. An analysis of the system includes the following.

1. Objectives of evaluation.
2. A model for the evaluation system.
3. Design of evaluation instruments.
4. Validation of evaluation instruments through research (pilot studies).

5. Selection and scheduling of personnel for evaluation teams.
6. Selection and scheduling of secondary vocational programs to be evaluated.
7. Orientation of State Staff and Teacher Education personnel on:
   a. Objectives of state-directed evaluation.
   b. Evaluation procedures.
   c. Schedule of team visits.
   d. Procedures for conducting a team visit.
   e. Duties of a team chairman.
   f. Duties of the team members.

B. Phase Two - Distribution of Program Evaluation and Summary Evaluation Instruments. Program Evaluation (objective data) and Summary Evaluation (subjective data) questionnaires are mailed to all secondary vocational and technical programs in September that have been scheduled for an evaluation for the current school year. The questionnaires (2) should be completed by the teacher and returned no later than October 1. Administrative assistance may be necessary to complete question number one on the Program Evaluation Instrument. Summary Evaluation questionnaires for team members are distributed to team chairmen shortly before the visitation date. Certain schools will be scheduled for North Central Evaluation in the coming school year. Efforts will be made to avoid the possibility of a Vocational-Technical Evaluation Team arriving in the school while North Central evaluations are being conducted.

C. Phase Three - Team Evaluations include a visitation with the local administration explaining the procedures for an evaluation, the purpose of the visit, and the objectives to be accomplished. This is to be followed by an on-site evaluation of the program. Each team member and the teacher will rate the program on various evaluative criteria contained in the team's questionnaire. Sufficient time should be allowed for a question and answer session between the teacher and team before team members complete the recommendations sections under each major heading of the questionnaire. Team members should complete the questionnaire immediately after leaving

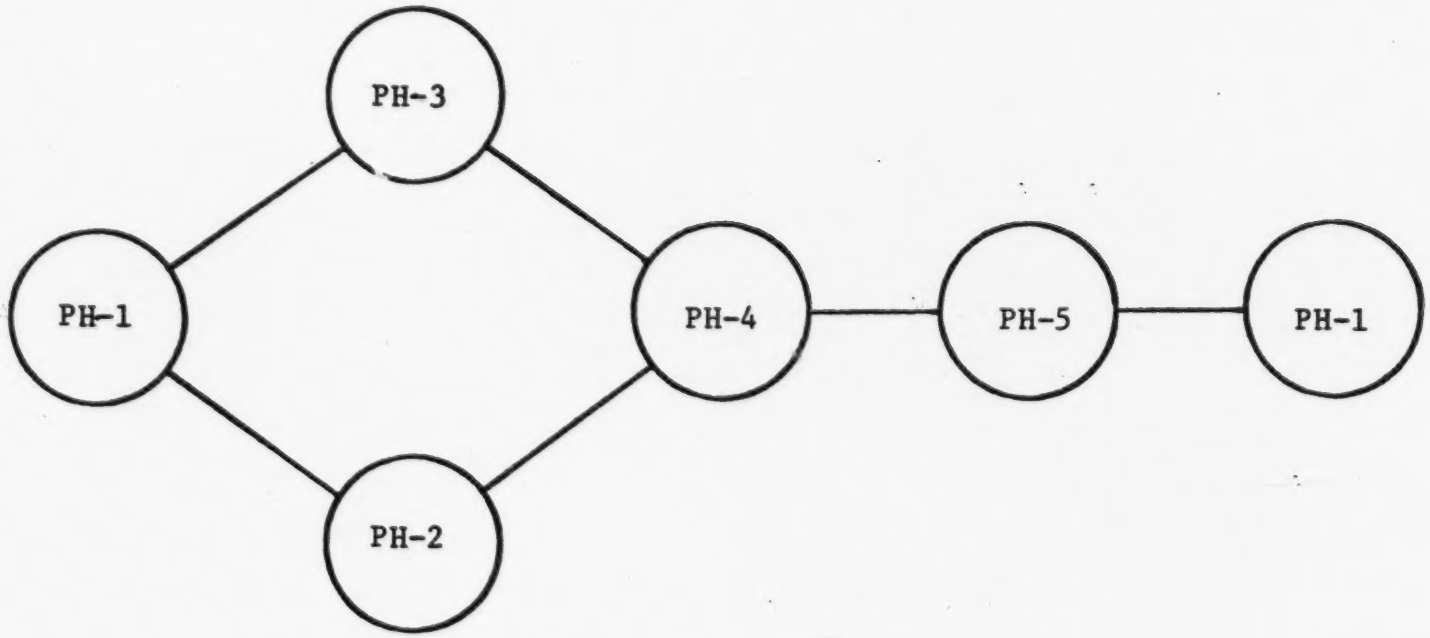
the program. Each team chairman is responsible for collecting the evaluation material of his team and submitting it to the Evaluation Unit.

D. Phase Four - Synthesis Phase. Data from the program evaluation instruments submitted by the teacher is assimilated by program area (drafting, home economics useful, etc.). A regional and state mean or norm on each evaluative criteria with the program area is established. A comparison is then made between local data to regional norms and local data to state norms on each criteria. This same procedure is used for student follow-up on the program. An average of the team and teacher ratings on each criteria in the Summary Evaluation questionnaire is established to complete a third input to the evaluation of each vocational or technical program. Periodically a correlation will be made between team and teacher responses on each item in the Summary Evaluation questionnaire for the particular program area by district, region, or state. The three inputs just described (1) objective data from the Program Evaluation Instrument to compare local conditions to regional and state norms, (2) the same methodology on student follow-up by program area, and (3) subjective data from the Summary Evaluation Instrument completed by the team and teacher will constitute the major thrust in evaluating local vocational and technical programs. After careful study and comparison of all criteria a final report is drafted by the Evaluation Unit. Copies of evaluation reports will be submitted to the State Director of Vocational and Technical Education, State Supervisors, team members, and the local school.

E. Phase Five - Refinement Phase. Any particular refinement of evaluation instruments or of the evaluation process is conducted at this point. The refinement phase will be effected at the end of each school year, and the system will revolve again to phase one during the summer months before the summer conference convenes.

SYSTEM PROCESS CYCLE

DIVISION OF RESEARCH, PLANNING, AND EVALUATION



Phase One - Initiation Phase
Phase Two - Distribution and Retrieval of PEI
Phase Three - Team Evaluations
Phase Four - Synthesize Data
Phase Five - Refinement of Instruments

3124

STAFF CODE

AGRICULTURE	A-1 -	Benton Thomason
	A-2 -	Joe Raunikar
	A-3 -	Cleo Collins
	A-4 -	John Jones
	A-5 -	Ralph Dreessen
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	A-7 -	Hallard Randell
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HOME ECONOMICS	HE-1 -	May Rollow
	HE-2 -	Martha Frizzell
	HE-3 -	Nedra Johnson
	HE-4 -	Helen Jensen
	HE-5 -	Wanda Wilson
	HE-6 -	Lenorah Polk
	HE-7 -	Joyce Thompson
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	TI-2 -	Charles Haraughty
	TI-3 -	Ray Meritt
	TI-4 -	Roy Ayres
	TI-5 -	Jack Berry
BUSINESS & OFFICE	B-1 -	Rex Moore
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TECHNICAL EDUCATION	T-1 -	John Talbott
	T-2 -	Barry Ballard
COOPERATIVE VOCATIONAL EDUCATION	CVE-1 -	Harry Robinson
COORD. VOC. EDUCATION TRAINING	CVET-1 -	Jack Herron
AREA VOC.-TECH. EDUCATION	AS-1 -	Dale Hughey
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	R-2 -	Charles Hopkins
	R-3 -	William D. Frazier
	R-4 -	Ralph Ross
	R-5 -	Les Miller
	R-6 -	Larry Catherwood
	R-7 -	John Chumbley
	R-8 -	Bob Hunter
	R-9 -	Gary Ward
	R-10 -	Susan Leverenz
	R-11 -	Nathan Young
	R-12 -	Gene Smith
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CURRICULUM & INSTRUCTIONAL MATERIALS CENTER	C-1 -	Ronald Meek
	C-2 -	Bob Patton
	C-3 -	Charles Henderson
	C-4 -	Irene Clements
	C-5 -	Dale Cotton

	C-6 -	Charles Brannon
	C-7 -	Amy Barnard
	C-8 -	Don Hiebert
	C-9 -	Virginia Lamb
	C-10 -	Linda Nielson
	C-11 -	Frances Braden
	C-12 -	Beverly Sloan
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	H-3 -	Pat Jamison
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	TE-2 -	Elaine Jorgenson
	TE-3 -	Lloyd Wiggins
	TE-4 -	Don Phillips
	TE-5 -	Lucille Patton
	TE-6 -	Leroy Overstreet
	TE-7 -	Bob Griffith
	TE-8 -	Pete Chapman
	TE-9 -	Clyde Knight
	TE-10 -	Jack Pritchard
	TE-11 -	Robert Terry
	TE-12 -	Jim Key
	TE-13 -	Doyle Butler

TEAM VISITS PER STAFF

1971-1972

STAFF CODE	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	TOTAL VISITS
A-1	0	0	1	1	1	0	0	1	4
A-2	1	0	0	0	0	0	0	0	1
A-3	0	1	1	1	0	1	0	0	4
A-4	0	0	1	1	0	0	0	0	2
A-5	0	0	0	0	1	0	0	0	1
A-6	0	0	0	0	0	0	1	0	1
A-7	0	0	0	0	0	0	0	0	0
A-8	0	0	0	0	0	0	0	0	0
A-9	0	0	0	0	0	0	0	0	0
HE-1	0	0	0	0	0	0	0	0	0
HE-2	0	0	1	1	1	0	0	1	4
HE-3	1	0	0	0	0	0	0	0	1
HE-4	0	0	1	1	1	0	0	0	3
HE-5	0	0	0	0	0	0	0	0	0
HE-6	0	0	0	0	0	0	0	0	0
HE-7	0	1	1	1	0	1	1	0	5
TI-1	1	0	0	1	1	0	0	1	4
TI-2	0	0	1	1	0	0	1	0	3
TI-3	0	1	1	0	1	1	0	0	4
TI-4	0	1	1	1	0	1	0	0	4
TI-5	0	0	0	0	0	0	0	0	0
B-1	1	2	1	1	1	2	1	1	10

STAFF CODE	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	TOTAL VISITS
B-2	0	0	0	0	0	0	0	0	0
DE-1	0	1	0	0	0	0	1	0	2
DE-2	0	0	0	1	1	0	0	0	2
T-1	0	1	0	0	0	0	0	0	1
T-2	0	0	0	0	0	0	0	0	0
CVE-1	1	0	1	0	0	0	1	0	3
CVET-1	1	1	0	0	0	0	0	0	2
AS-1	0	0	0	0	0	0	0	0	0
AS-2	0	1	0	0	0	0	0	0	1
R-1	0	0	0	0	0	0	0	0	0
R-2	0	0	0	0	0	0	0	0	0
R-3	0	0	0	0	0	0	0	0	0
R-4	0	0	0	0	0	0	0	0	0
R-5	0	0	0	0	0	0	0	0	0
R-6	0	0	0	1	1	0	0	0	2
R-7	0	0	0	0	0	0	0	0	0
R-8	0	0	0	0	0	0	0	0	0
R-9	0	0	0	0	0	0	0	0	0
R-10	0	0	0	0	0	0	0	0	0
R-11	0	0	0	0	0	0	0	0	0
R-12	0	1	0	0	0	0	0	0	1
AE-1	0	0	0	0	0	0	0	0	0
CD-1	0	0	0	0	0	0	0	0	0
C-1	0	0	0	0	0	0	0	0	0
C-2	0	0	0	0	0	0	0	0	0
C-3	0	0	0	0	0	0	0	0	0
C-4	0	0	0	0	0	0	0	0	0

STAFF CODE	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	TOTAL VISITS
C-5	0	0	0	0	0	0	0	0	0
C-6	0	0	0	0	0	0	0	0	0
C-7	0	0	0	0	0	0	0	0	0
C-8	0	0	0	0	0	0	0	0	0
C-9	0	0	0	0	0	0	0	0	0
C-10	0	0	0	0	0	0	0	0	0
C-11	0	0	0	0	0	0	0	0	0
C-12	0	0	0	0	0	0	0	0	0
C-13	0	0	0	0	0	0	0	0	0
H-1	0	1	0	0	0	1	0	0	2
H-2	0	0	0	0	0	0	0	0	0
H-3	0	0	0	0	0	0	0	0	0
H-4	0	0	0	0	0	0	0	0	0
TE-1	0	0	0	0	0	0	0	0	0
TE-2	0	0	0	0	0	0	0	0	0
TE-3	0	0	0	0	0	0	0	0	0
TE-4	0	0	0	0	0	0	0	0	0
TE-5	0	0	0	0	0	1	0	0	1
TE-6	0	0	0	0	0	0	0	0	0
TE-7	0	0	0	0	0	0	0	0	0
TE-8	0	0	0	0	0	0	0	0	0
TE-9	0	0	0	0	0	0	0	0	0
TE-10	0	0	0	0	0	0	0	0	0
TE-11	0	0	0	0	0	0	0	0	0
TE-12	0	0	0	0	0	0	0	0	0
TE-13	0	0	0	0	0	0	0	0	0

Who Will Serve On Evaluation Teams

State supervisors representing the various divisions of vocational and technical education, other state supportive staff, and teacher educators will constitute the membership of evaluation teams. Members from local advisory councils to serve on evaluation teams will be encouraged whenever possible.

The Team Chairman

The duties of the team chairman shall include directing the orientation with the local administrators and teachers; directing activities of the team during the evaluation; summarizing and submitting a preliminary report with the completed evaluation material to the Evaluation Unit.

(NOTE: Should there be more than one team visiting a school, both teams shall arrive at the same time and one chairman shall conduct the orientation process. Team chairmen shall submit a preliminary report on each vocational program visited.)

Why Should Evaluation Be Given Special Attention

To determine the efficiency and effectiveness of vocational programs in meeting the needs of all people and to what degree the program has been successful in meeting its stated objectives. A process-product evaluation will be used and objectives will be included when they are both operationally and behaviorally defined at the local level.

TOTAL NUMBER OF SECONDARY PROGRAMS BY DIVISION AND
NUMBER TO BE EVALUATED PER YEAR

Division	Total Programs	Number of Programs Evaluated Per Year 71-72	72-73	73-74	74-75	75-76
Agriculture	389	80	72	77	78	82
Home Economics	379	72	84	70	76	77
Trade and Industrial Education	413	79	74	81	87	92
Technical Education	16	2	6	0	2	6
Health Occupations	22	3	7	5	2	5
Distributive Education	55	7	12	14	9	13
Business and Office	92	16	21	15	18	22
Coop. Voc. Ed.	25	3	1	6	6	9
CVET	32	10	3	5	1	13
TOTALS	1423	272	280	273	279	319

BY COUNTY
PROGRAM EVALUATION SCHEDULE
FOR SCHOOL YEAR
71-72

Counties:

Adair (September)

Bryan (October)

Oklahoma City AVTS (October)

Beckham (November)

Coal (November)

Beaver (November)

Cimarron (November)

Texas (November)

Alfalfa (December)

Atoka (December)

Caddo (December)

Counties:

Woods (January)

Woodward (January)

Cleveland (January)

Choctaw (February)

Capitol Hill H.S. (February)

Carter (March)

Blaine (April)

SUMMARY EVALUATION QUESTIONNAIRE

for

(NAME OF PROGRAM AREA)

IN

OKLAHOMA HIGH SCHOOLS

Name of School .....

Name of Superintendent .....

Name of Teacher .....

School Year .....

Evaluation Team .....

Date ..... Year .....

State Department of Vocational and Technical Education

Division of Research, Planning, and Evaluation

1515 W. 6th Street

Stillwater, Oklahoma 74074

SUMMARY EVALUATION QUESTIONNAIRE
Section I

REACTION: Please circle the appropriate answer. (Yes or No)

I. PHILOSOPHY AND OBJECTIVES

1. Do you have written goal statements for your vocational or technical programs?	Yes	No
2. Do you have a list of written objectives for your vocational program?	Yes	No
3. Are objectives based on community and student needs?	Yes	No
4. Were students involved in writing the objectives of the program?	Yes	No
5. Are objectives based on student performance?	Yes	No
6. Have you reviewed or updated the objectives within the past twelve months?	Yes	No

RECOMMENDATIONS:

SUMMARY EVALUATION QUESTIONNAIRE
SECTION II

REACTION:

Check rating 5 if you consider the item excellent.
Check rating 4 if you consider the item above average.
Check rating 3 if you consider the item average.
Check rating 2 if you consider the item below average.
Check rating 1 if you consider the item poor.

II. ADMINISTRATION AND SUPERVISION

	1	2	3	4	5
1. Administrative personnel encourage and support in-service training for teachers					
2. Administrative personnel allow in-school release time for teachers to visit vocational programs in other schools					
3. Administrative personnel encourage teachers to replace worn or obsolete equipment on a percentage basis each year					
4. State supervisory and consultant personnel give assistance to local administrators and teachers in program projection, planning, and evaluation					
5. State supervisory and consultant personnel's assistance was satisfactory during the last school year					

RECOMMENDATIONS:

SUMMARY EVALUATION QUESTIONNAIRE
SECTION II

III. STAFF

	1	2	3	4	5
1. The vocational teacher(s) has professional preparation of the quality and nature to be an effective teacher in subject areas that he teaches					
2. The vocational teacher(s) has the necessary background of related work experience					
3. The vocational teacher participates in school activities					
4. The vocational teacher participates in community activities					
5. The vocational teacher has the personal qualifications to be an effective teacher					
6. The vocational teacher takes active measures to further his professional growth and development					

RECOMMENDATIONS:

IV. PROGRAM PLANNING AND EVALUATION

	1	2	3	4	5
1. The vocational teacher(s) prepares and carries out a plan of continuous evaluation for improvement and development					
2. There is a planned program which is followed for the periodic revision of courses of study in the light of changing community, socio-economic, mechanical, and technological changes					

RECOMMENDATIONS:

SUMMARY EVALUATION QUESTIONNAIRE
SECTION II

V. CURRICULUM

	1	2	3	4	5
1. The curriculum for your vocational program is based upon community needs and interests					
2. The vocational program has a dual purpose--general education for all high school youth and vocational career preparation					
3. Education in your vocational program provides students with a wider range of occupational goals					
4. The curriculum for your vocational program is concerned with the overall development of each pupil					
5. There is close coordination and cooperation between the vocational program and the related academic, guidance, and extracurricular areas of the school system					
6. The State course of study for your particular program area is followed					

RECOMMENDATIONS:

VI. INSTRUCTIONAL CONTENT

	1	2	3	4	5
1. There is a "common core" of learnings which is stressed for all vocational students and related materials given to individual students in their areas of interest in your program					
2. The core of learnings in the vocational program develops understandings and skills necessary for all students					

SUMMARY EVALUATION QUESTIONNAIRE
Section II

VI. INSTRUCTIONAL CONTENT (continued)

	1	2	3	4	5
3. The core of learnings in your vocational program provides students with marketable skills, knowledges, and understandings necessary for initial employment in the occupation or related occupation for which they are being trained					

RECOMMENDATIONS:

VII. INSTRUCTIONAL MATERIALS AND SUPPLIES

	1	2	3	4	5
1. The vocational teacher has access to and uses supplementary materials of instruction					
2. The vocational teacher selects effective materials and resources					
3. The vocational teacher is acquainted with the instructional materials before presenting them to the class					
4. The vocational teacher uses the instructional materials effectively					
5. Adequate and appropriate instructional supplies are provided for the vocational program					

RECOMMENDATIONS:

SUMMARY EVALUATION QUESTIONNAIRE
SECTION II

VIII. INSTRUCTIONAL METHODS, ACTIVITIES, AND PROCEDURES

	1	2	3	4	5
1. The vocational teachers' methods of teaching are adaptable to individual needs, interests, and rates of learning					
2. The Vocational Department considers evaluation to be an integral part of instruction					
3. All students are occupied at a definite assignment					
4. Only the minimum number of students are assigned to each task assignment					

RECOMMENDATIONS:

IX. LIBRARY MATERIALS AND FACILITIES

	1	2	3	4	5
1. Adequate library facilities are available for the vocational teacher's and students' needs					
2. Library and instructional materials are filed in such a manner that they are readily accessible to the students or instructor					

RECOMMENDATIONS:

X. COMMUNITY RESOURSES

	1	2	3	4	5
1. The vocational teacher becomes familiar with the community through surveys (questionnaires, telephone contacts, or personal interviews).					
2. The vocational teacher utilizes community resources					
3. The vocational teacher enriches the curriculum with related resources					

SUMMARY EVALUATION QUESTIONNAIRE
Section II

X. COMMUNITY RESOURCES (continued)

	1	2	3	4	5
4. Vocational classes visit local businesses and industries related to their occupation.					
5. A representative advisory committee assists in improving and expanding the vocational program					

RECOMMENDATIONS:

XI. HOME, BUSINESS, AND COMMUNITY RELATIONS

	1	2	3	4	5
1. Informative materials enlighten educators, parents, students, and the general public concerning the vocational program					
2. Informational materials are made available to the public in a variety of ways					

RECOMMENDATIONS:

XII. GUIDANCE

	1	2	3	4	5
1. Guidance is a part of the orientation of pupils entering the vocational program.					
2. The vocational teacher(s) engages in guidance activities					
3. Guidance is a part of the learning activities of pupils in the vocational classes					

RECOMMENDATIONS:

SUMMARY EVALUATION QUESTIONNAIRE
Section II

XIII. PLACEMENT (prior to program completion)

	1	2	3	4	5
1. There is an organized plan for placement of students					
2. The teacher assists students in finding job opportunities					
3. The teacher cooperates with existing employment agencies					
4. Implications of follow-up studies are used as a basis for curriculum change					

RECOMMENDATIONS:

XIV. PLACEMENT AND FOLLOW-UP (Post-program completion)

	1	2	3	4	5
1. There is an organized plan for placement of students					
2. The teacher assists students in finding job opportunities					
3. The teacher cooperates with existing employment agencies					
4. Information is maintained on the occupational status of former students					

RECOMMENDATIONS:

XV. FACILITIES AND EQUIPMENT

	1	2	3	4	5
1. Machines and equipment are arranged in such a manner as to emphasize safety, function, and class control					
2. The size and quality of the classroom and/or shop is adequate to have an effective program in light of its philosophy and objectives					

SUMMARY EVALUATION QUESTIONNAIRE
Section II

XV. FACILITIES AND EQUIPMENT (continued)

	1	2	3	4	5
3. The extent and quality of the equipment is adequate to have an effective program in keeping with the philosophy and objectives					
4. Materials and supplies are stored in a systematic way					
5. An ample amount of storage space is available for supplies, equipment, and projects of the program					
6. There is a definite policy and plan for acquiring and replacing equipment					
7. Sufficient funds are made available for immediate repairs to malfunctioning equipment					
8. To what extent is obsolete equipment replaced in the program					
9. To what extent is the equipment modern and representative of that being used in industries representative in your field					
10. All equipment is operative and in good working order					
11. The classroom and/or shop is orderly and attractive and provides an example of good housekeeping.					

RECOMMENDATIONS:

XVI. YOUTH ORGANIZATIONS

	1	2	3	4	5
1. The vocational teacher(s) sponsors a youth organization in which students plan the organization and activities					
2. A majority of the total class are members of the youth organization					
3. Club meetings are held regularly with students conducting the proceedings					

SUMMARY EVALUATION QUESTIONNAIRE
Section II

XVI. YOUTH ORGANIZATIONS (continued)

	1	2	3	4	5
4. Committees are formed and make contributions to the improvement of the youth organization, school, and community					
5. Opportunity for all members to serve on committees is provided					
6. To what extent did members participate in local, district, and state activities					
7. The club enriches the instructional program in the attainment of the primary program objectives					

RECOMMENDATIONS:

PROGRAM EVALUATION QUESTIONNAIRE

for

(NAME OF PROGRAM AREA)

in

OKLAHOMA HIGH SCHOOLS

Name of School . . . . . .

Name of Superintendent . . . . . .

Name of Teacher . . . . . .

School Year . . . . . .

Evaluation Team . . . . . .

Date . . . . . Year . .

State Department of Vocational and Technical Education

Division of Research, Planning, and Evaluation

1515 W. 6th Street

Stillwater, Oklahoma 74074

PROGRAM EVALUATION

Questionnaire

Rating Key:	Rate	Reaction
	a	Yes
	b	No
	c	Does not apply

INSTRUCTIONS

This instrument is to be completed by the vocational teacher as Phase II of an evaluation of his program. Read each question and circle the appropriate answer. Refer to the rating key noted above if the question has only three possible choices. If a question has more than the three choices indicated in the rating key, it should be self-explanatory.

1. What was the total amount of funds spent on your vocational or technical program during the last school year? (NOTE: Teacher's salary, equipment, instructional materials, supplies, travel expenses, EVERYTHING except construction or repairs to buildings.)

ANSWER:

01	$7000 - $7500	12	$12,501 - $13,000
02	$7501 - $8000	13	$13,001 - $13,500
03	$8001 - $8500	14	$13,501 - $14,000
04	$8501 - $9000	15	$14,001 - $14,500
05	$9001 - $9500	16	$14,501 - $15,000
06	$9501 - $10,000	17	$15,001 - $15,500
07	$10,001 - $10,500	18	$15,501 - $16,000
08	$10,501 - $11,000	19	$16,001 - $16,500
09	$11,001 - $11,500	20	$16,501 - $17,000
10	$11,501 - 12,000	21	$17,001 - up
11	$12,001 - 12,500		

2. Upon graduation, release from military service, or completion of post secondary education, what percent of the total students enrolled have as their objective entrance into full-time employment in the occupation for which they are being trained?

ANSWER:

01	10% - 20%	06	61% - 70%
02	21% - 30%	07	71% - 80%
03	31% - 40%	08	81% - 90%
04	41% - 50%	09	91% - 100%
05	51% - 60%	10	None

3. What percent of the upcoming graduates in your program will move or commute up to fifty miles, if employment is available?

ANSWER:

01	0% - 10%	06	51% - 60%
02	11% - 20%	07	61% - 70%
03	21% - 30%	08	71% - 80%
04	31% - 40%	09	81% - 90%
05	41% - 50%	10	91% - 100%

4. State vocational supervisory personnel visited your program how many times during the last full school year?

ANSWER:

01	Once	06	Six times
02	Twice	07	Seven times
03	Three times	08	Eight times
04	Four times	09	Nine times
05	Five times	10	Ten times

5. How many years have you taught a vocational or technical subject?

ANSWER:

01	Less than one year	09	Eight years
02	One year	10	Nine years
03	Two years	11	Ten years
04	Three years	12	Eleven years
05	Four years	13	Twelve years
06	Five years	14	Thirteen years
07	Six years	15	Fourteen years
08	Seven years	16	Fifteen or more years

6. How long have you taught in your present position?

ANSWER:

01	Less than one year	09	Eight years
02	One year	10	Nine years
03	Two years	11	Ten years
04	Three years	12	Eleven years
05	Four years	13	Twelve years
06	Five years	14	Thirteen years
07	Six years	15	Fourteen years
08	Seven years	16	Fifteen or more years

7. Have you had supervisory or management experience in your particular field?

ANSWER: a b c

8. Indicate the highest degree level you have attained at the present time.

ANSWER:

01	Non-degree
02	Associate Degree
03	Bachelors Degree
04	Masters Degree

9. How many years skill experience do you have in the area in which you teach?

ANSWER:

01	Two years	09	Ten years
02	Three years	10	Eleven years
03	Four years	11	Twelve years
04	Five years	12	Thirteen years
05	Six years	13	Fourteen years
06	Seven years	14	Fifteen or more years
07	Eight years	15	Does not apply
08	Nine years		

10. When was the last year you updated your skill experience by either full-time or part-time employment in the area which you teach?

ANSWER:

01	This year	04	Three years ago
02	One year ago	05	More than three years ago
03	Two years ago	06	Does not apply

11. How many times during the last full school year did you visit related business firms with your class?

ANSWER:

01	Once	09	Nine times
02	Twice	10	Ten times
03	Three times	11	Eleven times
04	Four times	12	Twelve times
05	Five times	13	Thirteen times
06	Six times	14	Fourteen times
07	Seven times	15	Fifteen or more times
08	Eight times	16	None

12. When was the last year you were enrolled in a professional class (college)?

ANSWER:

01	This year	04	Three years ago
02	One year ago	05	More than three years ago
03	Two years ago		

13. How many employers have requested information on students during the last full school year?

ANSWER:

01	One	09	Nine
02	Two	10	Ten
03	Three	11	Eleven
04	Four	12	Twelve
05	Five	13	Thirteen
06	Six	14	Fourteen
07	Seven	15	Fifteen or more
08	Eight	16	None

14. How many business firms or prospective employers related to your vocational or technical program do you know in your local community or surrounding area (farthest distance students will travel that would employ graduates of your program)?

ANSWER:

01	One	09	Nine
02	Two	10	Ten
03	Three	11	Eleven
04	Four	12	Twelve
05	Five	13	Thirteen
06	Six	14	Fourteen
07	Seven	15	Fifteen or more
08	Eight	16	None

15. Do you have one of the following programs?

ANSWER:

01 DECA - Distributive Education Clubs of America
02 FFA - Future Farmers of America
03 FBLA - Future Business Leaders of America
04 VICA - Vocational Industrial Clubs of America
05 FHA - Future Homemakers of America

16. Indicate the present value of all small or portable equipment in your shop or lab.

ANSWER:

01	$100 or less	12	$2101 - $2600
02	$101 - $300	13	$2601 - $3100
03	$301 - $500	14	$3101 - $3600
04	$501 - $700	15	$3601 - $4100
05	$701 - $900	16	$4101 - $4600
06	$901 - $1100	17	$4601 - $5100
07	$1101 - $1300	18	$5101 - $5600
08	$1301 - $1500	19	$5601 - $6100
09	$1501 - $1700	20	$6101 - $6600
10	$1701 - $1900	21	$6601 - $7100
11	$1901 - $2100	22	$7101 - up

17. Indicate the present value of equipment in your shop or lab. (NOTE: Value of all equipment other than that listed in item 16. Not chairs, desks, etc.)

ANSWER:

01	$1000 or less	14	$9001 - $10,000
02	$1001 - $1500	15	$10,001 - $11,000
03	$1501 - $2000	16	$11,001 - $12,000
04	$2001 - $2500	17	$12,001 - $13,000
05	$2501 - $3000	18	$13,001 - $14,000
06	$3001 - $3500	19	$14,001 - $16,000
07	$3501 - $4000	20	$16,001 - $18,000
08	$4001 - $4500	21	$18,001 - $20,000
09	$4501 - $5000	22	$20,001 - $22,000
10	$5001 - $6000	23	$22,001 - $24,000
11	$6001 - $7000	24	$24,001 - $26,000
12	$7001 - $8000	25	$26,001 - up
13	$8001 - $9000		

18. What has been the total amount of funds expended for the purchase of new equipment (small equipment, audiovisual equipment, etc.) in your vocational or technical program in the last school year?

ANSWER:

01	Less than $100	16	$2801 - $3000
02	$101 - $200	17	$3001 - $3200
03	$201 - $400	18	$3201 - $3400
04	$401 - $600	19	$3401 - $3600
05	$601 - $800	20	$3601 - $3800
06	$801 - $1000	21	$3801 - $4000
07	$1001 - $1200	22	$4001 - $4200
08	$1201 - $1400	23	$4201 - $4400
09	$1401 - $1600	24	$4401 - $4600
10	$1601 - $1800	25	$4601 - $4800
11	$1801 - $2000	26	$4801 - $5000
12	$2001 - $2200	27	$5001 - $5500
13	$2201 - $2400	28	$5501 - $6000
14	$2401 - $2600	29	$6001 - up
15	$2601 - $2800		

19. What percentage of the equipment is more than five years old?

ANSWER:

01	100%	06	50%
02	90%	07	40%
03	80%	08	30%
04	70%	09	20%
05	60%	10	10% or less

20. What percentage of your medium or large equipment needs to be replaced at the present time?

ANSWER:

01	10% or less	05	51% or more
02	11% - 20%	06	None
03	21% - 30%	07	Does not apply
04	31% - 50%		

21. Indicate the replacement cost of all equipment referred to as needing replacement in question 20.

ANSWER:

01	$100 or less	11	$1001 - $1100
02	$101 - $200	12	$1101 - $1200
03	$201 - $300	13	$1201 - $1300
04	$301 - $400	14	$1301 - $1400
05	$401 - $500	15	$1401 - $1500
06	$501 - $600	16	$1501 - $1600
07	$601 - $700	17	$1601 - $1700
08	$701 - $800	18	$1701 - $1800
09	$801 - $900	19	$1801 - $1900
10	$901 - $1000	20	$1901 - $2000
21	$2001 - $2100	31	$5001 - $5500
22	$2101 - $2200	32	$5501 - $6000
23	$2201 - $2300	33	$6001 - $6500
24	$2301 - $2400	34	$6501 - $7000
25	$2401 - $2500	35	$7001 - $7500
26	$2501 - $3000	36	$7501 - $8000
27	$3001 - $3500	37	$8001 - $8500
28	$3501 - $4000	38	$8501 - $9000
29	$4001 - $4500	39	$9001 - 9500
30	$4501 - $5000	40	$9501 - up

22. Indicate the cost of new equipment needed in your vocational or technical program. (NOTE: Do not include the cost for replacement of old equipment asked for in question 21.)

ANSWER:

01	$100 or less	11	$1001 - $1100
02	$101 - $200	12	$1101 - $1200
03	$201 - $300	13	$1201 - $1300
04	$301 - $400	14	$1301 - $1400
05	$401 - $500	15	$1401 - $1500
06	$501 - $600	16	$1501 - $1600
07	$601 - $700	17	$1601 - $1700
08	$701 - $800	18	$1701 - $1800
09	$801 - $900	19	$1801 - $1900
10	$901 - $1000	20	$1901 - $2000
21	$2001 - $2100	31	$5001 - $5500
22	$2101 - $2200	32	$5501 - $6000
23	$2201 - $2300	33	$6001 - $6500
24	$2301 - $2400	34	$6501 - $7000
25	$2401 - $2500	35	$7001 - $7500
26	$2501 - $3000	36	$7501 - $8000
27	$3001 - $3500	37	$8001 - $8500
28	$3501 - $4000	38	$8501 - $9000
29	$4001 - $4500	39	$9001 - $9500
30	$4501 - $5000	40	$9501 - up

23. What is the total square foctage of your shop, classroom, toolroom, etc.?

ANSWER:

01	1200 Sq. Ft. or less	14	3601 - 3800
02	1201 - 1400	15	3801 - 4000
03	1401 - 1600	16	4001 - 4200
04	1601 - 1800	17	4201 - 4400
05	1801 - 2000	18	4401 - 4600
06	2001 - 2200	19	4601 - 4800
07	2201 - 2400	20	4801 - 5000
08	2401 - 2600	21	5001 - 5300
09	2601 - 2800	22	5301 - 5600
10	2801 - 3000	23	5601 - 5900
11	3001 - 3200	24	5901 - 6200
12	3201 - 3400	25	6201 - 6500
13	3401 - 3600	26	6501 - up

24. Indicate the year in which your facility was constructed.

ANSWER:

01	1970 to present	15	1957 - 1958
02	1969 - 1970	16	1956 - 1957
03	1968 - 1969	17	1955 - 1956
04	1967 - 1968	18	1954 - 1955
05	1966 - 1967	19	1953 - 1954
06	1965 - 1966	20	1952 - 1953
07	1964 - 1965	21	1951 - 1952
08	1963 - 1964	22	1950 - 1951
09	1962 - 1963	23	1945 - 1949
10	1961 - 1962	24	1940 - 1944
11	1960 - 1961	25	1930 - 1939
12	1959 - 1960	26	1920 - 1929
13	1958 - 1959	27	Prior to 1920

25. What is the present condition of your facilities?

ANSWER:
01 Excellent
02 Good
03 Fair
04 Poor

26. What type of facility is your program located in?

ANSWER:
01 Concrete
02 Brick Veneer
03 Metal
04 Wooden
05 Other

SCHOOL-PROGRAMS-TEAMS SCHEDULE

County: Adair-01

Number of Schools in County - 4

Number of Secondary Vocational Programs in County

Agriculture	5	Distributive Ed.	
Home Economics	4	Business & Office	2
Trade & Industrial	2	Coop. Voc. Ed.	1
Technical		CVET	8
Health Occupations		Total	22

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-30	1971	Cave Springs (Stilwell)	Agriculture	A-2	(A-2, CVET-1, CVE-1)	Sept. 13-17
			CVET (3) - (H) - (Ag. & Home Ec.)	CVET-1	(A-2, CVET-1, CVE-1)	Sept. 13-17
I-25	1971	Stilwell	Agriculture (2)	A-2	(A-2, CVET-1, CVE-1)	Sept. 13-17
			Home Economics Jr.	HE-3	(HE-3, TI-1, B-1,)	Sept. 13-17
			Home Economics Sr. (2)	HE-3	(HE-3, TI-1, B-1,)	Sept. 13-17
			Carpentry	TI-2-1	(HE-3, TI-1, B-1,)	Sept. 13-17
			Business & Office	B-1	(HE-3, TI-1, B-1,)	Sept. 13-17
			CVET (2) - (M.H.) - (Ag. & Home Ec.)	CVET-1	(A-2, CVET-1, CVE-1)	Sept. 13-17
			Coop. Voc. Ed.	CVE-1	(HE-3, TI-1, B-1,)	Sept. 13-17
I-4	1971	Watts	Agriculture	A-2	(A-2, CVET-1, CVE-1)	Sept. 13-17
			CVET (2) - (C.H.) - (Ag. & Home Ec.)	CVET-1	(A-2, CVET-1, CVE-1)	Sept. 13-17
I-11	1971	Westville	Agriculture	A-2	(A-2, CVET-1, CVE-1)	Sept. 13-17
			Home Economics	HE-3	(HE-3, TI-1, B-1,)	Sept. 13-17
			Business & Office	B-1	(HE-3, TI-1, B-1,)	Sept. 13-17
			Carpentry	TI-2-1	(HE-3, TI-1, B-1,)	Sept. 13-17
			CVET - (M) - (T&I)	CVET-1	(A-2, CVET-1, CVE-1)	Sept. 13-17

County: Oklahoma-55

Number of Schools in County - 1

Number of Secondary Vocational Programs in County

Agriculture		Distributive Ed.	
Home Economics		Business & Office	1
Trade & Industrial	16	Coop. Voc. Ed.	
Technical	2	CVET	
Health Occupations	2	Total	21

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-89	1972	Oklahoma City Area Vocational-Technical School	Medical Off. Asst.	H-1	(B-1, T-1, H-1)	Oct. 11-15
			Dental Off. Asst.	H-1	(B-1, T-1, H-1)	Oct. 11-15
			Business & Office	B-1	(B-1, T-1, H-1)	Oct. 11-15
			Air Cond. & Ref.	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Aircraft Mechanics	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Auto Body	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Cold Type Comp.	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Commercial Art	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Diesel Mechanics	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Machine Shop (2)	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Printing (3)	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Sheet Metal	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Welding	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Auto Mechanics	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Chemical Tech (Tech)	T-1	(B-1, T-1, H-1)	Oct. 11-15
			Drafting & Design (T&I)	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Electronics (T&I)	TI-2-3	(TI-3, R-12, AS-2)	Oct. 11-15
			Computer Science (Tech)	T-1	(B-1, T-1, H-1)	Oct. 11-15

County: Bryan-07

Number of Schools in County - 9

Number of Secondary Vocational Programs in County

Agriculture	7	Distributive Ed.	1
Home Economics	9	Business & Office	1
Trade & Industrial	1	Coop. Voc. Ed.	
Technical		CVET	1
Health Occupations		Total	20

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-3	1971	Achille	Agriculture	A-3	(A-3, HE-7, CVET-1)	Oct. 25-29
			Home Economics	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29
I-40	1971	Bennington	Agriculture	A-3	(A-3, HE-7, CVET-1)	Oct. 25-29
			Home Economics	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29
I-6	1971	Blue	Home Economics	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29
I-23	1971	Bokchito	Agriculture	A-3	(A-3, HE-7, CVET-1)	Oct. 25-29
			Home Economics	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29
I-5	1971	Caddo	Agriculture	A-3	(A-3, HE-7, CVET-1)	Oct. 25-29
			Home Economcis	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29
			CVET (M.H.)-(Ag.)	CVET-1	(A-3, HE-7, CVET-1)	Oct. 25-29
I-48	1971	Calera	Agriculture	A-3	(A-3, HE-7, CVET-1)	Oct. 25-29
I-4	1971	Colbert	Agriculture	A-3	(A-3, HE-7, CVET-1)	Oct. 25-29
			Home Economics	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29

County: Bryan-07 (Cont.)

Number of Schools in County - 9

Number of Secondary Vocational Programs in County

Agriculture	7	Distributive Ed.	1
Home Economics	9	Business & Office	1
Trade & Industrial	1	Coop. Voc. Ed.	
Technical		CVET	1
Health Occupations		Total	20

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-72	1971	Durant	Business & Office	B-1	(B-1, TI-4, DE-1)	Oct. 25-29
			Home Economics Jr.	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29
			Home Economics Sr.	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29
			Distributive Ed.	DE-1	(B-1, TI-4, DE-1)	Oct. 25-29
			Auto Mechanics	TI-3-4	(B-1, TI-4, DE-1)	Oct. 25-29
I-1	1971	Silo (Durant)	Agriculture	A-3	(A-3, HE-7, CVET-1)	Oct. 25-29
			Home Economics	HE-7	(A-3, HE-7, CVET-1)	Oct. 25-29

County: Beckham-05

Number of Schools in County - 6

Number of Secondary Vocational Programs in County

Agriculture	7	Distributive Ed.	1
Home Economics	6	Business & Office	1
Trade & Industrial	3	Coop. Voc. Ed.	1
Technical		CVET	
Health Occupations		Total	19

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-50	1971	Carter	Agriculture	A-4	(A-4, HE-4, TI-3)	Nov. 1-5
			Home Economics	HE-4	(A-4, HE-4, TI-3)	Nov. 1-5
I-6	1971	Elk City	Agriculture (2)	A-4	(A-4, HE-4, TI-3, B-1)	Nov. 1-5
			Home Economics Jr.	HE-4	(A-4, HE-4, TI-3, B-1)	Nov. 1-5
			Home Economics Sr.	HE-4	(A-4, HE-4, TI-3, B-1)	Nov. 1-5
			ICT	TI-4-3	(A-4, HE-4, TI-3, B-1)	Nov. 1-5
			Auto Mechanics	TI-4-3	(A-4, HE-4, TI-3, B-1)	Nov. 1-5
			Bus. & Office	B-1	(A-4, HE-4, TI-3, B-1)	
I-2	1971	Merritt (Elk City)	Agriculture	A-4	(A-4, HE-4, TI-3)	Nov. 1-5
I-51	1971	Erick	Agriculture	A-4	(A-4, HE-4, TI-3)	Nov. 1-5
			Home Economics	HE-4	(A-4, HE-4, TI-3)	Nov. 1-5
I-31	1971	Sayre	Agriculture	A-4	(A-4, HE-4, TI-3, CVE-1)	Nov. 1-5
			Home Economics	HE-4	(A-4, HE-4, TI-3, CVE-1)	Nov. 1-5
			Distributive Ed.	DE-2	(A-4, HE-4, TI-3, CVE-1)	Nov. 1-5
			Carpentry	TI-4-3	(A-4, HE-4, TI-3, CVE-1)	Nov. 1-5
			Coop. Voc. Ed.	CVE-1	(A-4, HE-4, TI-3, CVE-1)	Nov. 1-5
I-15	1971	Sweetwater	Agriculture	A-4	(A-4, HE-4, TI-3)	Nov. 1-5
			Home Economics	HE-4	(A-4, HE-4, TI-3)	Nov. 1-5

County: Coal-15

Number of Schools in County - 1

Number of Secondary Vocational Programs in County

Agriculture	1	Distributive Ed.	
Home Economics	1	Business & Office	
Trade & Industrial	1	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	3

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-1	1971	Coalgate	Agriculture	A-3	(A-3, HE-7, TI-4)	Nov. 8-12
			Home Economics	HE-7	(A-3, HE-7, TI-4)	Nov. 8-12
			Carpentry	TI-3-4	(A-3, HE-7, TI-4)	Nov. 8-12

County: Beaver-04

Number of Schools in County - 2

Number of Secondary Vocational Programs in County

Agriculture	2	Distributive Ed.	
Home Economics	1	Business & Office	
Trade & Industrial		Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	3

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-75	1971	Balko	Agriculture	A-1	(A-1, HE-2, TI-2)	Nov. 17-19
I-22	1971	Beaver	Agriculture	A-1	(A-1, HE-2, TI-2)	Nov. 17-19
			Home Economics	HE-2	(A-1, HE-2, TI-2)	Nov. 17-19

County: Cimarron-13

Number of Schools in County - 1

Number of Secondary Vocational Programs in County

Agriculture	1	Distributive Ed.	
Home Economics	1	Business & Office	
Trade & Industrial	1	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	3

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-2	1971	Boise City	Agriculture	A-1	(A-1, HE-2, TI-2)	Nov. 17-19
			Home Economics	HE-2	(A-1, HE-2, TI-2)	Nov. 17-19
			Auto Mechanics	TI-1-2	(A-1, HE-2, TI-2)	Nov. 17-19

County: Texas-70

Number of Schools in County - 4

Number of Secondary Vocational Programs in County

Agriculture	4	Distributive Ed.	
Home Economics	1	Business & Office	
Trade & Industrial	2	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	7

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-8	1971	Guymon	Agriculture	A-1	(A-1, HE-2, TI-2)	Nov. 17-19
			Home Economics	HE-2	(A-1, HE-2, TI-2)	Nov. 17-19
			Carpentry	TI-1-2	(A-1, HE-2, TI-2)	Nov. 17-19
			ICT	TI-1-2	(A-1, HE-2, TI-2)	Nov. 17-19
I-15	1971	Hardesty	Agriculture	A-1	(A-1, HE-2, TI-2)	Nov. 17-19
I-23	1971	Hooker	Agriculture	A-1	(A-1, HE-2, TI-2)	Nov. 17-19
I-61	1971	Texhoma	Agriculture	A-1	(A-1, HE-2, TI-2)	Nov. 17-19

County: Alfalfa-02

Number of Schools in County - 6

Number of Secondary Vocational Programs in County

Agriculture	7	Distributive Ed.	
Home Economics		Business & Office	
Trade & Industrial	1	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	8

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-1	1971	Burlington	Agriculture	A-1	(A-1, TI-2, R-6)	Dec. 6-10
I-77	1971	Carmen-Dacoma (Carmen)	Agriculture	A-1	(A-1, TI-2, R-6)	Dec. 6-10
I-46	1971	Cherokee	Agriculture	A-1	(A-1, TI-2, R-6)	Dec. 6-10
I-89	1971	Helena-Goltry (Helena)	Agriculture (2)	A-1	(A-1, TI-2, R-6)	Dec. 6-10
I-89	1971	Helena Training School	ICT	TI-1-2	(A-1, TI-2, R-6)	Dec. 6-10
I-4	1971	Jet-Nash (Jet)	Agriculture (2)	A-1	(A-1, TI-2, R-6)	Dec. 6-10

County: Atoka-03

Number of Schools in County - 3

Number of Secondary Vocational Programs in County

Agriculture	4	Distributive Ed.	
Home Economics	3	Business & Office	
Trade & Industrial	1	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	8

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-15	1971	Atoka	Agriculture (2)	A-3	(A-3, HE-7, TI-4)	Dec. 13-15
			Home Economics Jr.	HE-7	(A-3, HE-7, TI-4)	Dec. 13-15
			Home Economics Sr.	HE-7	(A-3, HE-7, TI-4)	Dec. 13-15
			Auto Mechanics	TI-3-4	(A-3, HE-7, TI-4)	Dec. 13-15
I-26	1971	Caney	Agriculture	A-3	(A-3, HE-7, TI-)	Dec. 13-15
			Home Economics	HE-7	(A-3, HE-7, TI-4)	Dec. 13-15
I-7	1971	Stringtown	Agriculture	A-3	(A-3, HE-7, TI-4)	Dec. 13-15

County: Caddo-08

Number of Schools in County - 14

Number of Secondary Vocational Programs in County

Agriculture	14	Distributive Ed.	1
Home Economics	12	Business & Office	2
Trade & Industrial	14	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	43

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-13	1971	Anadarko	Agriculture (2)	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics Jr.	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics Sr.	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Distributive Ed.	DE-2	(A-4, HE-4, DE-2)	Dec. 9-17
I-6	1971	Apache	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17
I-15	1971	Binger	Agriculture	A-5	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17
I-68	1971	Broxton (Apache)	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
I-33	1971	Carnegie	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17
I-160	1971	Cement	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17

County: Caddo-08 (Cont.)

Number of Schools in County - 14

Number of Secondary Vocational Programs in County

Agriculture	14	Distributive Ed.	1
Home Economics	12	Business & Office	2
Trade & Industrial	14	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	43

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-64	1971	Cyril	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17
I-132	1971	Eakly	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4	(A-4, HE 4, DE-2)	Dec. 9-17
I-7	1971	Fort Cobb	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17
	1971	Fort Cobb Area School (Caddo-Kiowa Area Vocational-Technical School)	Bus. & Office (2)	B-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Auto Body	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Auto Mechanics	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Carpentry	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Cosmetology	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Diesel Mechanics	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Electronics	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Machine Shop	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Printing	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Welding	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Air Cond.& Refrig.	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
I-161	1971	Hinton	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Auto Mechanics	TI-4-1	(TI-1 B-1, HE-2)	Dec. 13-17

County: Caddo-08 (Cont.)

Number of Schools in County - 14

Number of Secondary Vocational Programs in County

Agriculture	14	Distributive Ed.	1
Home Economics	12	Business & Office	2
Trade & Industrial	14	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	43

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-1	1971	Hydro	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-2	(TI-1, B-1, HE-2)	Dec. 13-17
I-12	1971	Lookeba-Sickles (Lookeba)	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17
			Home Economics	HE-4-1	(A-4, HE-4, DE-2)	Dec. 9-17
			Appliance Repair	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Auto Mechanics	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
			Cosmetology	TI-4-1	(TI-1, B-1, HE-2)	Dec. 13-17
I-10	1971	Oney (Albert)	Agriculture	A-4	(A-4, HE-4, DE-2)	Dec. 9-17

County: Woods-76

Number of Schools in County - 3

Number of Secondary Vocational Programs in County

Agriculture	3	Distributive Ed.	
Home Economics	1	Business & Office	
Trade & Industrial	1	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	5

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-1	1972	Alva	Agriculture	A-1	(A-1, TI-3, HE-2)	Jan. 10-14
			Auto Mechanics	TI-1-3	(A-1, TI-3, HE-2)	Jan. 10-14
I-6	1972	Freedom	Agriculture	A-1	(A-1, TI-3, HE-2)	Jan. 10-14
I-3	1972	Waynoka	Agriculture	A-1	(A-1, TI-3, HE-2)	Jan. 10-14
			Home Economics	HE-2	(A-1, TI-3, HE-2)	Jan. 10-14

County: Woodward-77

Number of Schools in County - 4

Number of Secondary Vocational Programs in County

Agriculture	5	Distributive Ed.	
Home Economics	2	Business & Office	
Trade & Industrial	1	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	8

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-5	1972	Fort Supply	Agriculture	A-1	(A-1, TI-3 HE-2)	Jan. 10-14
I-2	1972	Mooreland	Agriculture	A-1	(A-1, TI-3 HE-2)	Jan. 10-14
			Home Economics	HE-2	(A-1, TI-3 HE-2)	Jan. 10-14
I-3	1972	Sharon-Mutual (Mutual)	Agriculture	A-1	(A-1, TI-3 HE-2)	Jan. 10-14
I-1	1972	Woodward	Agriculture (2)	A-1	(A-1, TI-3 HE-2)	Jan. 10-14
			Home Economics	HE-2	(A-1, TI-3 HE-2)	Jan. 10-14
			ICT	TI-1-3	(A-1, TI-3 HE-2)	Jan. 10-14

County: Cleveland-14

Number of Schools in County - 4

Number of Secondary Vocational Programs in County

Agriculture	6	Distributive Ed.	2
Home Economics	8	Business & Office	3
Trade & Industrial	4	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	23

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-57	1972	Lexington	Agriculture	A-5	(A-5, HE-4, R-6)	Jan. 10-14
			Home Economics	HE-4	(A-5, HE-4, R-6)	Jan. 10-14
I-2	1972	Moore	Agriculture (2)	A-5	(A-5, HE-4, R-6)	Jan. 10-14
			Home Economics Jr.	HE-4	(A-5, HE-4, R-6)	Jan. 10-14
			Home Economics Sr.	HE-4	(A-5, HE-4, R-6)	Jan. 10-14
			Distributive Ed.	DE-2	(TI-1, B-1, DE-2)	Jan. 10-14
			Auto Mechanics	TI-3-1	(TI-1, B-1, DE-2)	Jan. 10-14
			Carpentry	TI-3-1	(TI-1, B-1, DE-2)	Jan. 10-14
			Cosmetology	TI-3-1	(TI-1, B-1, DE-2)	Jan. 10-14
			Welding	TI-3-1	(TI-1, B-1, DE-2)	Jan. 10-14
			Business & Office	B-1	(TI-1, B-1, DE-2)	Jan. 10-14
I-40	1972	Noble	Agriculture	A-5	(A-5, HE-4, R-6)	Jan. 10-14
			Home Economics Jr.	HE-4	(A-5, HE-4, R-6)	Jan. 10-14
			Home Economics Sr.	HE-4	(A-5, HE-4, R-6)	Jan. 10-14
I-29	1972	Norman	Agriculture (2)	A-5	(A-5, HE-4, R-6)	Jan. 10-14
			Home Economics Central Jr.	HE-4	(A-5, HE-4, R-6)	Jan. 10-14
			Home Economics Sr. (2)	HE-4	(A-5, HE-4, R-6)	Jan. 10-14
			Distributive Ed.	DE-2	(TI-1, B-1, DE-2)	Jan. 10-14
			Bus. & Office (2)	B-1	(TI-1, B-1, DE-2)	Jan. 10-14

County: Choctaw-12

Number of Schools in County - 6

Number of Secondary Vocational Programs in County

Agriculture	6	Distributive Ed.	
Home Economics	9	Business & Office	1
Trade & Industrial	6	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations	1	Total	23

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-1	1972	Boswell	Agriculture	A-3	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Home Economics	HE-7	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Auto Mechanics	TI-3-4	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
I-2	1972	Ft. Towson	Agriculture	A-3	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Home Economics	HE-7	(A-4, HE-7, TI-4, B-1)	Feb. 7-11
I-3	1972	Grant	Agriculture	A-3	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Home Economics	HE-7	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
I-39	1972	Hugo	Agriculture (2)	A-3	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Home Economics (5)	HE-7	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Carpentry	TI-3-4	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			ICT	TI-3-4	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
	1972	Hugo Area School (Kiamichi Area Vocational-Technical School)	Business & Office	B-1	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Auto Body	TI-3-4	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Diesel Mechanics	TI-3-4	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Welding	TI-3-4	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Health Serv. Occ.	H-1	(H-1, A-3, HE-7, TI-4, B-1)	Feb. 7-11
I-4	1972	Soper	Agriculture	A-3	(A-3, HE-7, TI-4, B-1)	Feb. 7-11
			Home Economics	HE-7	(A-3, HE-7, TI-4, B-1)	Feb. 7-11

County: Oklahoma-55

Number of Schools in County - 1

Number of Secondary Vocational Programs in County

Agriculture		Distributive Ed.	1
Home Economics		Business & Office	1
Trade & Industrial	11	Coop. Voc. Ed.	
Technical		CVET	
Health Occupations		Total	13

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-89	1972	Capitol Hill (Oklahoma City)	Distributive Ed.	TE-5	(TE-5, TI-3, B-1)	Feb. 21-25
			Auto Body	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			Auto Mechanics	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			Cabinetmaking	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			Cosmetology	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			Electronics	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			Electricity	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			ICT	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			Machine Shop	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			Upholstery	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-15
			Welding	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25
			Business & Office	B-1	(TE-5, TI-3, B-1)	Feb. 21-25
			Drafting & Design (T & I)	TI-2-3	(TE-5, TI-3, B-1)	Feb. 21-25

County: Carter-19

Number of Schools in County - 9

Number of Secondary Vocational Programs in County

Agriculture	4	Distributive Ed.	1
Home Economics	10	Business & Office	3
Trade & Industrial	13	Coop. Voc. Ed.	1
Technical		CVET	1
Health Occupations		Total	33

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-19	1972	Ardmore	Home Economics (2)	HE-7	(A-6, HE-7, DE-1)	March 27-31
			Distributive Ed.	DE-1	(A-6, HE-7, DE-1)	March 27-31
	1972	Ardmore Area School (Southern Oklahoma Area Vocational-Technical School	Home Economics	HE-7	(A-6, HE-7, DE-1)	March 27-31
			Air Cond. & Ref.	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Auto Body	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Auto Mechanics	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Carpentry	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Cosmetology	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Drafting	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Machine Shop	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Welding	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Electronics (T & I)	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Bus. & Office (3)	B-1	(TI-2, B-1, CVE-1)	March 27-31
			Diesel Mech. (T&I)	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Electronics (T&I)	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
I-77	1972	Dickson (Ardmore)	Home Economics	HE-7	(A-6, HE-7, DE-1)	March 27-31
			Coop. Voc. Ed.	CVE-1	(TI-2, B-1, CVE-1)	March 27-31
I-74	1972	Fox	Agriculture	A-6	(A-6, HE-7, DE-1)	March 27-31
			Home Economics	HE-7	(A-6, HE-7, DE-1)	March 27-31
			Welding	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
			Carpentry	TI-3-2	(TI-2, B-1, CVE-1)	March 27-31
I-55	1972	Healdton	Home Economics	HE-1	(A-6, HE-1, DE-1)	March 27-31

County: Carter-10 (Cont.)

Number of Schools in County - 9

Number of Secondary Vocational Programs in County

Agriculture	4	Distributive Ed.	1
Home Economics	10	Business & Office	3
Trade & Industrial	13	Coop. Voc. Ed.	1
Technical		CVET	1
Health Occupations		Total	33

District Number	Evaluation Year	School District	Program	Supervisor Code	Evaluation Team	Date
I-32	1972	Lone Grove	Agriculture	A-6	(A-6, HE-7, DE-1)	March 27-31
			Home Economics	HE-7	(A-6, HE-7, DE-1)	March 27-31
I-27	1972	Plainview (Ardmore)	Home Economics	HE-7	(A-6, HE-7, DE-1)	March 27-31
I-21	1972	Springer	Agriculture	A-6	(A-6, HE-7, DE-1)	March 27-31
			Home Economics	HE-7	(A-6, HE-7, DE-1)	March 27-31
I-43	1972	Wilson	Agriculture	A-6	(A-6, HE-7, DE-1	March 27-31
			Home Economics	HE-7	(A-6, HE-7, DE-1)	March 27-31
			CVET (M) - (T&I)	CVET-1	(A-6, HE-7, DE-1)	March 27-31

MONTHLY EVALUATION SCHEDULE

PROGRAM EVALUATION FOR SEPTEMBER, 1971

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Adair-01	Cave Springs (Stilwell) - - - -	(A-2, CVET-1, CVE-1)*	September (13-17) 1971	Team #1 13 Programs 4 Days	A-2
	Stilwell - - - - - - - - - - - -	(A-2, CVET-1, CVE-1)*			
		(HE-3, TI-1 B-1)**			
	Watts - - - - - - - - - - - - - -	(A-2, CVET-1, CVE-1)*		Team #2 9 Programs 3 Days	HE-3
	Westville - - - - - - - - - - - -	(A-2, CVET-1, CVE-1)*			
		(HE-3, TI-1 B-1)**			

* Team #1
** Team #2

PROGRAM EVALUATION FOR OCTOBER, 1971

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Bryan-07	Achille - - - - - - - - - - - - -	(A-3, HE-7 CVET-1)*	October 25-29 1971	Team #1 17 Programs 4½ Days	A-3
	Bennington - - - - - - - - - - -	(A-3, HE-7 CVET-1)*			
	Blue - - - - - - - - - - - - - -	(A-3, HE-7 CVET-1)*			
	Bokchito - - - - - - - - - - - -	(A-3, HE-7 CVET-1)*			
	Caddo - - - - - - - - - - - - - -	(A-3, HE-7 CVET-1)*			
	Calera - - - - - - - - - - - - -	(A-3, HE-7 CVET-1)*			
	Colbert - - - - - - - - - - - - -	(A-3, HE-7 CVET-1)*		Team #2 3 Programs 1 Day	B-1
	Durant - - - - - - - - - - - - -	(A-3, HE-7 CVET-1)*			
		(B-1, TI-4 DE-1)**			
	Silo (Durant) - - - - - - - - - -	(A-3, HE-7 CVET-1)*			
Oklahoma-55	Oklahoma City AVTS- - - - - - -	(B-1, T-1, H-1)***	October 11-15 1971	Team #3 5 Programs 2 Days	B-1
		(TI-3, R-12, AS-2)****		Team #4 16 Programs 3 Days	TI-3

* Team #1
** Team #2
*** Team #3
**** Team #4

3177

PROGRAM EVALUATION FOR NOVEMBER, 1971

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Beckham-05	Carter - - - - - - - - - - Elk City - - - - - - - - - (B-1) Merritt (Elk City) - - - Erick - - - - - - - - - - Sayre - - - - - - - - - - (CVE-1) Sweetwater - - - - - - -	(A-4, HE-4, TI-3,)*	November (1-5) 1971	Team #1 19 Programs 4 Days	A-4
Coal-15	Coalgate - - - - - - - - -	(A-3, HE-7, TI-4)**	November 8-12 1971	Team #2 3 Programs 1 Day	TI-4
Beaver-04	Balko - - - - - - - - - - - - - - -	(A-1, HE-2, TI-2)***	Nov. 17-19 (1971)	Team #3 13 Programs 3 Days	HE-2
	Beaver - - - - - - - - - - - - - -	(A-1, HE-2, TI-2)***			
Cimarron-13	Boise City - - - - - - - - - - -	(A-1, HE-2, TI-2)***			
Texas-70	Guymon - - - - - - - - - - - - - -	(A-1, HE-2, TI-2)***			
	Hardesty - - - - - - - - - - - - -	(A-1, HE-2, TI-2)***			
	Hooker - - - - - - - - - - - - - -	(A-1, HE-2, TI-2)***			
	Texhoma - - - - - - - - - - - - - -	(A-1, HE-2, TI-2)***			

* Team #1
** Team #2
*** Team #3

3178

PROGRAM EVALUATION FOR DECEMBER, 1971

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Alfalfa-02	Burlington - - - - - - - - - - -	(A-1, TI-2, R-6)****	Dec. 6-10 1971	Team #4 8 Programs 2 Days	A-1
	Carmen-Dacoma (Carmen) - - - -				
	Cherokee - - - - - - - - - - - -				
	Helena-Goltry (Helena) - - - -				
	Helena Training School - - - -				
	Jet-Nash (Jet) - - - - - - - - -				

* Team #1
** Team #2
*** Team #3
**** Team #4

PROGRAM EVALUATION FOR DECEMBER, 1971

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Atoka-03	Atoka Caney Stringtown	(A-3, HE-7, TI-4*	December 13-15 1971	Team #1 8 Programs 2 Days	A-3
Caddo-08	Anadarko	(A-4, HE-4, DE-2)**	Dec. 9-17 (1971)	Team #2 26 Programs 6 Days	DE-2
	Apache	(A-4, HE-4, DE-2)**			
	Binger	(A-4, HE-4, DE-2)**			
	Broxton (Apache)	(A-4, HE-4, DE-2)**			
	Carnegie	(A-4, HE-4, DE-2)**			
	Cement	(A-4, HE-4, DE-2)**			
	Cyril	(A-4, HE-4, DE-2)**			
	Eakley	(A-4, HE-4, DE-2)**	Dec. 13-17 (1971)	Team #3 17 Programs 4 Days	B-1
	Fort Cobb	(A-4, HE-4, DE-2)**			
	Caddo-Kiowa AVTS	(TI-1 B-1, HE-2)***			
	Hinton	(A-4, HE-4, DE-2)**			
		(TI-1 B-1, HE-2)***			
	Hydro	(A-4, HE-4, DE-2)**			
		(TI-1 B-1, HE-2)***			
	Lookeba-Sickles (Lookeba)	(A-4, HE-4, DE-2)**			
		(TI-1 B-1, HE-2)***			
	Oney (Albert)	(A-4, HE-4, DE-2)**			

* Team #1
** Team #2
*** Team #3

PROGRAM EVALUATION FOR JANUARY 1972

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Woods-76	Alva	(A-1, TI-3 HE-2)*	Jan. 10-14 (1972)	Team #1 13 Programs 3 Days	A-1
	Freedom	(A-1, TI-3 HE-2)*			
	Waynoka	(A-1, TI-3 HE-2)*			
Woodward-77	Ft. Supply	(A-1, TI-3 HE-2)*			
	Mooreland	(A-1, TI-3 HE-2)*			
	Sharon-Mutual (Mutual)	(A-1, TI-3 HE-2)*			
	Woodward	(A-1, TI-3 HE-2)*			
Cleveland-14	Lexington	(A-5, HE-4, R-6) **		Team #2 14 Programs 3 Days	HE-4
	Moore	(A-5, HE-4, R-6) ** (TI-1, B-1, DE-2)***			
	Noble	(A-5, HE-4, R-6) **		Team #3 9 Programs 2 Days	DE-2
	Norman	(A-5, HE-4, R-6) ** (TI-1, B-1, DE-2)***			

* Team #1
** Team #2
*** Team #3

3181

PROGRAM EVALUATION FOR FEBRUARY,1972

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Choctaw-12	Boswell	(A-3, HE-7 TI-4 B-1)*	Feb. 7-11 (1972)	Team #1 23 Programs 4 Days	HE-7
	Ft. Towson	(A-3, HE-7 TI-4 B-1)*			
	Grant	(A-3, HE-7 TI-4 B-1)*			
	Hugo	(A-3, HE-7 TI-4 B-1)*			
	Kiamichi AVTS (Hugo)	(H-1, A-3, HE-7 TI-4 B-1)*			
	Soper	(A-3, HE-7 TI-4 B-1)*			
Oklahoma-55	Capitol Hill (Okla. City)	TE-5 , TI-3 , B-1,)**	Feb. 21-25 (1972)	Team #2 13 Programs 3 Days	TI- 3

* Team #1
** Team #2

3182

PROGRAM EVALUATION FOR MARCH, 1972

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Carter-10	Ardmore - - - - - - - - - -	(A-6, HE-7, DE-1)*	March 27-31 (1972)	Team #1 16 Programs 3-4 Days	A-6
	Southern Okla. AVTS - - -	(TI-2, B-1, CVE-1,)**			
		(A-6, HE-7, DE-1)*			
	Dickson (Ardmore) - - - -	(TI-2, B-1, CVE-1)**			
		(A-6, HE-7, DE-1)*			
	Fox - - - - - - - - - - - -	(TI-2, B-1, CVE-1)**			
		(A-6, HE-7, DE-1)*			
	Healdton - - - - - - - - - -	(A-6, HE-7, DE-1)*		Team #2 17 Programs 3-4 Days	TI-2
	Lone Grove - - - - - - - -	(A-6, HE-7, DE-1)*			
	Plainview - - - - - - - - -	(A-6, HE-7, DE-1)*			
	Springer - - - - - - - - - -	(A-6, HE-7, DE-1)*			
	Wilson - - - - - - - - - - -	(A-6, HE-7, DE-1)*			
		(TI-2, B-1, CVE-1)**			

* Team #1
** Team #2

PROGRAM EVALUATION FOR APRIL, 1972

COUNTY	SCHOOL	TEAM	DATE	ESTIMATED EVAL. TIME	TEAM CHAIRMAN
Blaine-06	Canton	(A-1, HE-2, TI-1, B-1)*	April (10-14) 1972	Team #1 10 Programs 3 Days	TI-1
	Geary	(A-1, HE-2, TI-1 B-1)*			
	Okeene	(A-1, HE-2, TI-1 B-1)*			
	Watonga	(A-1, HE-2, TI-1 B-1)*			

* Team #1

VT 014 219
TECHNICAL TRAINING STUDY.

DEPARTMENT OF TRANSPORTATION, WASHINGTON, D.C.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - JUN71 91P.

DESCRIPTORS - *TECHNICAL EDUCATION; *JOB TRAINING; RESOURCE ALLOCATIONS; EQUIPMENT UTILIZATION; INFORMATION UTILIZATION; *INSTRUCTIONAL PROGRAMS; *SYSTEMS APPROACH; ELECTRICAL SYSTEMS; *OPERATIONS RESEARCH; GOVERNMENTAL STRUCTURE

ABSTRACT - THE PRIMARY REASON FOR THIS REVIEW OF TECHNICAL TRAINING WAS TO ESTABLISH IN THE OFFICE OF THE SECRETARY OF TRANSPORTATION (OST) A WORKING KNOWLEDGE OF THE DEPARTMENT OF TRANSPORTATION (DOT) TRAINING PROGRAMS AND DETERMINE IF EFFICIENCIES COULD BE ACHIEVED BY A REALIGNMENT OF TRAINING RESOURCES. SPECIFIC OBJECTIVES WERE TO: (1) EXAMINE PROGRAMS TO DETERMINE IF IT IS ECONOMICALLY FEASIBLE TO SHARE RESOURCES, (2) IDENTIFY THE EXTENT THAT DOT ADMINISTRATORS UTILIZE THE MOST APPROPRIATE INSTRUCTIONAL TECHNIQUES, (3) EVALUATE THE EXTENT OF APPLICATION AND UTILIZATION OF A SYSTEMS APPROACH, AND (4) ASSESS THE DEGREE OF APPLICABILITY, RECOGNITION AND UTILIZATION OF DESIGN ENGINEERING OF ELECTRONIC SYSTEMS TO REDUCE TRAINING COSTS. SPECIFIC CONCLUSIONS WERE THAT: (1) THE FIELD OF HAZARDOUS MATERIALS APPEARS TO OFFER THE MAXIMUM OPPORTUNITY FOR INTERMODAL COOPERATION AND IMPROVEMENT THROUGH JOINT TRAINING ACTIVITIES, (2) INSTRUCTIONAL METHODS AND DEVICES ARE GENERALLY ADEQUATE AND THERE IS EVIDENCE OF CONTINUING EFFORTS TO IMPROVE, (3) THE COAST GUARD HAS TAKEN INITIAL STEPS TO DEVELOP A "SYSTEMS" APPROACH TO TRAINING PROGRAMS, AND (4) EFFORTS TO INCREASE THE AVAILABILITY OF ELECTRONIC SYSTEMS AND REDUCE THE TOTAL MANPOWER AND TRAINING REQUIREMENTS ARE RECEIVING INCREASING ATTENTION. (GEB)

VT 014 219

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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DEPARTMENT OF TRANSPORTATION

TECHNICAL TRAINING STUDY

JUNE 1971

VT014219

3186

DEPARTMENT OF TRANSPORTATION

TECHNICAL TRAINING STUDY

TABLE OF CONTENTS

		Page
I.	BACKGROUND	1
II.	OBJECTIVES	3
III.	CONDUCT	4
IV.	SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS	5
V.	DISCUSSION OF CONCLUSIONS	
	A. Shared Use of Training Resources	8
	B. Equipment Designs to Reduce Training	12
	C. Systems Management and Instructional Methods	15
VI.	COAST GUARD TRAINING	18
VII.	FAA TRAINING	37
VIII.	FHWA TRAINING	51
IX.	SYSTEMS MANAGEMENT AND INSTRUCTIONAL METHODS	56
X.	EQUIPMENT DESIGN TO REDUCE TRAINING	66

APPENDICES

I.	Study Precept	I-71
II.	List of Visits and Discussions	II-77
III.	FAA and USCG Aircraft Inventory	III-78
IV.	Discussion Paper on Systems Approach	IV-79

I. BACKGROUND

The need for a review of technical training in the Department of Transportation parallels a number of studies conducted since the inception of the Department and arises from the same concern--a desire to increase internal effectiveness through optimum use of departmental resources to meet operational requirements.

In the case of technical training, the requirement for a study was logically derived from the presence of extensive training activity, apparent similarities in the training requirements and a lack of any detailed substantive information in the Office of the Secretary about the content and conduct of training in the administrations. The magnitude of training activity and the visibility of apparently similar training operations, particularly in the areas of aviation and electronics in the FAA and Coast Guard, has raised questions of possible efficiencies through shared use of facilities equipment and expertise.

Almost since the beginning of the Congressional consideration of President Johnson's recommendation to establish a Cabinet level agency for transportation, questions have arisen over whether a Department of Transportation could achieve organizational economies not available with the then dispersed agencies with transportation functions. Secretary Alan S. Boyd testified at that time and subsequently in the 1968 appropriation hearings that there were several areas where it appeared that the Department might hope for greater efficiency than the administrations could achieve independently. Secretary Boyd committed the Department to investigate these functions and take the action necessary to ensure the most efficient uses of its resources. One function identified for study was technical training.

Subsequently, two efforts were conducted to review departmental training resources. The first was a task group composed of members of the Federal Aviation Administration (FAA) and the U. S. Coast Guard (USCG) training staffs which conducted a brief survey of FAA, USCG and Federal Highway Administration training programs in the Spring of 1967, just prior to formal creation of the Department. This group submitted a report entitled, "Savings Project Report," which found no duplication in administration programs and recommended no significant changes. The task group did recommend USCG consider moving its correspondence course activity and Service Wide Examination organization group to the FAA Academy. The Correspondence Course group was moved to Oklahoma City soon thereafter and the Examination group was relocated in November 1969. One other recommendation concerning Coast Guard

use of FAA training in the Grumman Gulfstream aircraft, was implemented but subsequently discontinued due to scheduling difficulties.

In the Fall of 1967, a Counterpart Study of Personnel and Training functions was conducted as one of a series of such studies directed by Secretary Boyd to examine the role and staffing of the Office of the Secretary in functions which were shared by OST and the operating administrations. In the course of this study, several recommendations to increase the roles of OST in leadership and responsibility for training were made. Noting the results of the Joint Study Group on Training, the Counterpart Study concluded, "OST will need to be involved in identifying training needs within each administration which can be met by sharing expertise, equipment or facilities belonging to other administrations." The study group also recognized a need for more substantive information on the technical training activities of the administrations before the proper role of OST could be established.

A review of technical training to answer these questions was initiated by establishing a position in the Training and Career Development Division, Office of Personnel and Training, OST. The preliminary objectives were to review technical training to determine what, if any, efficiencies could be achieved, develop a clearer picture of what the appropriate roles of OST in relation to administration technical training activities should be, and provide management advice and staff assistance on a continuing basis.

This review was conducted as a staff function by the Office of Personnel and Training. A Coast Guard officer, Commander Charles Hahn, was assigned to the Training and Career Development Division to conduct the review. Commander Hahn is a graduate of the United States Coast Guard Academy and the United States Naval Postgraduate School, where he studied Electronics Engineering. Commander Hahn has 13 years experience as a Coast Guard aviator in both fixed wing and rotary wing aircraft. His experience in aviation, engineering and as a Coast Guard officer formed the basis for judgments made on the practicality of interadministration use of training resources.

II. OBJECTIVES

The primary reason for a review of technical training was to establish in OST a working knowledge of DOT training programs and determine if efficiencies could be achieved by realignment of training resources where similar requirements existed or where excess resources such as plant facilities could be better utilized. During preliminary visits and discussions, four additional objectives were identified. These objectives were outlined in the "Precept for a Review of Technical Training in DOT" submitted by the Assistant Secretary for Administration to the DOT Administrative Management Council for review by memorandum of March 24, 1969. One of these objectives which suggested an evaluation of the use of Job Engineering to reduce training was subsequently deleted as being inherently covered in the objectives relating to the use of a systems approach and design engineering to reduce training. The objectives pursued in this review are restated below.

A. Examine administration training programs to determine if it is feasible to achieve economics through the shared use of training resources.

B. Identify the extent that DOT administrations recognize and utilize the most appropriate instructional techniques and provide a means for sharing any particular expertise.

C. Evaluate the extent of application and utilization of a systems approach to the management of training activities.

D. Assess the degree of applicability, recognition and utilization of design engineering of electronic systems to reduce training costs.

III. CONDUCT

Information for the conduct of this review was collected by a variety of methods from a number of sources, both within DOT and from other Federal activities. The objectives of the study required a wide range of contacts many of which were outside the normal purview of the DOT training staffs. Within DOT, each major training facility was visited for familiarization with capacity, equipment, plant facilities, and instructional methods. Several operational activities representing major functions supported by training activities were visited to obtain an appreciation of the on-the-job environment and determine the on-site training capability. Nontraining personnel with whom discussions were held were personnel managers, electronic engineering and maintenance staffs, and research and development personnel. The latter two were in support of the study objective to assess the feasibility and recognition of engineering designs which could reduce training and manpower requirements. These were confined to electronic systems where the reviewer has some expertise and where a good deal of activity along this line is being conducted outside of DOT. Specific facilities and activities contacted are listed in Appendix II.

Information gathering outside of DOT was centered on the Department of Defense since it represents, in macrocosm, a model of some of the same technical and organizational problems found in DOT. Defense also has available considerably greater resources in staff and research functions which are addressing problems in training both along the management and methods route and through improved design of electronic systems. Finally, Defense provides some training to both FAA and Coast Guard personnel. A listing of these contacts and visits is also contained in Appendix II.

Another major source of information was a review of various internal staff studies, special issue studies, audit reports, and program and policy documents related to personnel and training.

There are several areas which in the broadest sense fall into the category of technical training, which were not included in this study. Graduate level education, short courses conducted for professional technical employees and intern programs for technical personnel, were not specifically considered as they were regarded as more appropriate to a study of career development programs and not consistent with the primary objectives of this review.

IV. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

A. Technical training in the Department of Transportation generally receives strong management support and is adequately funded. Some desirable improvements, particularly in high cost training devices, have been repeatedly deferred in favor of other operational priorities.

B. Close to 98% of the dollar and manpower costs for technical training are concentrated in FAA, USCG and FHWA, in order of relative costs.

C. Technical training requirements in the field of transportation safety, which were largely unmet for Railroad, Motor Carrier, Pipeline and Hazardous Materials at the outset of this review, are being programmed through the Transportation Safety Institute under the general direction of the Assistant Secretary for Safety and Consumer Affairs. Existing FAA requirements for certain air safety training are also being incorporated in the Institute.

The field of Hazardous Materials appears to be one which offers the maximum opportunity for intermodal cooperation and improvement through joint training activities and should be given a high priority for development once the Safety Institute is established and known needs are being met.

D. There is little opportunity at present to increase the efficiency of DOT technical training by sharing expertise or existing training facilities. Occupational groups in the administrations are largely unrelated with the exception of certain aviation and electronics occupations in Coast Guard and FAA. These occupations require significantly different training primarily because the hardware systems, i.e., aircraft and electronic systems, in use are not the same.

Acquisition of new equipment may offer some opportunity for joint training programs. The Office of Personnel and Training should maintain liaison with FAA and USCG for possible developments. The probable magnitude of such developments does not warrant a formal monitoring or reporting system.

E. Existing training facilities are operated only by FAA and USCG. All are at or near maximum capacity and do not offer any opportunity for cost avoidance by shared use. The National Highway Institute authorized by the Highway Safety Act of 1970 is only in the planning stages and its possible use by other DOT elements is conjectural.

The Office of Personnel and Training should continue to monitor utilization of existing facilities and give special consideration to the development of the National Highway Institute.

F. Instructional methods and devices are generally adequate and there is evidence of continuing efforts to improve and utilize new developments as they are adopted by agencies outside of DOT. FAA has traditionally monitored the practices used in the USAF and the airline industry while Coast Guard has generally been influenced mostly by U. S. Navy methods.

The Office of Personnel and Training should provide opportunities for greater communication between FAA and USCG regarding training methods and devices. Coast Guard in its consideration of new methods, as part of the Training Systems Approach being developed at the New York Training Center, should avail itself of the FAA experience with student responder-based teaching methods as employed in the FAA's "Student Centered Training" methods.

G. FAA has effective and well established procedures for identifying training requirements and developing centralized training programs. There are, however, large groups of employees concentrated at field facilities, particularly Air Traffic Control Centers and terminal facilities, whose on-going training is left largely to the determination of the facility staff.

It appears desirable in the interest of standardization and quality control to provide centrally developed training programs for the continuing training of Air Traffic Controllers in the major facilities and to ensure that training standards are being met through periodic evaluation visits.

H. Efforts to increase the availability of electronic systems and reduce the total manpower and training requirements are receiving increasing attention in both industry and the Department of Defense. These efforts are largely directed at automatic test systems organized around digital computers coupled with equipment of modular design. Specific systems in FAA and Coast Guard have incorporated automated diagnostic capability, but there has been no apparent effort to investigate the applications of such designs across the full range of equipments in use.

Advanced maintainability designs incorporating some form of fault diagnosis which reduces the skill required by maintenance personnel offers considerable potential for FAA and USCG. Programs to monitor and investigate the developments in this area in the Department of Defense and industry should be initiated for the specific purpose of developing design and maintenance criteria. This effort is primarily the concern of the technical services, but its probability of successful implementation will be enhanced by support from personnel and training activities.

I. Federal Highway Administration programs, although relatively small, are a major source of development of professional expertise in engineering, audit and highway right-of-way/relocation. Reviews conducted in the past year have developed several recommendations for improved programs.

The Office of Personnel and Training, OST, should monitor the implementation of the study recommendations. FHWA should give particular emphasis to the effort to develop clear cut written objectives for each selected work assignment for trainees and provide centrally developed outlines and guides for both trainees and supervisors. Stated objectives and standards should also be used to provide the basis for a more formal "feedback" system to monitor trainee progress and changing needs.

J. Coast Guard has taken the initial steps to develop a "systems" approach to training programs in a pilot project at the New York Training Center.

Development of the systems methods as a formal approach to training programs on a service-wide basis should be encouraged and the experience gained through the New York project used as a basis in developing guidance for other training activities.

K. FAA, although it has a well organized and systems oriented management program for the majority of training programs, does not appear to have provided for a formalized and systematic feedback from supervisory personnel to the FAA Academy and the Headquarters training staff.

FAA should develop a formal system for post-training evaluation of employees after an appropriate period of on-the-job observation. This system should be directed at an evaluation of the training provided with regard to its completeness and relevancy to job requirements. FAA should review Coast Guard's efforts in the area of Occupational Surveys as a possible model for such a system.

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V. DISCUSSION OF CONCLUSIONS

A. Shared Use of Training Resources

There is at present and for the immediate future little opportunity for greater efficiency in DOT training through sharing or realignment of training resources. The similarities in certain areas most notably aviation and electronics on close comparison prove to be more form than substance. The plant facilities, in particular the FAA Academy, which was less than maximally used in 1967, when the Department was established, are currently overcrowded or fast approaching that condition. There is unquestionably a degree of common expertise in some categories such as pilot training and electronics, but the specific applications to aircraft and electronic systems is so different that common training is not feasible.

Of the seven operating elements of the Department plus the NTSB, only the three largest organizations conduct technical training programs of sufficient magnitude to warrant detailed consideration in the context of this review. The technical training requirements of FRA, NHTSA, SLS and UMTA are occasional and generally met either through OJT or out-of-agency sources. No in-house programs relevant to the purposes of this review were noted.

Of the three administrations conducting significant in-house training programs, the technical training activities in the Federal Highway Administration are clearly the least susceptible to serving or being supported by the other organizations. Formal on going in-house programs exist for Highway Engineers, Auditors, and Right-of-Way/Relocation Specialists. In addition to subject content, these programs differ from the more typical training programs conducted by Coast Guard and FAA in several other respects. Each of the Highway programs is relatively long term and depends heavily on learning through selected work experience rather than formal classroom training. They are conducted in a manner somewhat analogous to the familiar Management Intern Programs though they are inherently more specialized and directed at developing skills and knowledge pertinent to a specific occupation. Trainees are not processed in groups but assigned individually to positions where they are guided in their work experience by a professional in their occupation and supplement their educational background through recommended self-study materials. FHWA has no training facilities other than classrooms or conference rooms. The Federal Highway Institute authorized by the Federal Highway Act of 1970 may provide a facility which could be utilized by other administrations. OST should monitor this development.

Federal Aviation Administration and Coast Guard have some training requirements which on the surface are similar but which with close review are found to be incompatible. Aside from certain flight operations training and electronic maintenance, the occupational requirements are very dissimilar. Approximately one-half of FAA centralized training is devoted to basic training of Air Traffic Control specialists. This requirement is peculiar to FAA. Of Coast Guard technical training about 50 percent is devoted to basic training in ratings[1] which are nautical and military in character and for which there is no civilian counterpart. This group contains 18 of the 26 ratings under which all Coast Guard enlisted personnel are classified. Another large segment of training requirement is for recruit training which is purely military and nautical in nature. Much of the same is true of officer candidate training though on a different level and with different subject matter.

Those occupations which have some apparent degree of similarity are found in electronics, electrical, aircraft maintenance and pilot training. The training requirements however, are not compatible due to the level at which training is conducted and the different hardware and systems in use. In pilot training, as an example, Coast Guard meets its requirements for basic training of pilots through use of the Naval Air Training Command. Officers with no previous aeronautical experience are trained in basic and advanced flight and upon completion are designated Coast Guard aviators. FAA has no comparable training requirement since its pilots are required to be licensed aviators as a prerequisite to employment.

Once a basic pilot qualification is established the training requirement is that of establishing and maintaining qualifications in a particular type of aircraft. This is a very specific process since any two aircraft differ considerably in flight characteristics, systems operation and emergency procedures. The aircraft which FAA and Coast Guard operate or have a training requirement for, are shown in Appendix 3. Of these aircraft four are common to both agencies. They do not offer any opportunity for mutual support due to other constraints. Aircraft for which one or both agencies have a training requirement are the C-123B, the Grumman Gulfstream I and Gulfstream II and the HH-3 (S-61) helicopter. FAA operates three Grumman Gulfstream I aircraft, which are shared between training and logistic operations. Coast Guard has attempted to use FAA training and expressed a preference for it over other available sources. Scheduling difficulties have prevented timely availability, and attempts to use the FAA training have been discontinued. The training requirement is relatively small--generally not more than two pilots in a given year.

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[1] A rating is the name given to a Coast Guard enlisted occupational career field.

The FAA's single C-123 is attached to the Alaskan Region and is not available for training. FAA does not conduct formal training in the C-123 and apparently meets its pilot needs through local checkout. Coast Guard obtains Ground School training in the C-123 from the Air Force and conducts flight training and checkout at the unit to which aircraft are assigned.

FAA has a training need in two other aircraft which Coast Guard operates and this is currently obtained from commercial sources. The possibility of using the Coast Guard's single Gulfstream II aircraft were explored but proved impractical. The operational use of the Gulfstream is too intense to make it available for training. Coast Guard has a training capability in the HH-3 helicopter at its facility at Mobile, Alabama, and FAA uses commercial sources to train personnel in the S-61 helicopter which is a civilian version of the HH-3. Coast Guard at present has only two HH-3 aircraft dedicated to training which is only sufficient to meet its own needs. FAA's training requirement is only for three pilots per year. These circumstances plus the fact that there are a number of differences in the HH-3 and S-61, do not offer any cost savings through joint training.

The training requirements for aircraft maintenance fail the test of common need for essentially the same reason as pilot training. The absence of common aircraft except for the Gulfstream I and C-123, precludes common training requirements because of the highly specific nature of maintenance training. FAA needs for both aircraft are met through on-the-job training and are only occasional because of a relatively stable work force. Coast Guard obtains training through USAF at no cost for the C-123B and from commercial sources for the Gulfstream. Training quotas are too small and irregular to warrant an in-house capability.

Inventories of electronic systems and equipment did disclose a small percentage of common equipment but very little opportunity for mutual training support. While there are eight electronic equipments in use common to both agencies, the structure of current programs, an absence of in-house training capability or less costly training sources combine to nullify any savings through shared use within DOT.

The ARN-21 TACAN is representative of equipment common to FAA and USCG for which both have a training requirement but where no gain is achieved by single agency training. The ARN-21 is an aircraft transceiver operating on radar principles which in conjunction with a ground station provides distance and bearing information in the aircraft. FAA incorporates ARN-21 maintenance training at Oklahoma City into a seven week course, along with two other equipments--a weather radar RDR-1, and an ATC Radar Beacon (TRU-1). This makes a convenient package because many circuits and the theory of operation are quite similar and the combination of units is

found in a number of FAA aircraft. Coast Guard has no RDR-1 or TRU-1 in any of its aircraft and consequently has no training requirement. Further, the Coast Guard requirement for ARN-21 training is less than 20 students per year and since U. S. Navy schools are available, no in-house training capability is maintained. While it might seem attractive to utilize the FAA course with possibly some rearrangement, it would, in the long run, cost more. The Navy offers ARN-21 training at a number of FAETU (Fleet Aviation Electronic Training Units) around the country. Coast Guard is not charged for students, and travel costs will generally be less than to Oklahoma City. Additionally, berthing and subsistence are provided at Navy facilities reducing per diem costs to a minimal amount.

With the given absence of common training requirements and attendant resources there is no apparent utility in shared use of training facilities. The savings in shared use of physical facilities would be largely in the cost avoidance in the construction of new facilities or a reduction in travel and per diem costs. Under the present circumstances, neither of these alternatives is feasible.

At present, each of Coast Guard's larger training facilities is at or near capacity or projected to be in the near future. The largest facility at Governor's Island is fast approaching saturation and various alternatives for relocating some of its training activities are being considered. The FAA is in much the same situation largely due to the increase in Air Traffic Control training and its centralization at Oklahoma City. Multiple shifts are being conducted and will continue for the foreseeable future even with additional facilities scheduled for construction in FY-71.

The geographical distribution of Coast Guard training facilities does not favor significant travel cost reduction that would challenge the centralization of FAA training at Oklahoma City, even if physical capacity were available.

With four facilities on the east coast and one on the west coast, and an FAA workforce spread throughout the United States, transportation costs would not be significantly reduced and per diem costs which are a much larger portion of the total travel costs would be unchanged.

Coast Guard use of FAA facilities at Oklahoma City is equally unattractive from a cost conscious approach. Coast Guard avoids the large costs of per diem through furnishing quarters and messing facilities, and by making basic training assignments on a permanent change of station basis. Any significant use of the FAA Academy would not only involve the construction of additional classroom facilities, but also facilities

for messing and quarters. The alternative would be to accept the additional cost of per diem. Neither is an attractive proposition.

B. Equipment Design to Reduce Training

1. General

The purpose of this portion of the review was to determine to what extent the design of electronic equipment could reduce the training required for maintenance technicians. "Conventional" testing of electronic equipment consists largely of injecting stimulus signals into an equipment and making measurements at selected locations using a variety of test equipment. Such signals tracing methods require logical decisions on the part of the technicians as to the significance of the absence or degradation of the signal at a given test point. Much of the training provided a technician is designed to enable him to analyze signal flow and relationships which will enhance this decision.

As electronic systems have become increasingly complex, the time required to train a technician and the time to analyze malfunctions have expanded accordingly increasing maintenance costs and decreasing availability of equipment. This problem has been particularly acute in the military organizations who are continually faced with the difficulty of retaining personnel and consequently must invest heavily in time and money to maintain an adequately trained workforce. Even in civilian organizations with a relatively stable workforce, the sheer complexity of new systems and their quick obsolescence creates serious problems in maintenance. These circumstances have led to ever increasing efforts to reduce the dependence on the technician either through built-in diagnostic features (BITE-Built-In Test Equipment) or through the use of special test equipment which requires less knowledge by the user and provides a more rapid means to diagnose problems and effect repairs.

2. Federal Aviation Administration

Efforts to incorporate self-diagnostic features in electronic equipment in DOT have to date been limited to major systems. The only systems in FAA which incorporate a significant degree of diagnostic tests are the Central Computer Complex being installed in Air Route Traffic Control Centers as part of the National Airspace Program to modernize Air Traffic Facilities and the Automated Terminal Radar System. The computer diagnostic tests of the ARTCC facilities cannot be regarded solely as an effort to reduce technical skill levels but rather an inevitable and necessary by product of a computerized system. The ARTCC configuration is too complex to be effectively maintained by manual methods and the inherent capability of digital computers to perform

self test makes this application a natural process wherever an operating system incorporates a digital computer. The use of computers for self test and test of associated equipment is a well-established technology which is continually undergoing refinement. In most other electronic maintenance areas, FAA has adapted a philosophy of on-site maintenance by technicians trained in depth. In some instances such as the Tactical Air Navigation System (TACAN), which provides airway and terminal navigation aids, special test equipment has been included in the system to facilitate maintenance. This equipment, however, while it is a necessary diagnostic aid does not relieve the technician of the requirement for a thorough knowledge of the equipment.

3. Coast Guard

Coast Guard has initiated development of several systems which incorporate test features which reduce technician skill and to some extent manpower. The most extensive effort was the Transportable Loran C system (TRANSLOC) which was terminated before completion because of technical difficulties which created serious overrun in contract costs. Loran C is low frequency long range aid to navigation systems which Coast Guard operates worldwide. The TRANSLOC system was designed on a modular basis with performance monitoring, fault isolation and redundancy sufficient to permit maintenance by technicians with two years or less electronic experience. Current generation Loran C station require highly skilled technicians generally with at least six years experience. In addition to the reduction in skill level required, the TRANSLOC concept reduced total technical manpower on site by 40%. No on-site repairs would be accomplished at TRANSLOC stations, but rather, defective modules would be shipped to a central facility for rennovation.

Another effort at reducing technical skill level is currently under development for an airborne radar system. The APS-119 Radar, which will be used for airborne search and navigation, will incorporate fault diagnostic features which will allow the operator to determine which of seven replaceable assemblies is defective. Repair of the replaceable assemblies, however, will still require relatively sophisticated testing by experienced personnel. The major advantage of the APS-119 Radar appears to be more in the quick restoration of system capability by removing one level of diagnosis than in reducing technical skill required. The URG-2 Radio Transmitter being installed in major Coast Guard radio stations utilizes a computer both for operational control, performance monitoring and fault diagnostics. The modular design and computer diagnostics allow a technician with minimum training and experience to perform the majority of repairs required.

4. Summary

The evidence indicates that the large, complex and expensive electronic systems are being designed to incorporate diagnostic aids which either reduce the technical skill level required or, as in the case of the Central Computer Complex, make the system maintainable within acceptable times. Even where no reduction in technical skill level is achieved the reduced time to restore equipment to operation is sufficient motivation to provide diagnostic aids. There has, however, been little if any effort in DOT devoted to providing diagnostic features to the less complex equipments such as communications equipment and navigation systems which represent a significant portion of the electronic inventory. There appears to be considerable potential, both for reducing technical skill levels and improving availability of equipment in this area.

The Department of Defense has invested heavily in the development of automatic test systems. These systems do accomplsih the task of providing comprehensive testing of a variety of electronic systems by relatively low skill personnel, but they do not appear suitable for direct application to FAA and Coast Guard maintenance problems. The major difficulty is that the military systems are extremely expensive and must service a large equipment population to be cost effective. Most FAA and Coast Guard activities do not have a sufficient quantity of equipment to warrant a test system which range in cost from $400,000 to over two million dollars. The most promising approach for the geographically dispersed equipment found in FAA, such as remote transceiver sites and the numerous Coast Guard small stations and boats, would appear to be built-in test equipment coupled with modular design backed up by centralized facilities for modular repair. Unfortunately, very little work has been done in this area. The only approach to fault detection noted which did not require complex and costly test equipment was the Fault Isolation by Semi-Automatic Techniques (FIST) developed by the National Bureau of Standards. FIST appears to be a promising approach for systems of moderate complexity, but since it has never been operationally tested, it cannot be recommended without reservation.

Further investigation of methods to provide diagnostic capability for systems which are not practical to support by automatic test systems seems desirable. Coast Guard has indicated an intent to pursue this possibility. FAA appears less motivated to invest time and money in developing equipment with diagnostic features because of its relatively stable workforce of experienced technicians.

Recommendation:

Coast Guard and FAA should develop programs to monitor and investigate the developments in new maintainability designs in industry and the Department of Defense for the purpose of developing design and maintenance.

C. System Management and Instructional Methods

At present none of the DOT administrations use a complete and formally structured systems approach as described in Appendix IV. Each of the three organizations having significant training programs with which this report is primarily concerned has evolved certain procedures for establishing and managing training programs which are generally suitable to their needs. Coast Guard and FAA with years of experience in technical training and many occupations and skills particularly suitable to job analysis have relatively well established procedures. FHWA programs which are confined to three professional groups have been less susceptible to job analysis and other elements of a systems approach, although in-house reviews conducted recently have recommended several revisions which are consistent with a systems approach.

1. Federal Aviation Administration

FAA training programs conducted at the FAA Academy are developed through well established and systematic procedures which include most of the elements of a "systems" approach. From the identification of a training need through final presentation and quality control, training programs are systematically developed and in most cases where it is appropriate some form of job analysis is conducted. Field training programs do not, however, appear to receive the same degree of analysis and control. This appears to be particularly true in the case of Air Traffic Control facility training. Although considerable amounts of facility training is conducted, programs are largely developed locally and the degree of standardization is suspect. Considering the quantity and the need for standardization, the resources of the FAA Academy could be profitably used to provide centrally developed courses for Enroute and Terminal facility proficiency training as is being done for initial training at Enroute facilities.

One element of a systems approach appears lacking in the FAA system is a positive method for feedback from operational facilities to the training activity which in most instances is the FAA Academy. Formal evaluation of the material taught the trainee should be compared with the on-site requirements to provide a continuing means to revise training content. In Air Traffic and Flight Standards occupations this

should present no major difficulty since the skill and knowledge requirements are well documented.

Instructional methods of many types are used and appear to be generally effective. Simulation is one very effective and in some instances almost indispensable method but one which requires modernization in the case of Air Traffic Control training. Simulators in use are obsolescent and inadequate to provide the environmental training necessary to produce effective radar qualified controllers in the minimum possible time. This situation is recognized by FAA and steps have been taken to provide modern equipment for training new controllers in Enroute Radar control.

2. Coast Guard

Coast Guard at present has no formally designated "systems" approach to development and management of training programs but the procedures used incorporate most of the essential elements. The initial and most critical element of a systems approach is the job analysis and this has been addressed in most Coast Guard training by one means or another. The major investment in training programs is in the initial training of enlisted personnel which encompasses recruit and basic occupational training. Curriculum for these programs is based on the enlisted career structure as defined by the Enlisted Ratings Qualification Manual (ERQM). The ERQM provides a form of job analysis which shapes the curriculum of basic occupational schools to provide graduates with the capabilities stated for Petty Officer Third Class which is the entry level into occupational specialties. Recent events particularly the trend of decreasing retention of enlisted personnel and new job analysis procedures have led to efforts to further refine job analysis and training programs.

Two efforts which show promise to strengthen training programs have been recently undertaken. The first is an Occupational Survey modeled on a program which has proven very successful in the U. S. Air Force. The survey collects data from the workforce in a particular occupation and compares it with the structure and content of training programs to check their relevancy to the actual job requirements. The second effort toward a more systematic approach is being undertaken at the New York Training Center. The NYTC is developing a pilot program of training for Electronic Technicians based on a Training Systems Engineering model developed by the Continental Army Training Command (CONARC). The CONARC model is a refined and expanded version of the System Approach described in Appendix IV which has been specifically directed toward military occupational training programs. These efforts appear promising and have the potential for providing more effective and efficient training

programs. As experience is developed in their application it appears probable that these procedures can be adapted in whole or in part to programs other than basic occupational schools.

Instructional methods in Coast Guard schools are strongly oriented toward classroom lectures supplemented by laboratory work, practical exercises and live experience such as pilot training. Methods are largely conventional but nontheless appropriate. Simulator training is presently limited to use in basic Radarman training and in the training of OCS candidates in Combat Information Center and Anti-Submarine Warfare procedures. A Flight Simulator for pilot training at the Aviation Support and Training Center at Mobile is under procurement. This will be Coast Guard's first aircraft simulator and offers considerable potential for improving both training effectiveness and cost effectiveness of flight training. At present no use is being made of responder type training although it appears to offer an effective and appropriate method to employ in a number of Coast Guard schools. It is recommended that Coast Guard evaluate the Student Centered Training used by FAA and consider using the FAA courses for SCT instructor and course developers available at the FAA Academy.

3. Federal Highway Administration

The three FHWA training programs for Highway Engineers, Auditors and Right of Way/Relocation Specialists are generally less susceptible to a rigorous application of a "systems" approach than the training requirements in FAA and Coast Guard because of their selected work assignment structure. FHWA review groups have noted areas where program improvement can be achieved. Two of these can be approached in a systems reference. The definition of objectives and the creation of feedback methods should be approached on the basis of a job analysis insofar as this method can be applied.

Instructional methods are not of major concern to FHWA programs. The lectures and problem solving exercises used in the limited classroom activity afforded in these programs are adequate and suitable to the material covered.

VI. COAST GUARD

A. General

Technical training in Coast Guard ranges from entry level recurit training to post graduate training for officers and includes a wide variety of short term special courses for both officers and enlisted personnel. A major portion of technical training is devoted to "entry level" training to prepare officers and enlisted personnel with the skills required for initial assignments and provide a base for future career development. As shown in figure one, approximately 75 percent of Officer training is devoted to precommissioning training of Coast Guard Academy cadets and Officer candidate trainees and over 85 percent of enlisted training is recruit indoctrination and basic schools which prepare trainees for occupational specialties.

Civilian technical training is most generally for wage board employees and is commonly met by using the same source as for the military personnel counterpart. Training for civilian personnel is--with the exception of some apprentice type OJT activity--not of the basic occupational type, but largely devoted to maintenance and repair of specific hardware or systems or to develop advanced skills within a trade. The relative insignificance of civilian technical training is not surprising since in the total workforce of approximately 44,000 there are about 5,700 civilian employees.

Coast Guard as a military organization inherently faces the same problems of retention of qualified personnel, which have been so often discussed and for which a plethora of studies have been conducted, most generally in the Department of Defense. It is not the purpose of this study to analyze the problems of retention in the military service but as long as the problem exists it will continue to increase personnel costs through increased training requirements.

It has become increasingly apparent that the general level of re-enlistments has been steadily decreasing, therefore generating increasing requirements for training at all levels, from initial recruit training through specialized training for specific systems or skills. In some ratings, such as the Electronic Technician, this lack of retention has already become acute. The Electronic Technician workforce is currently 70 percent composed of technicians on their first enlistment with less than four years technical experience. The particular problem of technicians has been addressed by a Coast Guard study group. One of the major recommendations of this group, whose report has as yet not been

given final acceptance, is to increase the specialization within the techician workforce and increase the basic training given to about double its present length. This approach at least for the near future accepts as a premise that retention will continue to be low and only through more extensive basic training and specialization will it be possible to provide an adequately qualified workforce. Similar problems exist in other enlisted ratings. Unless a greater percentage of personnel can be attracted to a career in the Coast Guard there will be a greater demand for commitment of more resources to training and the capability of the Coast Guard to perform its missions may be degraded. This general problem is beyond the scope of this review and is mentioned only to give perspective to a major difference in training requirements generated in a military organization as compared to civilian organizations with a relatively stable workforce.

B. Organization

The Procurement and Training Division (PTP) in the Office of Personnel has the responsibility both for recruiting military personnel and administering the training functions. Because the great bulk of training is recruit, officer candidate, and basic occupational training, based on an organizational career structure, training requirements are based primarily on attrition losses. To a lesser degree, training resources are acquired or realigned based on changing operational requirements, new missions or acquisition of new hardware. These requirements are levied by the various technical and operating elements of the Commandant's staff. Basic occupational categories, while requiring some new skills, have tended to remain the same for quite some time. In the past five years, only one entirely new rating has been established (Marine Science Technician) and one aviation rating, (Aviation Survival Man) was created by combining the previously existing function of the Parachute Rigger and Aviation Ordnance ratings.

Review and approval of curricula and training methods also falls within the preview of PTP, but generally that division is dependent on the training facilities, technical divisions and operating divisions for content analysis and technical evaluation.

Training is conducted within Coast Guard at seven separate facilities as shown in Figure One. The Coast Guard Academy provides a four year program combining college level education and professional training for cadets, and is the major source of Coast Guard career officers. The Coast Guard Academy was not included in this review since its unique function was regarded as sufficiently self-evident to exclude it from consideration as having resources appropriate to use by other departmental elements, and its basic education function is viewed as serving a different purpose from the job oriented training provided

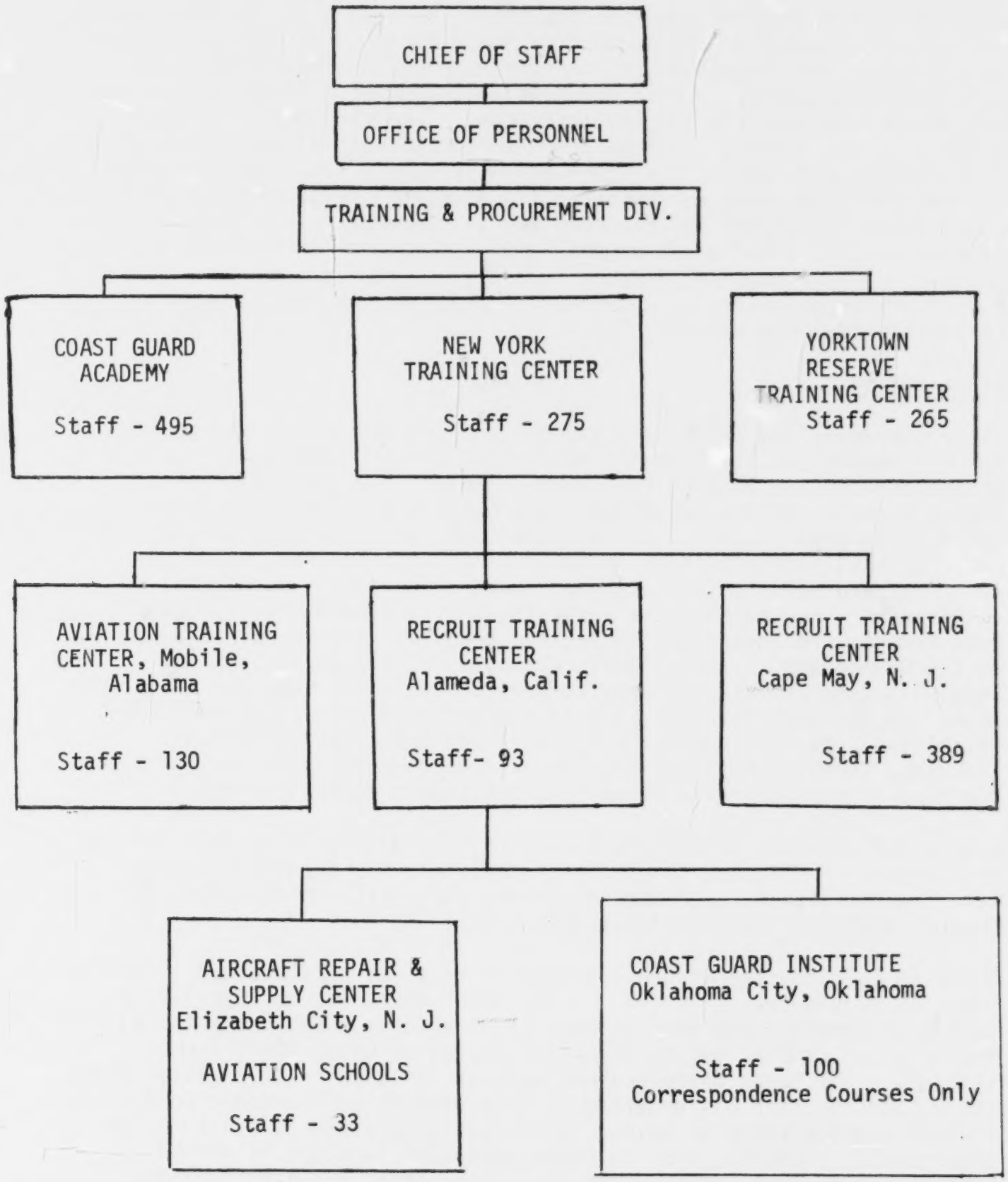
CHIEF OF STAFF
OFFICE OF PERSONNEL
TRAINING & PROCUREMENT DIV.
COAST GUARD ACADEMY
Staff - 495
NEW YORK TRAINING CENTER
Staff - 275
YORKTOWN RESERVE TRAINING CENTER
Staff - 265
AVIATION TRAINING CENTER, Mobile, Alabama
Staff - 130
RECRUIT TRAINING CENTER Alameda, Calif.
Staff- 93
RECRUIT TRAINING CENTER Cape May, N. J.
Staff - 389
AIRCRAFT REPAIR & SUPPLY CENTER Elizabeth City, N. J.
AVIATION SCHOOLS
Staff - 33
COAST GUARD INSTITUTE Oklahoma City, Oklahoma
Staff - 100
Correspondence Courses Only

FIGURE 1

by other training activities.

The overall Coast Guard budget for training is approximately $20,000,000 annually for training conducted in training facilities, whether Coast Guard operated or contracted. This figure does not include the costs of training conducted as On-the-Job Training or operation exercises and unit evolutions such as Search and Rescue and military readiness drills. There are approximately 1200 staff personnel assigned to instructional and support duties (exclusive of the Coast Guard Academy) either at Coast Guard training facilities or in some cases assigned to Navy schools which provide significant amounts of recurring training to Coast Guard personnel.

The output of the entire enlisted training effort is approximately 3100 man years. Officer training including cadets at the Coast Guard Academy, Flight Training, Officer Candidate School, Post Graduate Training and miscellaneous short courses account for about 1300 man years. A breakdown by general category of training is shown in figure two. Each of the facilities is described in the subsequent paragraphs with regard to the nature of training conducted as it relates to possible use by other DOT elements.

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GENERAL CATEGORIES

OF

COAST GUARD TRAINING

OFFICER	
COAST GUARD ACADEMY CADETS	900 myr
OFFICER CANDIDATE SCHOOL	126 myr
FLIGHT TRAINING	60 myr
POST GRADUATE TRAINING	145 myr
SPECIAL SHORT COURSES	90 myr
	1321 myr
ENLISTED	
RECRUIT TRAINING	1100 myr
BASIC SCHOOLS	1905 myr
SPECIAL SHORT SCHOOLS	200 myr
ADVANCED SCHOOLS	15 myr
ADVANCED ELECTRONIC TECHNOLOGY	15 myr
	3135 myr

FIGURE 2

C. New York Training Center (NYTC)

The USCG Training Center, a tenant of the USCG Base at Governor's Island New York, is the primary facility for training enlisted personnel in basic occupational specialities and additionally provides special schools for training in the operation and maintenance of certain electronic systems, maintenance of Aids to Navigation and Search and Rescue. NYTC has a full-time complement of instructor and support personnel numbering approximately 275. Figure three is a complete listing of the schools presently operated at the New York Training Center. The eleven basic occupational schools at NYTC account for all but three of the basic occupational schools which Coast Guard operates. Two aviation basic schools are located at the Aircraft Repair and Supply Center and an Engineman School is located at the Reserve Training Center at Yorktown, Virginia. The remaining basic occupational training requirements are met through the use of Navy basic schools which are discussed separately in this report.

The additional schools at Governor's Island, designated class C schools are special schools serving various purposes. About half are electronic maintenance training schools for equipment peculiar to Coast Guard such as LORAN (Long Range Aid to Navigation). Trainees in these schools are qualified technicians receiving special additional training in the operation and maintenance of these equipments. Another significant segment is training in non-Electronic Aids-to-Navigation for both officers and enlisted personnel. These range from navigational bouys and markers to lightships and their replacements, the offshore light structures. Also included, are courses in Ordance Equipment, Instructor Training and a school in the Administration and operation of LORAN stations for perspective commanding officers. Each of these schools represents a requirement unique to Coast Guard operations and has no utility outside Coast Guard.

The Search and Rescue (SAR) School, which is concerned with teaching Search and Rescue organization procedures and methods, has had some utility outside of Coast Guard but primarily to USAF personnel who share SAR responsibilities in certain areas with Coast Guard. There has been limited participation by FAA personnel, primarily for orientation in SAR procedures because of the interface of FAA's Air Traffic Control responsibilities and Coast Guard's SAR missions.

Basic occupational schools are a training feature unique to Coast Guard because of its military composition. The primary technical workforce is made up of approximately 34,000 enlisted military personnel. This workforce is distributed over 26 enlisted ratings as shown in figure 4. Historically, military organizations have been unable to

COURSES OFFERED
U. S. COAST GUARD TRAINING CENTER
GOVERNORS ISLAND, NEW YORK

CLASS "A" COURSES (11)	DURATION
Commissaryman	16 weeks
Damage Controlman	16 weeks
Electrician's Mate	16 weeks
Basic Electronics	21 weeks
Telephone Technician	27 weeks
Basic Gunner's Mate	18 weeks
Radarman	16 weeks
Radioman	21 weeks
Storekeeper	12 weeks
Yeoman	12 weeks
Marine Science	16 weeks

CLASS "C" COURSES (14)	
Major Aids to Navigation	6 weeks
Minor Aids to Navigation	6 weeks
Radio-beacon Operation	2 weeks
LORAN A Equipment Maintenance	4 weeks
AN/SPS 29 Radar and MK 10 IFF	6 weeks
AN/FPN 38/39 Ground Station Equipment	8 weeks
AN/FPN 41/42 Ground Station Equipment	8 weeks
AN/FPN 44/46 Ground Station Equipment	8 weeks
AN/SPN 29 Receiver Equipment	8 weeks
AN/SPN 30 Receiver Equipment	8 weeks
AN/SPN 39 Receiver Equipment	6 weeks
Ordnance Equipment	8 weeks
Instructor Training	4 weeks
Search and Rescue	4 weeks

OFFICER CLASS "O" COURSES (5)	
Officers Basic Aids to Navigation	4 weeks
Officers Advanced Aids to Navigation	2 weeks
LORAN A/C P.C.O.	3 weeks
Search and Rescue	4 weeks
Search and Rescue (Special)	1-2 weeks

Figure 3

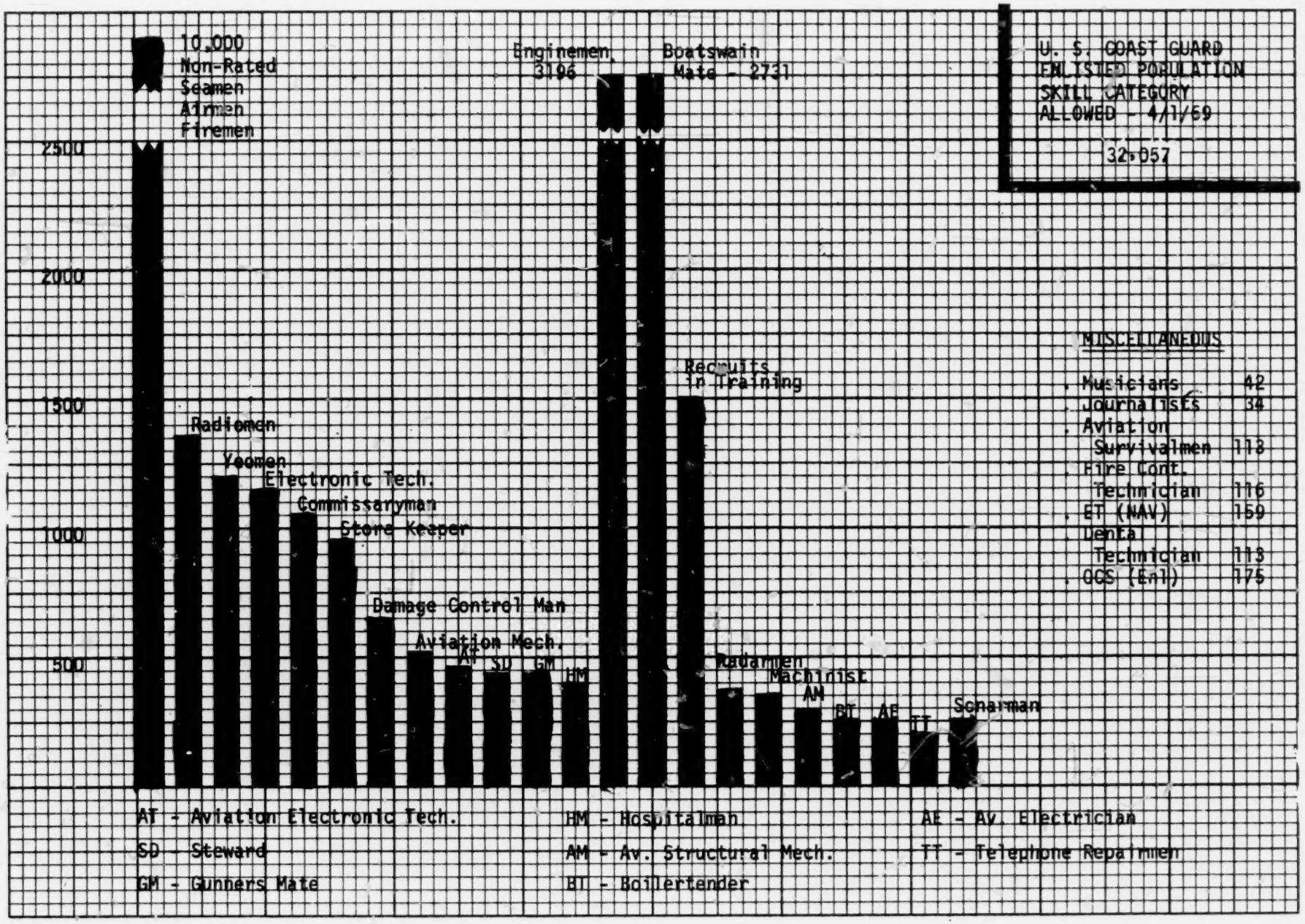

FIGURE 4

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recruit personnel with the necessary technical and military skills and have consequently been dependent on internal training programs to provide qualified personnel to operate and maintain the systems and equipment essential to mission performance.

The basic occupational "Class A" school is the method used to provide the base skills and knowledge which are subsequently increased through experience and in some cases advanced training. The entering trainees are generally young men with a high school education and no specific skills related to the technical specialty. The "A" school function is to graduate a trainee with the capability of an advanced apprentice capable of performing routine tasks independently but requiring supervision and guidance on more complex problems. To accomplish this, the basic school must begin with the most rudimentary skills and elementary principles and then progress to build until the trainee can integrate the skills sufficiently to apply them to specific tasks. It is because of the skill level of trainees and the consequent curriculum structure that basic occupational schools even in occupations such as electronics technician and electricians which are common to FAA and Coast Guard are not suitable for use by FAA. The electronic technicians and electricians in FAA must possess certain prerequisite experience or training which is as a minimum equivalent to that possessed by a Class A school graduate.

Since the availability of plant facilities might offer an opportunity for cost avoidance either by eliminating a building requirement, rental or reducing travel cost, the utilization of facilities at each existing training activity was considered. It is quite apparent that the facilities at Governor's Island offer no such opportunity. On the contrary, the existing facilities are not sufficient to meet projected requirements without some overcrowding and development or construction of new facilities must be constrained by the needs of the other users on the island. Figure 5 is a summary of the space requirements for existing schools projected through 1978, based on established service-wide growth patterns. While these figures are not precise, they clearly indicate that at best the training center can only meet its space requirement and will not provide any unused capacity for other activities. The figures shown in the table are conservative if current growth trends continue. More recent analysis indicates that re-enlistment rates are dropping even lower than those which formed part of the basis for the estimates for training requirements. Most recent indications are that an alternate location must be found for one or more schools.

ANNUAL TRAINEE REQUIREMENTS AND CAPACITY OF BASIC TECHNICAL SCHOOLS
AT U. S. COAST GUARD GOVERNORS ISLAND TRAINING CENTER, N.Y.

FY-YR	Commissary Man		Damage Control		Electrician		Electronic Technician		Gunners Mate		Radarman	
	ROD	CAP	ROD	CAP	ROD	CAP	ROD	CAP	ROD	CAP	ROD	CAP
71	115	297	61	186	210	340	653	840	108	157	106	72
72	160	297	140	186	281	340	877	840	112	157	131	72
73	217	297	151	186	310	340	785	840	149	157	143	72
74	183	297	146	186	330	340	843	840	---	---	158	72
75	216	297	155	186	349	340	931	840	---	---	---	---
76	270	297	176	186	363	340	---	---	---	---	---	---
77	259	297	---	---	382	340	---	---	---	---	---	---
78	266	297	---	---	---	---	---	---	---	---	---	---
	NOTE 1		Remains adequate NOTE 2		Marginal but adjust thru real-location NOTE 3		Reduce requirement by shift basic at school to "E" City		Projected to remain within capacity NOTE 4		Additional space required	

FY-YR	Radioman		Storekeeper		Telephone Technician		Yeoman	
	ROD	CAP	ROD	CAP	ROD	CAP	ROD	CAP
71	307	584	91	228	45	114	141	223
72	572	584	183	228	46	114	213	223
73	519	584	170	228	56	114	235	223
74	---	---	201	228	---	---	250	223
75	---	---	275	228	---	---	472	223
76	---	---	280	228	---	---	---	---
77	---	---	---	---	---	---	---	---
78	---	---	---	---	---	---	---	---
	Capacity remains adequate		Additional space required NOTE 5		Capacity adequate		Additional space required	

NOTE 1: Total requirement 200 greater than shown. Balance to be trained OJT.

NOTE 2: Total requirement 90 greater than shown. Balance to be trained OJT.

NOTE 3: Total requirement 40 greater than shown. Balance to be trained OJT.

NOTE 4: Total requirement 50 greater than shown. Balance to be trained OJT.

NOTE 5: Total requirement 180 greater than shown. Balance to be trained OJT.

FIGURE 5

D. Reserve Training Center

The Reserve Training Center (RTC) at Yorktown, Virginia is not, as its name implies, solely for reserve training, but actually provides a variety of training for both regular and reserve programs. Although acquired for Reserve Training, it has since had other activities added, due to overcrowding at the Coast Guard Academy and the Governor's Island Training Center. In its role of supporting reserve training, the Center provides a centralized facility for reservists from the eastern half of the United States meeting annual active duty requirement, and provides two basic schools for reserve personnel entering on initial active duty. The training in support of Coast Guard Regular programs includes an Officer Candidate School, Merchant Marine Safety, a basic Engineman School, Port Safety and Law Enforcement, an Outboard Motor School and classes for orientation of officers commissioned into the Coast Guard from sources other than the Coast Guard Academy or Officer Candidate Schools. The Training Center has a staff of 265, including support personnel and processes about 6800 students per year. Of this number about 3100 are reservists on two weeks active duty, primarily during the summer months.

Training conducted at the Reserve Training Center is with the exception of the Engineman School directed to missions unique to Coast Guard. A brief description is given below of the major training provided.

1. Officer Candidate School

The OCS conducts a 17-week course designed primarily to prepare selected college graduates and enlisted personnel for duty afloat as Coast Guard officers. Classes from 150 to 250 are conducted twice annually in the fall and spring. The OCS courses are directed toward providing basic military and nautical skills required of junior officers. These include Coast Guard orientation, military justice, communications, navigation gunnery, anti-submarine warfare and seamanship.

2. Engineman School

The engineman school is a basic school which develops the skills necessary for the operation and maintenance of internal combustion engines and associated equipment. The curricula ranges from basic use of tools to the theory of operation of internal combustion engines and includes practical alboratory experience in the repair of diesel engine equipment. Like all basic schools, graduates are developed to an apprentice level skill upon completion.

MSC

3. Port Securityman School

This is a twelve week basic course in Port Security functions, methods and regulations for reserve personnel on initial active duty. It is intended to train reservists for augmentation of Port Security forces in time of war or national emergency. Four of the twelve weeks are normally spent in on-the-job training at a unit involved in Port Security.

4. Merchant Marine Safety

A twelve week course designed to provide Coast Guard officers being assigned to Merchant Marine Safety duties with basic training in the method and techniques of vessel inspections, marine casualty investigations and marine personnel investigations.

5. Port Safety and Law Enforcement

The Port Security and Law Enforcement School conducts a four week course devoted to Coast Guard functions and responsibilities for safety in the U. S. ports with regard to such matters as compatibility of cargo stowage in vessels and water front storage areas, notification of entry of vessels, water front facility safety inspection, control of access of waterfront areas and fire fighting. Also covered are such topics as riot control, shipment of radioactive material, procedures in case of suspected sabotage and various administrative procedures.

6. Reserve Active Duty Training

A major function of the Reserve Training Center is to provide a facility for Reserve personnel to receive two weeks of training annually in an active duty status. This training is intended to upgrade and refresh skills acquired while serving on initial active duty and supplement training achieved during weekly drill periods held throughout the year at local reserve units. About 2800 reservists undergo training each summer at the RTC and 200 to 300 receive special training during the winter months. The majority of the courses are in occupational specialties (ratings) which are counterparts of the regular forces such as Boatswain Mate, Storekeeper, Yeoman, Quartermaster and Gunners Mate. These are generally taught at two levels--basic and advanced. Basic courses are a somewhat condensed and simplified versions of the basic courses taught in regular service schools. These courses are primarily for Reservists whose initial active duty training included only recruit training and OJT over a five month period. Advanced

courses are provided for Reservists who have previously completed basic courses. In addition to the courses which parallel regular basic schools, training is conducted in Port Security functions, Dangerous Cargo handling and in the operation, organization and administration of Captain of the Port functions.

E. Aircraft Repair and Supply Center (ARSC)

Two basic aviation training schools for Aviation Mechanics and Aviation Electronic Technicians and a Class C Electronic Equipment School are located as an element of the Aircraft Repair and Supply Center, Elizabeth City, North Carolina. The Aircraft Repair and Supply Center has as its primary function the overhaul of certain types of Coast Guard aircraft and provides a centralized supply facility for all Coast Guard aviation units for aircraft components. The ARSC is colocated with the Coast Guard Air Station, whose primary responsibility is search and rescue. The two activities share common airfield facilities as well as messing and berthing facilities. The Aviation Mechanic School has been a component of the ARSC for almost as long as Coast Guard has provided its own training in this function. The Aviation Electronic Technician School is a recent addition which was established in 1965 when it became evident that training being obtained at U. S. Navy Schools was not well suited to Coast Guard needs and was not reliable in terms of available quotas, as Navy requirements increased.

1. Aviation Machinist School (AD)

The Aviation Machinist School (AD) is a relatively small activity with a staff of 13 and an approximate annual input of 140 students. Like all basic occupational schools the AD school is designed to input young men with little or no skills related to aircraft maintenance and graduate an apprentice-level performer who is capable of performing simple tasks independently but requires guidance and supervision on more complex operations. Training covers a full range of skills and knowledge elements ranging from the proper use of hand tools through the principles of aircraft mechanical systems with particular emphasis on aircraft power plants and accessory systems. The present training curriculum covers a 27-week period.

2. Aviation Electronic Technician School

The Aviation Electronic Technician (AT) School provides both basic occupational skill training and special training on electronic equipment peculiar to Coast Guard. It is, like the AD school, relatively small, with a staff of 20 and an annual input of about 100 into the 28-week

basic course. Until recently, students entering the AT school were graduates of the basic electronic technician schools at the Governor's Island Training Center. Overcrowding at the Governor's Island facility required relocation of some training and a realignment of the Aviation Electronic Technician School to provide training from basic principles through equipment familiarization seems a logical arrangement which should eliminate certain apparent duplications which previously existed. The AT school also provides training to experienced technicians in equipment peculiar to the Coast Guard. This training is generally limited to four or five equipments which will vary according to current needs. Currently, courses are conducted in maintenance of an airborne computer (AYN-1), doppler radar (APN-175) a LORAN receiver (APN-180) and a radar altimeter (ARN-79).

3. Discussion

There is some division of opinion among Coast Guard personnel as to the desirability of having two small schools as a component of an organization whose primary function is aircraft overhaul and central logistics support. There is some belief that these circumstances do not provide sufficient management attention to training as a primary function and and that the isolation of a small training group tends to deter improvements in support resources and training methods which would accrue at a facility devoted primarily to training and with a larger student base. Proponents of this view believe that if the AD and AT schools were centralized with flight training activities at the Coast Guard Aviation Training Center, a better overall training effort could be developed. Such relocation might also offer the opportunity to include Aviation Electricians in a newly established school complex. Aviation Electricians currently receive basic training at the Naval Training Center at Jacksonville, Florida and there is some evidence to suggest that significant portions of the Navy training are not relevant to Coast Guard requirements.

No attempt was made in this study to form a judgment as to the ultimate desirability of such a relocation, but on the surface it seems an attractive possibility.

The question of the location of these schools is currently under study by a Coast Guard panel which is conducting a broad study of the status and needs of aviation training in Coast Guard, including the desirability of continued use of certain Navy schools. The results of this study should provide a basis for determining the desirability and feasibility of the relocation of the AT and AD schools.

F. Aviation Training Center (ATC)

The Aviation Training Center located at Mobile, Alabama, is the Coast Guard's only in-house pilot training activity. At present, the ATC offers training in the two types of rotary wing aircraft which comprise Coast Guard's helicopter inventory. Fixed wing training in the HU-16E Grumman Amphibian was previously conducted at ATC but was terminated in July 1970 in order to utilize the aircraft for Search and Rescue purposes. In addition to its training function, the ATC is the base for an Icebreaker Support Section which supports 14 HH-52 helicopters for deployment aboard Coast Guard Icebreakers engaged in polar operations and three fixed wing HU-16E aircraft currently committed to Search and Rescue missions in the eastern gulf regions. The ATC has a total staff of 350 of which 130 are engaged in or support the training activity.

Pilot training is conducted by the Training Section (TRASEC)of the ATC in the HH-3F and HH-52A helicopters. The HH-3F is an amphibious twin engine single rotor helicopter equipped for medium range search and recovery. The HH-52A is a single engine, single rotor amphibious helicopter equipped for short range search and rescue. These two helicopter types comprise over 50% of the total Coast Guard aircraft inventory.

The TRASEC conducts two types of pilot training--qualification and transition. Qualification training is devoted to providing designated aviators with only fixed wing aircraft background with a helicopter rating and a co-pilot qualification in the type helicopter used. The HH-52A is used for this type of training since it is less complex than the larger HH-3F and offers a simpler vehicle for initial training. The requirement to convert fixed wing aviators to helicopters is generated by service needs as aviators are rotated between air units. Coast Guard Aviators receive their initial training and pilot designation as either fixed wing or rotary wing pilots from the Naval Air Training Command. A variety of factors influencing the assignment of aviators often requires that the fixed wing pilot also acquire a rotary wing qualification at some point in his career. The TRASEC Qualification training provides the initial rating of co-pilot which is then upgraded to Aircraft Commander by further training at the Aviation unit to which the pilot is assigned.

Transition training is designed to provide a pilot with a helicopter designation with the specific skills and knowledge necessary to operate the HH-3F or the HH-52A helicopter in a safe and efficient manner. Pilots trained in the HH-52A are generally recent graduates of basic flight training whose limited helicopter experience has been

in other types of helicopters or pilots commissioned directly into the Coast Guard from the other armed services. HH-3F trainees may be qualified as a co-pilot or first pilot depending on the amount of helicopter experience they possess. Training syllabus are very similar but the first pilot designee must perform to a higher standard and possess certain minimum hours of flying experience.

The TRASEC operates three HH-3F and four HH-52A helicopters. These resources are not sufficient to train all the Coast Guard aviators requiring training in these aircraft and some pilots must be given qualification training at the air unit to which assigned. Approximately 80 Coast Guard pilots are trained annually by the TRASEC.

The available resources at the Aviation Training Center are limited and generally cannot fully satisfy Coast Guard's own training requirements. No training requirement for HH-52A type aircraft exists in FAA. The FAA does have a small requirement for training Flight Standards Inspectors in the S-61 helicopter which is a commerical version of the HH-3. However, it is doubtful that Coast Guard could provide this training in view of its own needs.

G. Recruit Training Centers - Alameda and Cape May

Recruit Training Centers are located at Alameda, California, and Cape May, New Jersey, to serve as basic indoctrination facilities for recruits entering Coast Guard from the western and eastern halves of the United States. Recruit Training provides the process whereby young men without previous service are indoctrinated into the military organization and equipped with basic military and nautical skills. Recruit training is largely concerned with seamanship, military drill, small arms handling, orientation to the Coast Guard, shipboard damage control and military conduct and discipline. Recruit training requires nine weeks. Upon completion, graduates are assigned to basic technical schools or directly to operating facilities. About 6,000 recruits (approximately 4,000 at Cape May and 2,000 at Alameda) are inducted annually and account for 1100 man-years of training. Cape May has a staff of 389, including support personnel, and conducts only recruit training. Alameda has a full-time staff of 93 directly assigned to the Training Center with additional support services provided by Alameda Base personnel.

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The purely military and naval nature of recruit training clearly precludes any utility to the civilian components of the Department of Transportation.

The Recruit Training Center in Alameda also serves as the centralized facility for reserve two week active duty training programs for the western half of the United States in much the same manner as the Reserve Training Center (RTC) at Yorktown does for the eastern portion. Sixteen schools are available for reserve enlisted personnel at Alameda and ten for Officer personnel.

As in the case of the RTC, enlisted courses are the counterpart of training for the regular enlisted forces at either the basic or advanced level. In addition to enlisted occupational specialty courses, training is conducted in Firefighting, Leadership, Port Security and Dangerous Cargo Handling. Officer courses are conducted for Deck Watch Officers, Merchant Marine Safety, Indoctrination, Leadership, Training Officer, Prospective Commanding Officer, Executive Officer, Captain of the Port functions, Dangerous Cargo and Firing Range Officers. Reserve Personnel handle most of the instruction and program administration for the Alameda Training Center reserve training programs.

The Reserve active duty training courses are peculiar to Coast Guard and are of no apparent utility or interest to other DOT elements.

H. Coast Guard Institute

The Coast Guard Institute has two major functions--the development and administration of correspondence courses and the management of the Coast Guard service wide examination system. Service wide examinations are a major element in the advancement of enlisted personnel. Each enlisted man seeking advancement to the next highest grade must compete with all other personnel of the same grade and rating in a written examination. The results of this examination combined with other factors such as length of service are used to establish a ranking of candidates for promotion. The majority of correspondence courses administered by the Institute provide the study material on which the examinations are based. Of some 113 courses administered by the Institute, 88 are for enlisted ratings, 9 for officers and 6 are of a general nature.

The Institute is located as a tenant activity at the FAA Aeronatical Center in Oklahoma City. The Correspondence Course Division of the Institute was relocated at the Center in 1967 to take advantage of computer and printing facilities. The Examination Division which

had been located at the Governor's Island Training Center was re-established as part of the Institute in the fall of 1969. The Institute has a staff of 100 and processes slightly less than one quarter of a million correspondence lessons annually from a student enrollment of approximately 17,000. The Examination Division processes about 13,000 examinations annually.

The location of the Institute at the FAA Center has not produced any significant interplay regarding the technical content of course materials. The Coast Guard courses are directed to Coast Guard occupations and methods which are not compatible with FAA requirements. The location has provided the Institute with excellent support facilities which might otherwise not be available. Coast Guard has made some use of FAA courses on Course Development.

I. Navy Training

Coast Guard has traditionally used a variety of Navy training programs ranging from basic occupational schools to military readiness operations conducted with Navy commands. The use of Navy basic schools is a natural development since a number of the enlisted ratings are essentially the same in Coast Guard and Navy and the much larger Navy training programs could absorb Coast Guard requirements at much less cost than a separate program would require. At present Coast Guard utilizes eleven Navy basic schools which provide about 360 student man years of training. A breakdown of these schools is shown in figure 6. Navy makes no direct charge for Coast Guard students but is supported by the assignment of Coast Guard personnel as instructors and in-support positions.

The Navy also furnishes flight training for initial qualification to all Coast Guard aviators through the Naval Air Training Command. About 40 to 50 Coast Guard officers undergo flight training annually. In this instance Coast Guard furnishes pilots to the Navy for flight instructor duty and reimburses Navy for other costs based on the flight hours provided. This has been a highly satisfactory arrangement for a number of years and furnishes Coast Guard with pilots at a cost considerably less than an in-house program.

A third major use of Navy schools arises from the requirement for Coast Guard to operate as a service under the Navy Department in time of war. This relationship has led to Coast Guard use of a good deal of Navy designed equipment particularly in the categories of ordnance equipment, sonar and electronic systems. Since Navy operates schools for the operation and maintenance of much of this equipment it is only logical for Coast Guard to use these schools, particularly since training is furnished at no cost.

NAVY FURNISHED TRAINING
CLASS A

		Dur.	Quota	M-WKs	M-Yrs
FT	(Fire Control Technician)	31 wk	76	2356	47
GM	(Gunnersmate)	18 wk	179	3222	64
HM	(Hospitalman)	22 wk	60	1320	26
JO	(Journalist)	10 wk	14	140	3
MM	(Machinist Mate)	15 wk	94	1410	28
QM	(Quarter Master)	12 wk	144	1728	35
SO	(Sonarman)	36 wk	108	3828	77
BT	(Boiler Tender)	15 wk	60	900	18
					298
	AVIATION				
AE	(Aviation Electrician)	23 wk	60	1380	35
AM	(Aviation Structural Mechanic)	23 wk	40	920	19
ASM	(Aviation Survivalman)	20 wk	20	400	9
					63

Figure 6

The use of Navy schools, while it has generally been very economical for Coast Guard, has not been without some drawbacks. Coast Guard cannot obtain firm long term quota commitments for Navy schools and the quotas it does receive are dependent on Navy requirements at any given time. Another problem area is that of curriculum control in basic schools. Since the Navy schools are geared to Navy needs they often contain some material not relevant to Coast Guard personnel. The degree to which differences exist between Navy training and Coast Guard skill needs is not precisely known and probably varies in the different schools. Sufficient comment on the inadequacy of some aviation training has led to a review of these schools as part of an overall study of the Coast Guard programs of aviation training.

While it would be desirable to have all training programs of a subject to a greater degree of control, both as regards to quota control and curriculum, it is not practical as a short term measure. Coast Guard training facilities are already operating at maximum capacity and the cost of establishing and equipping schools to meet the requirements presently supported by Navy schools would not outweigh the benefits to be gained.

VII. FEDERAL AVIATION ADMINISTRATION

A. General

Technical training in the Federal Aviation Administration is not surprisingly devoted primarily to the occupational groups essential to performance of the three major operational functions of the administration--air traffic control, air navigation facilities and civil aviation safety. Training requirements other than those for Air Traffic Controllers are generated primarily by: new hardware, particularly electronics; expansion of the workforce; and in the case of flight standards inspectros, a requirement for periodic refresher training. The workforce is relatively stable except for the current Air Traffic Controller expansion and turnover is not a major source of training requirements. The major portion of FAA technical training needs are met in-house through the FAA Academy at Oklahoma City, or field facilities. Formal programs are conducted largely at the Academy but there is a large undocumented amount of on-the-job training conducted at facilities for technicians and controllers. A number of limited requirements are met using out of agency sources. These generally are categorized by a small volume of trainees and high cost for resources such as aircraft or electronic systems. A number of electronic systems are USAF type, and USAF training is used.

B. Scope

In FY-71 FAA budgeted 43 million dollars for training, the major portion of which was devoted to technical training. More than 19,000 training actions were programmed with course lengths varying from one to 36 weeks in length. A training staff of approximately 1,100 is maintained of which over 900 are centralized at the FAA Academy. Formal centralized programs accounted for over 1400 man years, a figure which has more than doubled since FY-69. The major portion of the increase is attributable to the reactivation of centralized Air Traffic Control Training. A small but increasingly important requirement is training being phased-in, in support of the maintenance and operation of the automated Enroute Control element of the National Airspace System.

C. Organization and Management

The Office of Training under the Associate Administrator for Manpower assigned overall responsibility for the direction of training. Within the Office of Training, the Technical Training Division provides a subject matter expertise and the Planning and Program Requirements Division is responsible for translating training requirements into

planned training program and budgetary levels for upcoming fiscal years.

FAA has a well established formal procedure for determining the need for a training program and assigning responsibilities for its development and the allocation of dollar and human resources. The procedure is published and established as organization policy through the FAA Training Handbook. Generally, the need to establish a new training program and a preliminary estimate of the number of trainees is determined by the headquarters service with technical responsibility. Most frequently this is the Air Traffic, Systems Maintenance or Flight Standards Services since these activities generate about 90 per cent of the technical training conducted by FAA. An initial "Training Course Proposal" is prepared by the activity requesting the training with assistance from the training staff as necessary. Given the desired training outcomes, number of trainees, completion schedule and special resources required, the proposal is evaluated for feasibility in terms of available space, dollars, people and equipment. After a determination that sufficient resources are available or attainable, the training proposal is used as a basis for a training plan. The training plan provides a format and method for comparison of alternative sources of training, which usually involves resident training, on site training at a facility or contractor training.

Resident training at the FAA Academy requires a further determination whether conventional or Student Centered training is most appropriate. "Student Centered Training"(SCT) is the FAA designation for a type of classroom training which utilizes student responders and a highly structured format. The format involves the use of techniques similar to programmed instruction and consequently involves much higher development costs than for conventional training. SCT is generally believed to be much more effective than conventional methods in student learning and efficient in use of classroom time. The decision thus is one of balancing development cost against effectiveness, frequency of use and stability of course content. The completed plan prepared by FAA headquarters or the FAA Academy, as appropriate, is then reviewed by the service and the training staff to insure that it meets the stated requirements and that resources are adequate.

The definition of technical content of each course is the responsibility of the sponsoring activity and is expressed in the training proposal and plan in terms of the training outcomes expected. The training outcomes are necessarily stated in rather gross terms and their interpretation and restatement in the specific form of curriculum material is left to the judgment of the course developer. If there is a weakness in the system it is in the area of precision of language in the

training outcomes statements. The FAA has recognized this tendency and has developed job training standards in some occupational areas, which provide a basis for more precise communication with the course developers. This area is one, however, which will require continuous effort to avoid the problems which might arise.

D. Field Training

FAA is unique within the Department in having sizable numbers of employees of its technical workforce concentrated at various locations. The largest of these are Air Traffic Controllers stationed at Air Traffic Control Centers and Terminal Facilities. A smaller, but significant concentration, is found in the Electronic Technician workforce. An appreciable, but incompletely documented, amount of on-site training is provided for these groups.

Technician facility training which has in the past been largely performed by on the job training is being somewhat more formalized through the "Integrated Training" concept which is discussed in the section of this report on Training Methods. Air Traffic Control training is conducted on several levels. These consist of initial and basic training for new hires at the EnRoute Centers, on-the-job qualifications for Terminal controllers with prior experience and proficiency, and upgrade training for journeymen controllers. Under current programs, only the initial and basic training for new hires in the ARTCC's is conducted based on centrally developed programs. This "initial" training provided new hires at the ARTCC is a new program which was instituted as a result of recommendations by the Air Traffic Controller Career Committee (Corson Committee). The Committee recommended that the practice of sending new hires directly to the FAA Academy for "basic" training be discontinued and that instead, they be given orientation and basic instruction at the facility. This recommendation was designed both to expose the new employee to actual working conditions (which past experience indicated as a cause of voluntary separation) prior to expensive training and to free Academy resources to provide intensive environmental training which would allow accelerated development of the trainee to journeyman qualifications. This program was established in the Fall of 1970 and EnRoute facilities were furnished with training packages developed by the FAA Academy.

Upgrade and proficiency training is left to the discretion of the individual facilities. Although the Air Traffic Control Qualification Manuals provided detailed guides for facility training, there are indications that the quality of programs varies considerably and that standardization is not maintained. It appears desirable that standardized training packages should be centrally developed and

monitored much in the same fashion as was recently done with basic controller training.

E. FAA Academy

The FAA Academy, which is a part of the FAA Aeronautical Center at Oklahoma City, Oklahoma, provides a centralized facility for all FAA technical training except that which is conducted on-the-job at facilities or contracted out-of-agency. In addition, the Air Traffic Control training is being conducted at the National Aviation Facilities Experimental Center at Atlantic City, New Jersey as an interim measure but will ultimately be replaced when the necessary simulation facilities are available at the Academy.

The Academy is organized into seven branches under the direction of a superintendent and management staff as shown on Figure 7.

1. Air Traffic Control Branch

Air Traffic Control training is designed on three options which correspond to the three general kinds of air traffic facilities:Enroute; Terminal; and Flight Service Station.

a. Enroute Option

As previously noted, the Enroute training program was revised in in the fall of 1970 to shift "basic" material from the Academy to the facilities in order to allow Academy facilities to be utilized for upgrading training. Such material as familiarization with the airways structure, navigational aids, aircraft characteristics, weather, Federal Aviation Regulations and basic flight data position training have been assigned to the Air Route Traffic Control Centers, supported by training material packages developed by the Academy.

The Enroute training at the Academy now centers on developing the trainees' ability to actually integrate their skills and knowledge through laboratory exercises in the control of air traffic. Both manual control (non radar) and radar control procedures are emphasized in the nine week course. Manual control labs have been reconfigured to provide a more realistic type of training. Under the previously existing "basic" training concept, entirely new hires were manual control training on standard sectors. Under the new configuration, trainees are brought in teams from a facility and trained in two sectors which simulate the actual configuation of air space, communications and traffic

FAA ACADEMY
ORGANIZATION & APPROXIMATE STAFFING

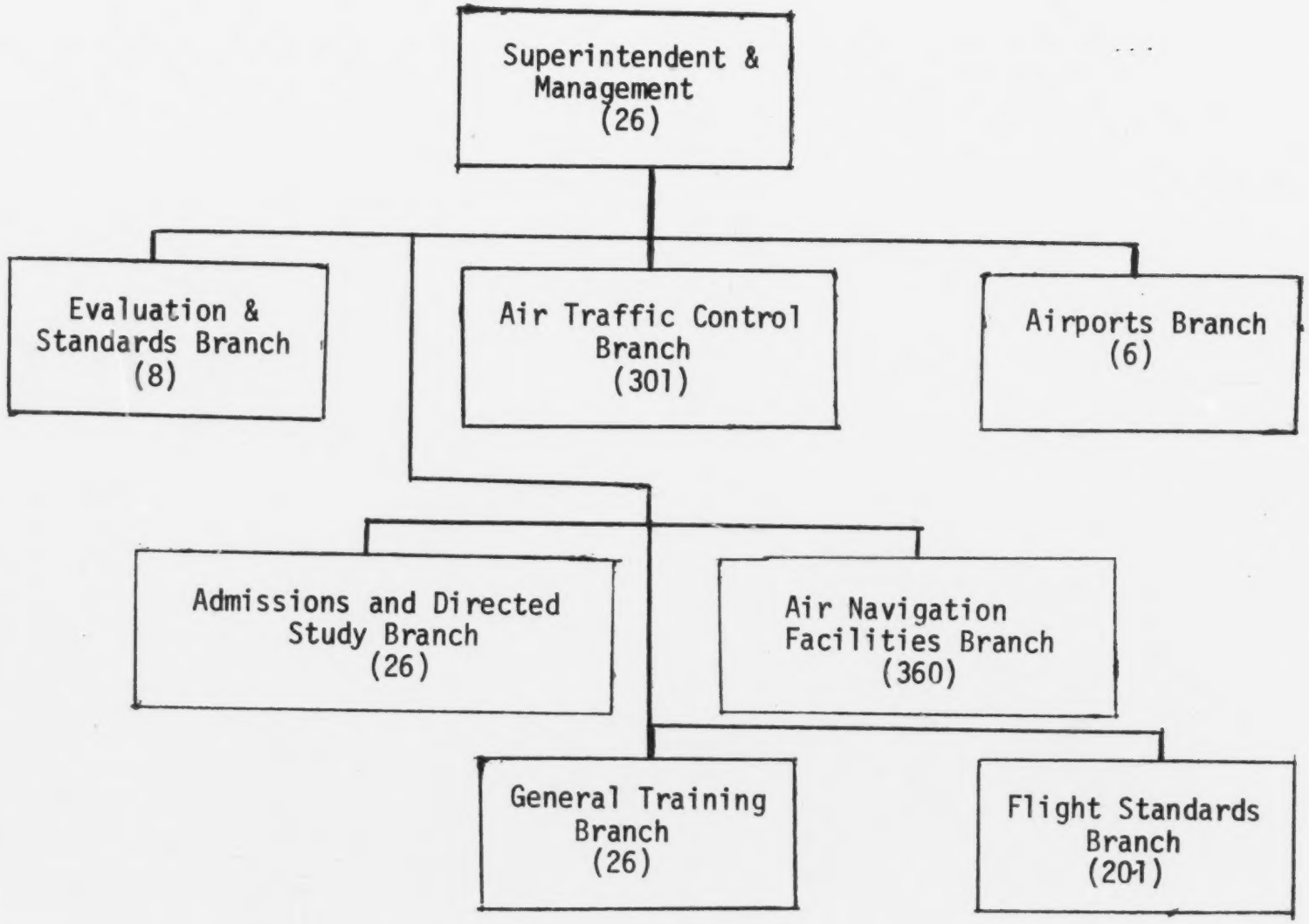

FIGURE 7

3229

which would be encountered at the facility to which they are assigned.

Radar control procedures are also taught, covering fundamental principles of radar, beacon code assignments, identification, vectoring, radar handoff procedures, radar separation departures and arrivals and emergencies. Simulation capabilities at present however, are very limited, due to obsolete equipment which does not have the capability for configuation into different sector simulation and provides very poor target displays. At best the current radar simulation can provide a tool for limited practice application of radar control. As previously indicated, the FAA is taking steps to correct this problem.

b. Terminal Option

Trainees in this option are prepared through a nine week training period to perform flight data position duties in an airport tower and acquire sufficient skills and knowledge to progress subsequently to ground control, local control, radar arrival and departure control positions through on-the-job training experience. A number of the training elements such as standard communications, terminology, airways structure, flight plans are basic to the terminal controller as well as the enroute controller. The terminal controller, however, is primarily concerned with controlling aircraft either prior to handoff to the enroute control (departures) or after accepting control from enroute (arrivals). The terminal curricula covers Federal aviation regulations with emphasis on the airport and terminal area environment.

Controllers slated for placement in the terminal option may either be sent to the Academy at the beginning of their tours-of-duty, or go directly to the terminal for on-the-job training depending on the nature and depth of their prior experience. This determination is made on an individual basis at the time the potential terminal controller is hired.

c. Flight Service Station Option

The Flight Service Station training consists of a fourteen week course designed to provide a trainee with the capability to perform at any of the six duty positions found at a Flight Service Station with moderate supervision. These six positions are flight data, teletypewriter, weather observer, broadcast,

pre-flight and inflight. Flight Service Station trainees are given a somewhat more complete indoctrination in a variety of skills than their Enroute and Terminal counterparts because the stations are generally small and have less capability to provide on-the-job training.

Upon completion of training at the Academy, students are assigned to Flight Service Stations where they often must perform any or all of the six functions with limited supervision and are upgraded to full capability by on-the-job training.

d. Conclusion

Air Traffic Control training is unique to the FAA within the Department and has no utility to other elements.

2. Air Navigation Facilities Branch

This branch provides training primarily for electronic technicians engaged in maintaining a vast array of communications, navigation and data processing systems. On a smaller scale it also offers training in electro-mechanical systems including teletype, gasoline engines, generators, visual navigation equipment and air conditioning.

The technicians trained by the ANF branch maintain the air navigation systems such as VOR and TACAN, the instrument landing systems (ILS), air to ground communication equipment, radar and microwave links, data processing equipment and teletype equipment. Some appreciation of the magnitude of the maintenance requirement can be gained by noting that the VOR and TACAN stations, providing the basic air way structure in the continental United States, number almost 1700.

The ANF branch conducts 58 separate training courses ranging from one to 36 weeks. The majority of the courses are from two to four weeks in length. Approximately 8600 training actions are programmed for FY-71.

The training provided by the ANF branch with the exception of courses in transistors and Data Processing Principles is concerned with electronic and electro-mechanical systems which are found only in FAA. The courses are tailored to specific equipment and have little application or utility outside of FAA.

One course of radar principles is to a degree an exception. Because of the variety of different radar equipments that are in service it has not been practical to establish a separate course for any but the

more common types. In order to provide a knowledge of radar systems in sufficient depth to allow proper maintenance with a minimum of on-the-job training and use of technical manuals, a course has been developed which emphasizes principles, functions, and methods common to all radar systems.

In addition to the resident courses, the ANF branch administers 35 additional courses and conducted out of agency through USAF and commerical sources. These courses cover equipment not found in DOT outside FAA with one exception. The TSEC/KW-26 is a cryptographic teletype system common to FAA and USCG. Coast Guard obtains training from Navy at no direct cost. FAA obtains training from USAF at minimal cost.

The majority of courses taught by the NAF branch are equipment controlled, i.e. the necessity for large and expensive electronic equipment which can be taken out of service for hands-on servicing is mandatory. In general, this precludes extensive training at facilities since equipment servicing an operational requirement cannot routinely be made available for training. Duplication of equipment and providing sufficient instructors at facilities would be less efficient and probably result in less effective training through dilution of effort.

In recognition of the significant percentage of cost of centralized training attributable to per diem payments, an effort has been made to reduce the time trainees must be in resident training through individual study prior to entering classroom training and supplementary on-the-job training at the facility on completion. This program which FAA has dubbed Integrated Training Program should provide some cost savings if its potential is fully developed.

3. Flight Standards Training Branch

The Flight Standards Branch provides training for occupational specialties within FAA engaged in the surveillance of civil aviation operations and maintenance, flight inspection of FAA operated navigational systems and to a lesser degree the operation and maintenance of the FAA aircraft fleet. In FY-71 the FS branch will conduct approximately 120 courses for an estimated 2800 inspection and maintenance personnel. Training covers indoctrination of newly assigned technical specialists into the regulations and procedures which govern civil aviation operations, special technical courses, and recurrent qualification and standardization. A significant portion of the training activity involves flight operations to train inspector pilots.

In addition to training conducted at the Academy, the FS branch administers out of agency training to meet needs for which FAA has no resources. The majority of these requirements are for flight training and maintenance in civil aircraft which cannot be met economically in house. The governing parameters are generally a relatively low volume of training requirements coupled with the high purchase cost of aircraft or systems. The training programs conducted by the FS branch are classified into six general categories:

Engineering and Manufacturing
Air Carrier Operations
General Aviation Operations
Aircraft Maintenance
Avionics
Flight Inspection

a. Engineering and Manufacturing

Thirteen Engineering and Manufacturing courses are conducted primarily for FAA inspectors and Engineers responsible for insuring compliance with Federal Aviation Regulations and standards in the manufacture, certification and design review of aircraft and aircraft systems. A basic course in Manufacturing Inspection is conducted to qualify personnel newly assigned to manufacturing inspection duties and a Manufacturing Inspection standardization course is provided to refresh experienced inspectors and insure uniform application of rules and standards. Short courses in technical specialties are conducted in subjects such as Non-Destructive Test Methods, Aircraft Load Analysis, Aircraft Flutter and Aircraft Vibration. Engineering and Manufacturing courses represent a rather small portion of the FS training program involving about 200 training actions and 8 to 10 man years.

b. Air Carrier Operations

Air Carrier Operations courses are devoted primarily to the initial qualification and recurrent standardization of Inspector pilots and Inspector Pilot/Flight Engineers in aircraft in use by the civil air carriers. Training is provided at the Academy for seven air carrier type aircraft and out of agency training is contracted for an additional six types.

A listing of aircraft types is shown in figure 8. Pilot training is conducted in the generally accepted fashion utilizing ground school, simulators or procedural trainers and flight operations. Academic portions of the training cover aircraft systems, powerplants, aircraft performance data, normal and emergency procedures, flight characteristics and procedural requirements. The procedural requirements are devoted to application of Federal Aviation regulations and the methods used to conduct enroute checks of air carrier personnel, oral examinations and evaluate the adequacy of air carrier training programs. In addition to Pilot Inspector training, shorter courses are provided for personnel requiring general familiarity with an aircraft but not directly engaged in inspection activities.

c. General Aviation Operations

General Aviation Operations Courses provide pilot training for much the same functions as the air carrier programs but are of course concerned with operation of a different type of aircraft and different regulation requirements governing the operators. The general aviation flight inspection functions range from light single engine private aircraft to helicopters to executive business twin jets whose performance approaches air carrier type aircraft. Aircraft types used are shown in figure 9.

d. Maintenance-Inspection

Maintenance training is conducted in a variety of aircraft systems and equipment to meet FAA needs for Maintenance Inspector/specialists, electrical/electronic inspector/specialists, general aviation maintenance inspectors, airborne instrument specialists and manufacturing inspectors. Aircraft systems courses covering fuel systems, hydraulic systems, flight controls, flight instruments, auto pilot systems, pressurization, air conditioning and power plants are conducted for seven of the major air carrier aircraft in use. These equip the maintenance inspector/specialist to judge the airworthiness of the aircraft, insure that air carrier maintenance procedures are adequate for continued safe operation and and analyze failures and malfunctions and determine that adequate corrective action has been taken.

AIR CARRIER OPERATIONS
AIRCRAFT TYPES

FAA ACADEMY

DC - 9

B - 737

LOCKHEED L - 188

DC - 6

DC - 3

CU - 340

CU - 580

GRUMMAN G - 159

OUT OF AGENCY

B - 747

B - 737

DC -8

BAC -111

MARTIN - 404

FH - 27/227

GULF STREAM II

CV - 880

DC - 10

VISCOUNT

CANDAR CL - 44

Figure 8

GENERAL AVIATION
AIRCRAFT TYPES

FAA ACADEMY

NA - 265

TV - 2

T - 34

BE - 55

AERO COMMANDER

LEAR JET

OUT OF AGENCY

DEHAVILLAND TWIN OTTER

NORD - 262

C - 46

S - 58 (HELICOPTER)

VS - 11

S - 61

HANSA - 320

LEAR JET - 25

BEECH KING AIR

BEECH 99

Figure 9

The electrical, electronic, auto pilot and integrated instrument systems used in modern aircraft are covered in a group of seven courses designed to train electrical/electronic and/or airborne instrument specialists to perform surveillance of maintenance facilities and systems. The subject matter deals with technical principles, representative systems and the Federal Aviation Regulations pertinent to maintenance, calibration and installation of these systems.

e. Avionics

Seven courses are conducted primarily in support of FAA requirements for maintenance of systems installed in agency aircraft. The available training does not cover all of the avionics equipment used in FAA but is limited to the equipments which are in inventory in sufficient number to allow reasonably efficient centralized training. The various aircraft used by FAA - 25 different types - are configured with a variety of avionics equipments. A number of these are found in small quantities. Maintenance capability is generally achieved through on site training or in some cases not currently required because of work force experience. This is most likely true with systems which have been in inventory for a period of several years.

Avionics courses cover FAA Aircraft and Avionics Maintenance Inspection Systems, Sabreliner Avionics equipment, Aircraft Navigational Aids, Pulse Equipment Guidance Systems and a one week course on an FAA solid state VOR/ILS receiver. Of the specific electronic equipments covered in these courses only three are common to FAA and Coast Guard. Of the three, two are available to Coast Guard at no cost from Navy schools. The third is a VHF transceiver for which Coast Guard has no formal training requirement. Maintenance requirements are met through on site training.

f. Flight Inspection

Flight inspection training meets the FAA requirement to insure the operational accuracy of the various electronic aids to navigation it operates and maintains for the airway structure and airport approach systems. Training is provided for pilots in the special flight techniques necessary for test and calibration and for technicians in operating and maintaining test systems aboard the aircraft used to conduct inflight inspection of various navigational aids.

Two courses are conducted in the operational techniques required for the Semi Automatic Flight Inspection System. One course is provided for pilots and another for technicians. A course in the maintenance of the SAFI equipment for technicians is also conducted. Finally, a course in the operation and maintenance of electronic flight inspection systems and associated communications equipment as installed in the DC-3 type two package is provided for technicians. The DC-3 type two configuration represents 46 of FAA's 100 aircraft.

g. Conclusions

1) The training conducted by the Flight Standards Branch is not of general utility to other DOT elements. While Avionics training courses contain three or four electronic equipments in use by Coast Guard, they are taught as a package in conjunction with other equipments not of concern to Coast Guard. The "equipment package" courses are well suited to FAA needs because the equipment groups are found in a number of aircraft types. Coast Guard can meet its limited requirements at less cost through Navy schools.

2) Pilot training provided is not pertinent to the needs of Coast Guard because they are not users of the type aircraft in which FAA has a training capability.

3) Engineering and Manufacturing Courses are-with the possible exception of a course in Non Destructive Testing- pertinent only to FAA mission and requirements.

4) Flight Inspection Courses are unique to FAA both in pilot technician and maintenance requirements.

4. General Training Branch

The General Training Branch is staffed to provide assistance to the technical training branches of the academy in training methodology and curriculum improvement. This branch also provides training for instructors in the academy and the facilities, as well as in areas such as Achievement Testing, Course Development, Instructional Evaluation and Student Centered Training Methods.

The General Training Branch also has a staff of instructors and course developers responsible for six courses in FAA logistics and procurement management. One of these courses, "Logistics for Technical Personnel" has been made available by FAA to other DOT elements on a reimbursable basis and three of these special courses were conducted in FY-71. To date, participants have come from USCG, FHWA, OST, FRA and NHTSA.

5. Airport Training Branch

The Airports Training Branch conducts four courses in Airport Design and Construction, Airport Systems Planning, Airport Program Operations and Orientation in Airport Planning, Engineering and Federal Aid. The first three courses are intended to provide FAA personnel with knowledge necessary to administer the technical and regulatory aspects of the Federal Airports Assistance Program. These courses are also open to members of state aeronautical commissions and the aviation industry on a fee basis.

The course orientation in Airports Planning, Engineering and Federal Aid is intended to provide uniform guidance on the administration of the Federal Airports Assistance Program (FAAP) to members of the public who are interested in airport planning and development under the FAAP.

6. Evaluation and Standards Branch and Admissions and Directed Study Branch

The Evaluation and Standards Branch performs a mission support function for the operations of the Academy by developing standards and evaluation criteria against which FAA Academy training can be measured.

Part of the functions of the Admissions and Directed Study Branch also supports the overall mission of the Academy. This is the process of registration of the steady influx of students to the Academy and reporting on their training progress to thir home duty stations. In addition, this branch is responsible for developing and administering the extensive Directed Study (correspondence or home study) program of the FAA. Directed Study courses consist of a variety of technical courses which are directly related to FAA occupational requirements as well as some courses in area such as management, which are available for the additional development of employees of FAA and some other Federal agencies. The Directed Study curriculum is in excess of 60 courses. On the average, there are approximately 10,000 separate course enrollments in the Directed Study programs at any given time.

VIII. FEDERAL HIGHWAY ADMINISTRATION

I. General

Technical training programs in FHWA differ considerably in structure and emphasis from those found in Coast Guard and FAA. The major resource commitment is to long-term professional level intern type programs for highway engineers, right-of-way specialists and auditors, graduate study programs and special short term seminars and courses in technical subjects spanning a wide variety of technical functions. Technical training is almost exclusively directed at college graduate, professional level employees with an almost total absence of the skill and craft programs found extensively in FAA and Coast Guard. FHWA also does not possess any significant plant facilities for training other than conference/ training rooms at headquarters and regional offices.

A. Management and Organization

The training branch of the Office of Personnel and Training, FHWA administers the long-term training programs and is responsible for budgetary planning. Full-time coordinators for the Highway Engineer Training Program (2), Right-of-Way, and Auditor programs are members of the Training Branch Staff. The Training Branch also administers other non-technical programs and conducts or supervises clerical and supervisory training. The structure of long-term programs has been developed by special groups composed of technical and training personnel. In the field, most training support is provided on a part-time basis by a member of the regional Personnel Staff. Most of this support is administrative in nature and involves work with short-term training programs. Highway, Auditor and Right-of-Way Programs generally are monitored and coordinated by the Regional Director or an immediate staff member.

The annual training budget for FHWA training generally runs at about 2.5 million dollars and covers all staff, contracts, and trainee salaries in long-term programs and other support costs. The largest single support cost is that for relocating or providing per diem for trainees in Highway, Auditor and Right-of-Way programs.

B. Short Term Technical Training

Short-term programs are generally forty hours or less, or involve part-time attendance at academic institutions. These programs typically are concerned with increasing individual effectiveness in technical specialties such as civil engineering (as applied to highway construction), automatic data processing, rapid transit planning, public administration, traffic analysis and control and economics. This listing is far from complete but is representative of the types of training provided. None of the training conducted in this area to any significant degree parallels any training conducted by other DOT elements except in instances when comparable university courses are used as a basis for training.

C. Long-Term Technical Training

The major sources of entry level technical training for the bulk of FHWA professional employees, are three long-term intern programs for highway engineers, auditors and right-of-way specialists spanning 27 months, 1 year and 18 months respectively. These programs are heavily oriented to learning through selected work experiences supplemented by self-study and some formal classroom sessions. Entrants are recent civil engineering graduates for the highway engineer, business administration, economics, or real estate graduates for the right-of-way trainee and accounting majors for the auditor program.

1. Highway Engineer Training (HET)

The 27 month HET program is designed to develop civil engineers into highway engineering specialists for positions as area engineers or staff engineers specializing in research, design or planning. The number of trainees in the program at various stages of their 27 month period over the last five years has averaged 179, with a larger or smaller number in training, depending on the extent of highway construction in progress, and projected vacancies. Nominally, Highway Engineer Trainees are given five assignments over the 27 month period, consisting of one assignment to Federal highway construction project or a State Highway Department; one assignment to a Federal Aid Division Project; a 2 1/2 month formal training period conducted at the Washington headquarters; a Washington office selected assignment; and an advanced field assignment. This advanced field assignment may involve an area of specialization or be geared to a post-program assignment as an Assistant Area Engineer. The Federal construction and direct construction assignment

differ in that in a Federal construction project, the Federal role is that of providing a monitor for technical and regulatory aspects of construction contracted for by state governments and of which the states maintain direct control over contractors. In the direct construction areas or for other Federal agencies, the FHWA area engineer is directly responsible for contract monitoring and compliance.

The current 27 month program is a recent innovation which reduced the previous program by 9 months as the result of a FHWA study of the HET program. The task group conducting this study noted certain problems areas and suggested corrective action. In recommending a revised program of 27 months duration in lieu of the former 36 month program, the FHWA study group Task Force 70 recently noted, "Each assignment should be evaluated in terms of the training objectives and the length of time needed to accomplish these objectives." The study group further noted that the HET program should only be the initial step in a total career development program and that additional opportunities for developmental training and experience should be provided at later stages in each engineer's career on a systematic basis.

These recommendations are consistent with such observations as were made during this review and their implementation is desirable. Insomuch as the HET program is unique to FHWA and has, as demonstrated by the Task Group 70 report, been carefully reviewed, OST need only maintain liaison to monitor the final action taken on the report.

2. Right-of-Way Training

The 18 month Right-of-Way training program was initiated in 1963 to meet the then Bureau of Public Roads need to provide expert assistance to the States in the appraisal, acquisition, utilization, disposition and administration of right-of-way involved in Federal Highway Aid programs. The original program was two years in length and consisted of four assignments to field offices and one Headquarters assignment. Currently, about 20 Right-of-Way trainees are recruited annually.

3243

The Right-of-Way training program was reviewed during the past year by a contract study with the Praxis Corporation and an FHWA group which followed up on the contract study, and major changes have been proposed which--if implemented--should result in a significantly improved program. The major change recommended by the study group is a division of the Right-of-Way program into two separate training paths for Right-of-Way and Relocation Specialists. While the relocation function has in the past been one of the aspects of the Right-of-Way training program, the emphasis on the need for better and more complete programs for the relocation of home and businesses displaced by highway contruction has generated the need for specialization within the Right-of-Way function.

In recognition of this change in mission orientation, the study group has recommended that the two training paths would involve three division office assignments of progressive complexity, a six month assignment with a State highway department, and a formal centralized training period. The difference in program content will be largely that the Relocation trainee will be given assignments concentrating on that function with sufficient exposure to the other Right-of-Way functions to be able to perform as a team member with the Right-of-Way specialist. The study group also identified a number of administrative improvements including more self-development devices establishment of a central program coordinator, a reporting system on program effectiveness and a trainee evaluation system. The study group report reflects a careful consideration of the Right-of-Way program and should serve as the basis for a strengthened program.

3. Auditor Training

The auditor training program is a one year intern type program similar in conduct to the Highway Engineer Trainee and Right-of-Way programs. The program has an annual input of 20 trainees who are recruited in two groups annually. The program is designed to develop a trainee with a baccalaureate degree and a major in accounting into an auditor for the Federal Highway Aid program, with the ability to conduct audits of contract execution, pastconstruction audits, right-of-way audits, and personnel service audits. He must also be taught Federal Aid billing procedures.

The Auditor program in its current form was initiated in July of 1970 and consists of four phases. The first phase is a five week formal training session conducted in the Washington headquarters. Phase two is an assignment to a division office for 21 weeks of training and experience in those subject areas covered in phase one. In phase three, the trainee undergoes formal training at the Washington headquarters in other areas of the audit specialty. The fourth phase is--like the second--designed for on-the-job training and experience in the subject areas covered in the preceeding training period. On completion of training, the program graduates are assigned to audit positions in the field.

From all indications, the same kind of attention has been given to making the Auditor training program a quality, objective oriented program, that was given to changes and recommended changes in the HET and Right-of-Way programs.

The Federal Highway Safety Act of 1970 authorizes the Secretary to establish a National Highway Institute within the FHWA for the purpose of training Federal, state and local employees in a variety of highway construction matters. The planning for the Institute is currently being conducted by FHWA. The Office of the Secretary should actively monitor development of the Institute and provide assistance as appropriate.

IX. SYSTEMS MANAGEMENT OF TRAINING AND INSTRUCTIONAL METHODS

The "Systems Management" or "Systems Engineering" of training which is discussed in Appendix IV is a methodical procedure for determining what skills and knowledge are required to perform a specific job and how and under what circumstances these skills and knowledge may be most effectively acquired. It also includes procedures for developing relevant test criteria, quality control of training and feedback methods to maintain training content current to organizational and operational practices. The major and most complete applications of this approach are found in well defined jobs such as military occupational specialties and technical trades. In these jobs, the full range of tasks which incumbents are expected to perform are generally capable of being specified and consequently are most susceptible to task analysis. Even in those jobs which are of broader scope and in which incumbents are required to apply an appropriate combination of principles to problem solving (such as engineering) the systems approach offers at least a conceptual guide to the development of an effective program. Applications of this approach are found to some extent in varying degrees in each of the administrations training programs.

The selection of instructional methods is an intergral part of the systematic development and management of training programs. The selection of an appropriate method for a given type of training is influenced both by the material to be learned and the cost effectiveness of the method. Methods can range from a simple lecture-discussion presentation without training devices to full scale simulation such as that used in many flight training programs. The most commonly used method, which might be called the "conventional" method, is the classroom lecture by an instructor supplemented by training aids. Despite the tendency to focus on the newer and more esoteric training methods such as Computer Assisted Instruction and the instructor supported by good training aids is an effective teaching device.

The use of a "systems" approach to training is utilized to varying degrees in DOT training programs and similar methods are often given different names in different organizations. These are discussed along with some of the newer training methods.

A. Federal Aviation Administration

1. General

FAA, although it does not use the nomenclature "systems engineering" for its training development and management, has well organized methods which incorporate many features of the "systems" method. The application of a systems approach is most clearly demonstrated by the Air Traffic Control training programs. The ATC specialist job functions have been exhaustively analyzed and documented in the Air Traffic Training Qualification Series Manuals. These documents describe the skills and knowledge required of the several ATCS options in considerable detail and assign appropriate portions to centralized formal training, on site and on the job training and self study. Training methods are appropriate to the material although some modernization of simulation capabilities is a recognized need and is being undertaken. Considerable attention is given to instructor development both for classroom presentation and in course development and testing methods. Quality control is achieved at the FAA Academy by internal evaluation staffs and student end of course critiques.

The training conducted for occupational specialists in the past two years also received considerable attention, and Job Training Standards have been developed or are being developed. Job Training Standards are essentially a translation of the job task analysis into training objectives and criteria for levels of skill and knowledge. A variety of training devices are used from simple visual aids to flight training simulators. Student Centered training which is described in subsequent paragraphs has been implemented as the teaching method in many courses.

Air Navigation Facilities training is primarily directed to the maintenance of electronic and electromechnical equipment. The content of training courses is consequently well defined and dictated by the characteristics of a particular system. The philosophy of instruction is consistent with that observed in programs of this type proceeding from the theory of operation to functional relationships between system components and finally to extensive laboratory exercises in adjustment calibration testing and fault isolation.

The only areas of apparent weakness in the FAA training system appear to be a lack of formal feedback from the operational facilities and the absence of centrally administered standardized programs at the facilities. There is no apparent method for the operational activities to routinely evaluate the adequacy of training of personnel after they have been on the job for a period of time after training. Such a

system could be relatively easily developed from existing training standards and used as a guide to updating or modifying training curricula. Also, most of the large facilities conduct considerable on the job training for ATC specialists and technicians. Although general guidelines are available, most training material is developed locally and is somewhat suspect regarding standardization and consistency of quality.

2. Instructional Methods

A wide variety of instructional methods and devices are employed in the several branches in the FAA Academy. Laboratory exercises are an important element of most programs and these are generally well equipped. The methods and devices used are generally appropriate and comparable to those used by other organizations conducting similar programs. Several methods of particular interest are:

a. Student Centered Training

Student Centered Training (SCT) is the FAA designation for a method of classroom instruction which applies a systems approach to development and incorporates some of the principles of programed instruction. The presentation of instruction using SCT is controlled through a tightly structured lesson sequence in which the instructor presents material in increments of three to five minutes and then queries students on the material covered. Each student has a responder device at his desk which allows him to select multiple choice or true-false answers. The student responses are recorded on a panel on the instructors podium which provides him with an immediate evaluation of how each student has answered and in the aggregate whether the class as a whole has understood the previous material. This allows the instructor to re-present any subject matter when it is evident that a significant number of students did not answer correctly. It also provides the instructor with an early indication of individual students who are having difficulty.

Typically the sequence of instruction in a SCT course is based around a series of slides which are projected on a back lighted screen. The slide sequence is the element which controls the instructor's delivery and provides a greater degree of uniformity and standardization than is found when instructors are guided only by lesson plans. The material presented by the slides is integrated with the instructor's delivery and where appropriate supplemented by other training aides such as models,

mock up or system trainers. SCT, because of its inherent structure requires an extensive analysis of the job skills and knowledge in order to develop precise instructional objectives. The process of analysis and decision if properly applied weeds out much of the "nice to know" and extraneous information which is often found in the more conventional classroom instruction. The restriction of content to "need to know" material can reduce the time to conduct the course from 10-30 percent. The development of an SCT course requires a far greater expenditure of manhours than conventional training and consequently its use must be justified to some extent on the basis that the student population will be sufficiently large that recurring savings will offset initial costs. Stability of course content and the existence of specific training objectives are also pertinent in the decision to use SCT.

3. Simulation

Both the Flight Standards and Air Traffic Control training branches utilize simulators for training. The Flight Standards Branch operates four aircraft simulators representing the Convair 340, the DC 6/7B, the Boeing 720 and the Lear Jet. Training personnel are well aware of the advantages of aircraft simulators. The simulator is much more economical to operate than an aircraft and it can be used to demonstrate situations which would be unsafe in actual flight. The simulators in use at the Academy handle about 25 per cent of the total training time required thus increasing the number of pilots who can be trained with the aircraft avaliable. The in-place simulators, however, are of an older type and more modern simulators can increase the percentage of training assigned to the simulator and decrease that required in the aircraft. New simulators for the Boeing 727 and DC-9 aircraft have been included in FAA budget requests several times but have not have been given sufficient priority to compete with other requirements and consequently have been cut each time.

Air Traffic Control training is another area where simulation is of major concern. Simulation is the only method by which the Radar Control of air traffic can be effectively taught. At present the FAA Academy has a limited capability to provide radar traffic control simulation. The simulator equipment on hand is of ancient vintage and lacks the target capacity and flexibility to provide an effective environmental training situation. This equipment has been used to teach Radar Control procedures but since it cannot easily be reconfigured a standard traffic environment has been used for all

trainees. This requires that the trainee must be given additional training on the job in his own facility before he can actually handle traffic. Modern digital simulator equipment has been programmed to replace the present equipment. The digital simulation will provide the capability to configure problems which duplicate actual traffic and airspace conditions for a specific facility. With this capability, a group of trainees from the same facility can be trained as a team and will require only limited check out at the facility to qualify for live control of Air Traffic.

4. Integrated Training

Integrated Training is the term used by FAA to designate a three phase program used in the training of maintenance personnel for Airway Facilities. The three phases consist of directed study (correspondence course), resident training and on the job training. The intent of this structure is to provide maximum flexibility and economy by reducing resident training and concentrating it on those subject areas which are best taught in classroom and laboratory environments. In most cases resident training will be preceeded by a prerequisite directed study course which deals with knowledge elements such as basic fundamentals and principles and general theory of operation for the equipment or system. On-the-job training using a centrally developed lesson guide may also be used to familiarize the trainee with the physical configuation of the equipment, operating adjustments and test procedures to the extent practical. Resident training can then concentrate on an in depth analysis of the equipment operation, modes of failure, fault detection procedures and repair. Laboratory exercises with actual equipment which can simulate both normal and faulty operation are significant elements of resident training since it is generally impractical to experiment with operational equipment in the field.

Under some circumstances it may be possible to qualify technicians to maintain equipment using only directed study and OJT. This depends on the complexity of equipment, availibility of equipment and qualified OJT instructors and the experience of the trainee with similar systems. The Integrated training approach is relatively new and its full utility has not yet been established. The use of prerequisite study is not new but the possibility of the combination of directed study and OJT to fully qualify maintenance personnel is a significant departure from the traditional practice of using resident training almost exclusively. The shift requires careful consideration and a thorough evaluation on a system by system basis before its usefulness can be validated.

B. Coast Guard

1. General

The development of curriculum, instructional methods, training materials, testing criteria and quality control have generally been left to the individual training facilities with no central direction or standards. The enlisted basic occupational (Class A) school curricula and recruit training curricula are developed from the Coast Guard Enlisted Ratings Qualification Manual which establishes the enlisted career structure from pay grade E-1 (Seaman recruit) through the highest enlisted grade E-9 (Senior Chief Petty Officer). Within each rating (occupational category) the ERQM specifies skills and knowledge required for advancement to each succeeding level. The qualifications for pay grade E-4 (Petty Officer Third Class) are the basis for the curriculum of basic occupational schools. The ERQM however, does not treat all skills with sufficient precision for direct translation into training course content and interpretation and modifications are generally made by those responsible for course development.

The ERQM while providing a basis for career structure has remained static and in at least one case, the premises on which it was developed are no longer valid. The Electronic Technician workforce has over a period of time failed to maintain a sufficient number of experienced technicians and an overall manning level has been maintained by increasing the number of basic school graduates to fill the gap. The basic school curriculum, however, based on the ERQM is not designed to develop a journeyman technician but an apprentice who will be seasoned under the guidance of more experienced technicians. The shortage of experienced technicians, however, has required assignment of inexperienced technicians to positions which they are not adequately trained. Action is being taken to revise training programs and establish greater specialization to produce a basic school graduate more nearly capable of performing as a journeyman. Data on overall enlisted retention rates suggests that similar conditions may exist in other specialities (ratings) but that the impact on operations has not been realized to the same extent as in the technician situation. The existence of such conditions suggests that a system which is more responsive to change is desirable.

Two pilot efforts are underway which should assist in developing training programs which will be more adaptive to changing conditions and be based on more specific information on the current skills required in the workforce. (1) The New York Training Center is in the process of adopting a "Training Systems Engineering" procedure which is an extension and refinement of the general approach discussed in Appendix IV. The NYTC approach is a modified version of that used by the Continential Army Command as specified in CONARC Regulation 350-100-1. The initial application will be directed to developing a revised basic Electronic Technician school curricula based on Job Task Analysis and incorporating the various elements of the systems method including the development of a feedback system to monitor changing conditions. (2) A concurrent pilot effort by the Office of Personnel will provide data on the tasks actually being performed by technicians in the field as well as the frequency and degree of criticallity of the tasks. This data was obtained from an occupational survey of the workforce modeled after survey procedures which have proven very successful for the Air Force. The data was collected from some 2000 technicians in response to a questionnaire specifying some 300 tasks which might be performed. The analysis of this data should provide a much more accurate picture of the real training needs than that which could be developed by a small group of technical experts drawing on their own expertise no matter how extensive.

The special purpose schools (Class C) do not appear to present the same difficulties in curriculum development as the basic occupational schools. The majority of special purpose schools conducted by Coast Guard are equipment constrained such as maintenance of a particular electronic system or piloting of a particular aircraft. The curriculum of schools of this type are rather well defined by the equipment characteristics and the documents specifying operation and/or maintenance. The "systems" approach has found less application in this area but is still valid as an approach to analyzing the development of a training program particularly in the analysis of tasks delegated to on the job training, selection of training materials, test criteria, quality control and feedback on graduate performance.

The current Coast Guard system has proved workable within the constraints of people and money but should be improved through the systems approach through clearer definition of training needs and more effective training procedures.

2. Instructional Methods

Coast Guard training programs utilize a wide variety of training methods in various combinations and new methods are being actively pursued. The methods currently used are generally appropriate to the subject matter. The most common methods are the "conventional" lecture, demonstration, laboratory and practical exercise approach. Lectures are to varying degrees supported by teaching devises such as visual aids, mock ups, samples and system trainers.

Laboratory exercises are a significant element in most schools particularly the basic occupational (Class A) schools where trainees learn the fundamental skills of their rating. These range from typing practice for yeomen to maintenance of operational equipment for electronic technicians and include such diverse activities as welding and carpentry for damage controlmen and the disassembly and reassembly of small diesel engines for enginemen. These experiences are an essential means of providing required skills for which no alternative is known.

Simulation is used to a limited degree at present but will be expanded with the acquisition of a flight simulator currently under procurement. Simulation in ship board radar procedures is conducted for the basic Radarmen school at the New York Training Center. The same simulator is used for training officer candidates in the Combat Information Center and ASW procedures at the Yorktown training center. Video Tape and closed circuit TV are used at each of the four major facilities.

Although its current methods have proven satisfactory, Coast Guard has indicated an interest in expanding the use of such methods as TV tape and examining other methods not currently used. A pilot project has been initiated at the New York Training Center which will include the consideration of using programmed instruction, student responder devices, teaching machines, computer based instructional systems and low fidelity training devices separately or in conjunction with existing methods. The selection of the most appropriate training methods will be one element of a pilot project to "systems engineer" a new training program for the basic Electronic Technician school.

Coast Guard has recently contracted for its first full scale digital computer simulator which will be installed at the Aviation Support and Training Center. The simulator will initially be configured to provide training in the HH-3 and HH-52 helicopters which comprise a major portion of the Coast Guard aircraft inventory and has the

capability to add two fixed wing cockpits at a future date. The simulator will be of the most modern design and promises to enhance the AS & TC training capability. Initial estimates are that a minimum of twenty-five percent of the hours now flown in aircraft can be recaptured through reduced aircraft hours over a five year period if the current level of training is maintained. If, however, the mission of the AS & TC is extended to provide annual standardization for all types of qualified Coast Guard pilots, the simulator cost can be amortized in less than two years. The capability of the simulator aircraft combination to provide more effective training than aircraft training alone is generally recog-ized. The ability to "play back" maneuvers, simulate conditions which would be unsafe in actual flight and freeze problems while errors are corrected, are features of a simulator which cannot be provided by any other device. The acquisition of the simulator capability should provide a major advance in Coast Guard flight training.

3. Recommendation:

In considering student responder devices for use in its training programs, Coast Guard could benefit from FAA experience in the development and conduct of Student Centered Training. It is recommended that Coast Guard establish communications with FAA regarding application of SCT.

C. Federal Highway Administration

The FHWA training programs for Highway Engineers, Auditors and Right-of Way Relocation Specialists are the least susceptible to direct application of the systems approach. These programs are based on qualifying trainees in the particular field largely through experience gained by selected work experiences. The projects available during a given assignment control the work experience to a great extent. Formal in house classroom training is provided only for the Highway Engineering trainees in a three month course in Highway Engineering and Administration conducted by the Headquarters staff.

Several apparent weaknesses have been highlighted by recent reviews of the Highway Engineer and Right-of-Way/Relocation training programs. One major problem area has been a lack of clear cut written objectives for work assignments to guide the trainee and his supervisor. In the past, the experience a trainee received on a particular assignment was largely determined by the interest of the supervisor and not necessarily related

to an overall objective. Lack of specific objectives and training outlines have also hampered an effective feedback system by which management could measure progress and advise trainees. The Right-of-Way program review also recognized a need to develop Relocation specialists as a separate entity and provide centralized job function training similar to that provided for Highway Engineer trainees.

The implementation of the recommendations made by FHWA study groups should largely connect the identifiable weaknesses in current programs and provide a systematic control.

Instructional methods have not been a major concern in FHWA programs because of their structure and content. Two recommendations of the study groups however, have definite merit. There is a need to provide guidance in the area of self-development and also the materials necessary for self-study. Instructor training is also desirable since most formal classroom presentations are given by technical staff personnel who are largely without training in instructing.

X. EQUIPMENT DESIGN TO REDUCE TRAINING

A. General

The intent of this aspect of a review of technical training was to examine the potential for reductions in training through hardware designs which would transfer some of the maintenance dependence from the technician to the equipment designer. Consideration of such designs was limited to the field of electronic systems since (1) they are a major source of training requirements for FAA and Coast Guard; (2) they are inherently suitable for such design and (3) there is evidence of considerable interest and activity in this area principally in the Electronics industry and the Department of Defense.

While the initial purpose was to examine the field of equipment design to see how electronic systems could reduce the need for technician training, it quickly became apparent that the full benefits to be derived, included reduced manpower requirements and greater availability of operational systems. Concepts and in some instances, available systems are designed to provide rapid diagnosis of system faults which coupled with modular equipment design allows rapid correction of defects and the restoration of normal operation by relatively low skilled personnel. The major stimulus for development of electronic systems incorporating self-test or automatic test has been the needs of the Armed Services who are faced with operating amd maintaining increasingly complex electronic equipment at a time when they are having serious difficulty retaining highly skilled personnel to maintain these systems.

Army, Navy and USAF each have major projects underway to develop an automatic test system which can service a variety of electronic systems designed to be compatible with the single test system. The Navy's Versatile Avionic Shop Tester (VAST) is illustrative of at least one approach to a general purpose automatic tester. The VAST system was developed by PRD Electronics for the Naval Air Systems Command after five years of research into the requirements for testing over 100 representative electronic systems in the current and projected Navy Avionics inventory.

The VAST system consists of 55 functionally independent test instruments which can be connected in a variety of test configurations by means of a digital control system. The design goal for VAST is that it be able to perform about 85% of the avionics testing for the A-7E aircraft and through extension of design requirements that future systems for new aircraft will be compatible with VAST testing to a high degree. The requirement for avionics systems of future Naval aircraft to be

compatible with VAST testing is stated in NAVAIR Avionics Requirement AR-8, 9 and 10. It is this extended application of the VAST system to new electronic systems eliminating the need for specialized test equipment and additional technician training which make its life cycle costs appear attractive. While the VAST system will cost over $2,000,000 per test station, it is estimated that it will save over $1,000,000,000 in the life cycle costs of avionics maintenance aboard an aircraft carrier. Additionally, VAST is estimated to reduce total manpower requirements by 25% and significantly lower the level of technician skill required. Design requirements are that a technician with only basic (Class A) electronics training and a four week course in VAST operation will be capable of testing any aircraft electronic system which is VAST compatible. This is a sharp contrast to present practice where technicians using conventional test equipment require special training in each system in order to maintain it properly and where any one technician can generally be expected to service two or three systems at most.

Another approach to automatic diagnosis of electronic equipment failures is the Naval Electronic Laboratories Automatic Test System (NELAT). The NELAT concept does not automate the entire system test as in VAST but leaves initial diagnosis to a modular component to the technician. The assumption is that either through the prime equipment symptoms or limited conventional testing, the technician can isolate the defect to one or more modules which can be replaced and restore the system to proper operation. NELAT is then used to determine which modular component of those replaced is defective and diagnose the fault to the circuit component or components which are defective. NELAT like VAST consists of a digital control computer and an assortment of stimulus sources and signal measuring devises. Initial estimates by the Naval Electronic Laboratory are that NELAT test equipment can be configured and programmed to test about 90% of the modules in use in Navy shipboard electronics equipment. The NELAT approach requires a greater degree of technician skill in recognizing, analyzing and correcting faults through module replacement than does VAST. It does, however, reduce the degree of expertise and training required from that required in conventional signal tracing test methods.

USAF has developed an automated test equipment very similar to the Navy VAST system which predates VAST and may have been the basis for the Navy approach. The General Purpose Automatic Test System (GPATS) was developed for the Air Force based on tests conducted in 1962 which established that automated test equipment could provide an increase in reliability over manual methods as well as reducing the time necessary

to locate faults. The final configuration of GPATS is much the same as VAST consisting of a variety of modular "building blocks" in the form of stimulus generators, amplifiers, response monitors and programmable power supplies which can be configured to match the test requirements for a number of electronic systems.

The Army also has a computer controlled automatic test equipment designated as Synthesized Computer Controlled Automatic Test Equipment (SCATE). The SCATE system has essentially the same functions as VAST and GPATS.

A nonautomatic test system which appears to offer considerable utility in situations where automatic test equipment is not economically feasible is the National Bureau of Standards developed Fault Isolation by Semi-Automatic Test (FIST). The FIST system permits measurement of the dynamic performance of electronic circuits by unskilled personnel under field operating conditions. It is a diagnostic tool for rapidly isolating faults in modularized noncomputer type equipment without removing modules from the prime equipment. FIST consists of test points and associated circuitry which are built into the prime equipment and a small, hand-carried, general purpose test equipment. The test points are located on an easily accessible test panel and are arranged in an order which permits rapid checking of the modules in a logical sequence.

Fault isolation is accomplished by testing the dynamic performance of each module by a test instrument which is basically a device for comparing the peak to peak amplitude of two periodic voltage wave forms. A full range of electrical characteristics can be measured by the use of transformation networks which convert the characteristic to be measured to a periodic voltage which is within the range of the test instrument.

The FIST approach is particularly attractive where the population of equipment is geographically dispersed and not found in sufficient quantity in any one location to justify the use of automatic test equipment. Typically, maintenance at such locations is either not adequate or very expensive since it requires very inefficient use of the skilled technicians time. There are two very promising user areas in DOT for a FIST type of approach. Coast Guard has a significant number of small stations with two to five pieces of communications equipment which cannot support the assignment of a full-time technician. Such facilities are supported by a central repair facility and considerable technician time is lost in travel. FAA has an analogous situation with a significant number of remote transceiver and navigational aids.

The FIST approach appears to offer a very promising technique to fill the gap where fully automated test systems are not economically feasible. Its major drawback is that it has not been demonstrated and tested under field operating conditions. The application of FIST techniques has been tested only on a demonstration basis on a single relatively uncomplicated radar system.

Further development of the FIST approach seems desirable as one method to reduce the demand for skilled technicians and to provide greater operational availability of equipment. A description of FIST techniques is available in NBS Monograph 83 - Project FIST, Library of Congress Catalog Card Number 64-60063. More detailed design information on FIST techniques are found in NBS Reports 9409, 9613 and 9408.

Within DOT, efforts to provide electronic equipment with diagnostic features which reduce the dependence on the technician have been limited. Those efforts which have been in project managed systems and have utilized the capabilities of digital computers which are an operational component of the system. The most extensive application in this area is in the automation of the Enroute (ARTCC) facilities in the National Airspace Program in FAA. In its final configuration, the Central Computer will monitor all of the Central Computer Complex equipment and provide automatic reconfiguration of units improperly operating. Maintenance programs will provide fault isolation to a functional area. Final fault diagnosis to a replaceable card or assembly must be accomplished by a technician using general test equipment. The Automated Terminal Radar Control System (ARTS) also utilizes the capability of its operational computer to provide equipment monitoring and some fault diagnostic capability. FAA Tactical Air Navigation systems (TACAN) which provide navigational airways and approach systems are provided with special test equipment which is built into the TACAN complex. This built-in test equipment does not reduce the knowledge required of the technician but rather provides devices on site by which he can analyze equipment operation and diagnose faulty conditions.

Coast Guard has only recently begun to become involved in systems designs incorporating fault diagnostics. The first system to incorporate a design goal of automatic fault detection was the Transportation Loran C navigation system (TRANSLOC). The TRANSLOC system contract, unfortunately was terminated due to cost overruns and was not produced. Coast Guard is continuing some in-house development. The TRANSLOC design concept was to provide on-line monitoring for all critical operating parameters with visual or audio indications when any parameter exceeded its pre-set limits. Further automatic fault sensing and display was required to detect 98 per cent of all required corrective maintenance actions.

Fault detection systems coupled with replaceable modules was designed to provide isolation to a replaceable module within five minutes for 90 per cent of all faults. No local repair of assemblies was to be provided. Modules were to be returned to a central facility for repair.

Coast Guard has indicated a commitment to further development of electronic equipment with inherent diagnostic capability. The first step in this process has been budgetary action to establish a modular repair facility. This facility will initially support on board equipment particularly those which are a hybrid design of semi-conductor and micro-electronic design. Ultimately it is planned that new equipments will incorporate designs which will allow field maintenance by relatively low skilled personnel through replacement of modules. Defective modules would then be sent to the centralized facility for repair.

Coast Guard has an acknowledged need to develop an extended capability in this technology because of the difficulty it has in maintaining a highly skilled workforce due to the high turnover in its enlisted technician ratings.

FAA, because it has a relatively stable workforce, is less motivated to pursue designs of the type discussed. It has long been the maintenance concept in FAA to "certify" technicians on the maintenance of systems and depend on on-site repair rather than an echelon maintenance system with more complex repairs being performed at centralized facilities.

The preponderence of evidence is that advanced maintainability designs incorporating some form of fault diagnosis which reduces the skill required by maintenance personnel offers considerable potential for FAA and USCG. Programs to monitor and investigate developments in this area should be initiated for the purpose of developing design and maintenance criteria.

Form DOT F 1320.1 (1-67)

UNITED STATES GOVERNMENT

Memorandum

DEPARTMENT OF TRANSPORTATION

OFFICE OF THE SECRETARY

DATE: March 24, 1969

In reply refer to: TAD-14

SUBJECT: Review of DOT Technical Training

FROM: Assistant Secretary for Administration

TO: Administrative-Management Council Members

As you may recall, the Counterpart Study of Personnel and Training functions identified the need for a technical training resource in OST. The study also defined the general functions of such a position, one of which was to review technical training throughout DOT. This review was initiated in September 1968 and has progressed to the point where we have sufficient information to establish the parameters to be examined. Accordingly, I have attached a copy of the study precept for your consideration. I would appreciate any comments you might have, and if you wish, we can discuss it in greater detail at our next meeting.

I think you will agree after reviewing the precept that it is very broad in concept and will necessarily involve communications with a variety of organizational elements. Since we are at this time committing only one individual to this effort, he will need the cooperation of your staffs. The study will be conducted by Cdr. Charles Hahn, USCG, who is assigned to the Office of Personnel and Training, OST, and I would appreciate any assistance you can give him.

During the course of this review, every attempt will be made to use existing documents and reports for any analysis so that extra work for your staffs will not be generated. Where it is necessary to get otherwise unavailable information we will request some assistance from your staff. Another situation where assistance might be required is when it is necessary to gain a better perspective than documentary material may give. We propose to make reports to interested persons in OST and the administrations as necessary during the study.

I hope you will give the precept a careful review so that we may discuss it fully.

Alan L. Dean

Attachment

PRECEPT

DOT TECHNICAL TRAINING REVIEW

Need: There are three compelling reasons for a review of technical training throughout DOT:

1. Approximately 40,000 of the almost 100,000 employees of DOT received formal classroom training of longer than one day in FY '68. The funds administered by training activities exceeded $45,000,000 but the true annual cost of training is probably closer to $150,000,000--- nearly 10% of the Departmental appropriated funds.

2. There is an apparent similarity in certain training activities common to two or more administrations. For example, FAA and USCG both have extensive electronic maintenance and pilot training programs. FAA and FHWA both conduct training in construction engineering. All of the administrations support some type of procurement activity. The extent to which these efforts can be mutually supporting should be examined.

3. There is no substantive detailed knowledge in OST of the nature, extent, problems and effectiveness of the administration training programs. An information source within OST is necessary to assist in establishing appropriate training policies and provide advice on training matters.

Objectives: This study will first of all establish an information base in OST and:

1. Determine the feasibility of intermixing technical training activities of the administrations.

2. Identify the extent to which administrations have recognized and adopted the latest proven training methods such as:

   a. Utilization of state of the art instructional techniques.

   b. Job engineering as a method to reduce training costs.

   c. Design engineering of systems and hardware to reduce training needs.

   d. Using a systems approach to managing training functions.

Benefits: The study will provide:

1. An information resource in OST.

2. Identification of areas where OST should consider coordinating training efforts.

3. Identify areas for more intensive study.

4. Provide a comparative analysis of the degree to which new training methods are being utilized in the several administrations with recommendations for improvements.

5. Provide the vehicle for more communication between the training activities within the administration.

Scope: The study will initially be a broad survey of the manner in which the training function is conducted in the administrations with emphasis on those items stated in the objectives. It will be a long-term effort due to the wide range of activity to be reviewed and because of the limited resources, i.e., one professional employee. It is probable that as greater understanding is developed one or more of the objective categories will be studied in greater depth if a significant cost reduction or increase in effectiveness appears probable.

Action Plan: PHASE I:

This is a reconnaissance phase during which the necessary information on the structure, current practices and dimensions of the various administration training programs will be developed. It will include establishing a well-rounded knowledge of applicable studies and research on training organization and instructional methods. This phase of the study began in September when the position of Departmental Technical Training Officer was filled. Several orientation visits have been made to FAA and USCG training facilities as well as to headquarters training staffs. A number of contacts have also been made outside of DOT with groups involved with research related to training. These include the Office of Naval Research, Human Resources Research Office of George Washington University and the National Bureau of Standards. About eight more visits to DOT training and operating activities will furnish sufficient data to proceed with the study. This phase will be complete by June 1.

PHASE II:

Phase II will consist of an examination in greater depth of activities identified during phase I as having the potential for improvement in a relatively short time frame and under the existing organization. Specifically, the course content of existing similar programs will be examined to determine if they will allow inter-administration use either in the present form or with small modifications. Also, during this period the extent to which engineering designs which can reduce training needs are recognized and being implemented will be evaluated. A discussion paper on this approach is attached. It has been given the acronym TRADE. Phase II should be complete by January 1, 1970.

PHASE III:

Phase III will essentially consist of compiling the study material and drafting the final report and recommendations. It will involve some coordination with administration officials and if conflicting viewpoints arise, some discussions or conferences to resolve them. Target date for completion is July 1, 1970.

Outputs: A series of trip reports and status reports will be submitted periodically during the study and a special report made of any significant developments or change of emphasis in the study. A final report will be submitted by July 1, 1970, with specific recommendations for appropriate action by OST and the administrators.

ATTACHMENT: Discussion Paper on TRADE -- an approach to cost reduction in technical training

TRADE

TRAINING REDUCTIONS ACHIEVED BY DESIGN ENGINEERING

The acronym TRADE is intended to suggest the cost trade-off between hardware design costs and training personnel costs. It is well within the current state of the art in the electronics industry to design and produce equipment with either self-test or programmed testing. These features coupled with modular design yield an equipment which does not require highly skilled technicians to maintain it. This is not a new concept. It has already been applied in a multitude of operational equipments.

Despite the fact that such a design concept offers tremendous potential savings in training costs, it has not found wide-spread use in DOT. It is possible that organizational barriers have prevented the administrations from taking full advantage of this approach. Experience suggests that there are several reasons:

1. Lack of communication between Personnel activities and Engineering activities with a resultant lack of support by Personnel.

2. The budget cycle and procurement pressures tend to make us buy the most available and less expensive hardware.

3. Since initial design costs are higher they raise the purchase price. This prevents industry from offering this type of design in competitive bidding unless the procurement specifications require it.

The net effect of these circumstances is preventing adequate use of designs which would save dollars and help meet the projected critical need for people in areas that are not as susceptible to machine solutions.

The most appropriate approach to eliminating these barriers appears to be an organization vehicle, i.e., a TASK FORCE composed of engineering, personnel and fiscal experts who jointly have the capability to assess the situation as it exists and find ways to improve it.

Such an effort effectively directed could accomplish the following:

1. Reduce the communication problem.

2. Generate a more rationale approach to procurement through life-cycle costing. (For the unfamiliar, this approach demands that the total cost of purchase and maintenance, including personnel costs, training costs over the life of the equipment be the parameter we focus on when deciding what to buy).

3. Stimulate industry to greater effort to solve any remaining technical problems across the board, through more tightly written technical specifications which require this type of design.

It should be emphasized that this concept has not been totally ignored but rather that it has not been as widely recognized as it should be or any concerted effort made to take advantage of it. One example of where it has been used is the USCG TRANSLOC Program (TRANS portable LOran C). The contract for this equipment was recently let to Sylvania Electronic Systems and incorporates general specification language that requires fault isolation techniques.

The FAA has established a similar requirement in its specification for ARTS III SYSTEM (AUTOMATED TERMINAL AIR TRAFFIC CONTROL SYSTEM) which was recently awarded to Sperry-Rand Corporation.

VISITS AND DISCUSSIONS IN SUPPORT OF

DOT TECHNICAL TRAINING REVIEW

DOT Activities

FAA Academy, Oklahoma City
USCG Training Center, Governors Island, N.Y.
USCG Reserve Training Center, Yorktown, Virginia
USCG Aviation School, Aircraft Repair & Supply Center, Elizabety City, N. C.
Region 15-Federal Highway Administration, Gatlinburg, Tenn. (Direct)
USCG Aviation Support & Training Center, Mobile, Alabama
San Francisco Area Office - FAA
San Francisco Regional Office - FHWA
Coast Guard 12th District Office-San Francisco, Calif.
USCG Training Center, Alameda, California
Washington ARTCC, Leesburg, Va.
Washington National Airport Tower & IFR Control, Washington, D. C.

National Aviation Facilities Experimental Center, Atlantic City, N. J.

Non-DOT Activities

Air Technical Training Command
USAF, Kesseler AFB, Biloxi, Miss.
USN Air Training Command, Pensacola, Florida
USN Electronic Systems Command
(Symposium on Automatic Test Equipment) Wash., D. C.
USN Office of Naval Research, Wash., D. C.
National Bureau of Standards, Gaithersburg, Md.
Rome Air Development Command, Griffiss AFB, Rome, N. Y.

EFF. 1/5/70

DEPARTMENT OF TRANSPORTATION
INVENTORY OF OPERATIONAL
AND
TRAINING AIRCRAFT

FAA

DC-3 Type II	46[1]	BE-80	4
T-29 Sabreliner	9	BE-65	2
DC-3	5	BE-55	4
C-135	2	T-34	1
*C-123B	1	[2]Aerocommander 1121	1
*G-159 (VC-4A)	3	[2]Lear Jet 24	1
CV-880	1	[2]Aerocommander	1
L-1329	1	[2]Cessna 210	1
B-727	1	Beech BE-90	1
DC-9	11		
NA-265	5	USCG	
TV-2	2		
CV-580	5	HH-52A	95
DC-7	1	HU-16E	35
DC-6	2	*HH-3F (S-61)	22
CV-340	1	HC-130	16
Aerocommander 680	1	*VC-4A (G-159)	1
		*C-123	6
		*C-11A	1

Type Training Requirements in Aircraft Not in Inventory[3]

F A A		U S C G
S-61 Helicopter (HH-3)	VS-11	NONE
B-737	L-382	
B-747	Lear Jet 25	
BAC-111	M-404	
CV-880	NORD 262	
B-58	Gulf Stream II(C-11)	
C-46	Falcon Jet	
CL-44	Beech 99	
CV-640	Beech King Air	
DC-8	DH-125	
F-227	HANSA 320	
S-58 Helicopter		

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* Aircraft common to both organization or aircraft for which both have a training requirement

1 Nav Aid Flight inspection aircraft

2 Leased aircraft

3 Aircraft for which FAA has a requirement to train flight standards operations inspector. Training is contracted commercially.

A Systems Approach to Training Management and Curriculum Development

A system in the most general sense is a collection of interacting elements. While this is a conceptual definition, it leads quite naturally to the examination of a system to determine what its specific elements are and how they interact. The answers to these questions provide an operational description of the system of interest. An organizational system consists of people, hardware and procedures and it is the interaction of elements which shape a collection of tasks which are labeled "job". The ultimate purpose of training is to provide the people element with the skills and knowledge necessary to perform the necessary tasks.

If the tasks which collectively define a job can be identified, the problem is reduced to analyzing the knowledge and skills required by an individual to perform these tasks at a specified level of performance. Training management must then apply the most appropriate techniques to insure that the skills and knowledge are developed which enable task performance and to do so in an efficient manner.

Chart One is a diagrammatic representation of the general procedure for developing a training program. The specific steps are described in the following paragraphs.

Identifying the Training Need

Training is a response to change generated either by a change in the system elements or by a deficiency in the system performance, which is attributable to the human element. In most situations, technical training needs are relatively easily identified since they are most often generated by personnel turnover, equipment changes or procedural changes. The acquisition of a new type of ship, aircraft or electronic system in itself clearly signals the need for new or modified skills and training is clearly indicated. In the case of deficiency in system performance, the need for training is not as well defined. It is all too natural to assume that a lack of appropriate skills or knowledge is at fault and that training is the appropriate response. The problem must be carefully defined to insure that other factors are at fault such as inadequate time or equipment to perform the tasks to a reasonable standard.

Once the observable problem has been clearly identified, one additional step is necessary before deciding that training is the solution. It is instructive to inquire whether the observed deficiency is one of execution or knowledge. There is considerable evidence that a deficiency in performance is all too frequently not because an employee does not have the knowledge and skill to accomplish a task at an acceptable level, but rather, because some other element of the system is interfering. The most recurring interference problem which has been cited repeatedly in management and behavioral literature is the situation where the employee simply does not know what standard of performance is expected or is not told that his work is not meeting standards (lack of feedback). Problems of this nature are generally classed as behavioral maintenance deficiencies, i.e., the system is preventing the performer from maintaining desired behavior.

Conduct System Analysis

The ultimate purpose of an organizational system is mission accomplishment. The performance requirements of a particular job should be defined and evaluated relative to this larger frame. The first step, therefore, is to define the operational system of which the job is a part, the system's missions and goals, the functions and interactions of its components, and the environments in which it operates.

System analysis places the job toward which training is to be designed in the perspective of the mission and requirements of the operational system. On the basis of system analysis, the importance of and probable gains to be realized from training can be viewed in relation to other system factors, such as logistics. Current field performance of the job and its tasks can be assessed in terms of system effectiveness. Training objectives can adequately reflect mission requirements. In short, system analysis is used to (1) define the scope of the training effort; (2) shape its design; (3) evaluate the remaining steps of the development process in terms of their effects on the efficiency of the system.

Development Task Inventories

Task inventories are organized lists of duties and tasks designed for performance by personnel in the system. Individual interviews and other techniques can aid in completing task inventories. Current practice should not be accepted uncritically, of course. Mission profiles and other system analysis devices can aid in determining the system effectiveness of current performances.

Conduct Task Analysis

Each of these tasks included and described in detail in the job model should be analyzed to determine which tasks or portions of tasks should be allocated to formal training and also to provide the basis on which precise, job-oriented training objectives can be stated. The decision to devote training time to a task should be made in

terms of criteria such as importance to mission success, frequency of performance on the job, and ease of learning on the job.

There are alternative systems for considering criteria for decisions on allocating tasks to formal training or to on-the-job learning. It is doubtful whether an overall criteria can be established for allocating content to formal training or on-the-job learning. Judgment of experienced personnel should provide adequate guidance in most cases.

In general, task analysis should also isolate (1) the conditions and standards under which task performance occurs in the operational setting; (2) those aspects of a task the performance of which can be supported by job aids, thus reducing training requirements; (3) those aspects which can be assumed [or demonstrated] to be already learned by the trainee; and (4) those aspects which must be learned, and their psychological nature. The possibility of supporting job performance by performance aids, thereby reducing training requirements, is worth serious consideration.

Evaluate Trainee Pre-Entry Knowledge and Skills

The value of evaluating trainee pre-entry capabilities (as distinct from prerequisite requirements) as a consideration in establishing the structure of a training program is largely a function of the heterogenity and size of the training population and the flexibility which is possible under the existing economic and organizational constraints. While it would be desirable to develop a program where each individual is exposed only to the skills and knowledge required which he does not now possess, it is not always feasible. It is often practical with large groups consisting of a limited number of heterogeneous classes. As an example, the Naval Air Training Command recently began an experiment in individual learning of the academic portions of flight training. The rationale behind such a system lies largely in the fact that the entry population is quite divergent in pertinent knowledge. Graduates of the military academies, for example, have already studies aerodynamics, aerology, theory of internal combustion engines and navigation. A graduate of a liberal arts program on the other hand, may not have had even the slightest exposure to such information. It, therefore, makes little sense to put them in the same classroom and proceed in a lock step fashion. The Navy has chosen the alternative of developing instructional packages which can be used directly by the student without an instructor. The former instructor now becomes a technical counselor to whom the student can turn for assistance. The key to this approach is the development of pretests which can validly measure the students current skills and knowledge.

Trainee Prerequisites

The prerequisite approach is inherently interlocked with the pre-entry capability assessment. It can either compliment or replace it.

There are always some minimum prerequisites but these will vary. Prerequisites beyond a minimal level have several possible uses: (1) To minimize training required by establishing a level of preknowledge; (2) to ensure aptitude or knowledge which will increase probability of successful completion; (3) to generate a training population of relatively homogeneous background. It is very difficult to divorce prerequisites from pre-entry skills and knowledge. One is an attempt to control, the other a recognition of an existing fact.

Establish Instructional Objectives

Instructional objectives are statements of what is expected of the trainee in measurable form. The nature of instructional objectives is best understood by way of example. A statement such as "the student shall understand the principles of aerodynamics," is not an instructional objective, it is a goal. It fails as an instructional objective because it is too broad and contains no measurable performance. A limited measure of "understanding of aerodynamic principles" stated as an instructional objective might be as follows:

> On completion of training, the student shall demonstrate an understanding of basic aerodynamics by:
>
> 1. Defining lift
> 2. Write lift equation
> 3. Solve problems using the lift equation
> 4. List the variables which affect Cl (coefficient of lift)
> 5. Define stall speed
> 6. Define stall angle of attack

The difference between the general statement and the specific is significant because the latter is a clear requirement of what is to be taught and learned while the former is at best a vague guide to the trainer and a mystery to the trainee.

Develop Instructional Strategy

The instructional approach is necessarily dependent on the task analysis and the system analysis since at that point considerable information on both the organizational system and the job have been collected. The instructional strategy should yield training which is best acquired in school environment and leave the remainder to self-study or on-site training.

Select Media and Materials

The possible choices of a combination of media and materials is almost limitless ranging from simple oral or written delivery to complex "enviornmental" training through simulation. The task complexity of

the job and cost effectiveness are major considerations in choosing the most appropriate method. Some guidance may be obtained from studies conducted by the Human Resources Research Office, the Office of Economic Opportunities Instructional Systems Development Manual and the U. S. Civil Service Commission's Bureau of Training publication Application of a System Approach to Training.

The Training System

Chart Two is a diagram of certain key elements in maintaining a training program which is adaptive to change conditions in the organizational system it supports. The significant elements are the Level I and Level II feedback paths. Level I is nothing more than a comparison of trainee performance at the completion of training. It is similar to the usually conducted tests in most training programs. It differs only in that the emphasis is on measuring student performance against job tasks and standards rather than on subject matter. If the task analysis has been properly conducted, then this becomes a relatively simple matter.

The Level II feedback loop is perhaps the most often neglected item in an on-going training program. All too often, training programs fail to adapt to the realities of the system operation. The system changes somewhat subtly and slowly in many cases, but the net effect over a period of time is substantial. Major or sudden changes such as a new piece of equipment for example, will generate a change in the training required which will be readily recognized. The more subtle changes, particularly in procedures, frequently go undetected by the training staff for considerable periods of time and consequently, what is taught is not completely relevant to the job.

There are a number of possible feedback corrective methods. The most common one which is used in many technical training programs is rotation of instructors from field operations to instructor duty. This has considerable value in many cases, but is of limited value in others. It depends largely on the currency of experience of the instructor and how well his experience matches the material to be taught. In the case of an electronic technician fresh from four years of work on a specific radar set should be very current. An inspector for manufacturing operations, however, may not because the locale in which he has worked may or may not be representative of all manufacturing inspection situations.

Meetings and seminars are another useful device for getting feedback, but unfortunately they all too often generate more heated discussion than concrete analysis. Field visits also can provide useful information, but these are frequently too unstructured to collect information that is wholly useful. Frequently they produce a memorandum to the boss, which, because of the press of other business and the absence of a systematic procedure, fails to cause any corrective action. What is needed is an information collecting device which precisely relates to the tasks to be performed on the job and the

standards set for those tasks. If the analysis in establishing the training program, i.e., task and performance is properly executed, the appropriate questions are readily at hand. At this point, it is essential to develop a list of questions which will yield sufficient information to be useful but not so extensive that a busy supervisor will regard it as just another harassment. This is not an easy task, but it is a necessary one if the feedback system is to function effectively.

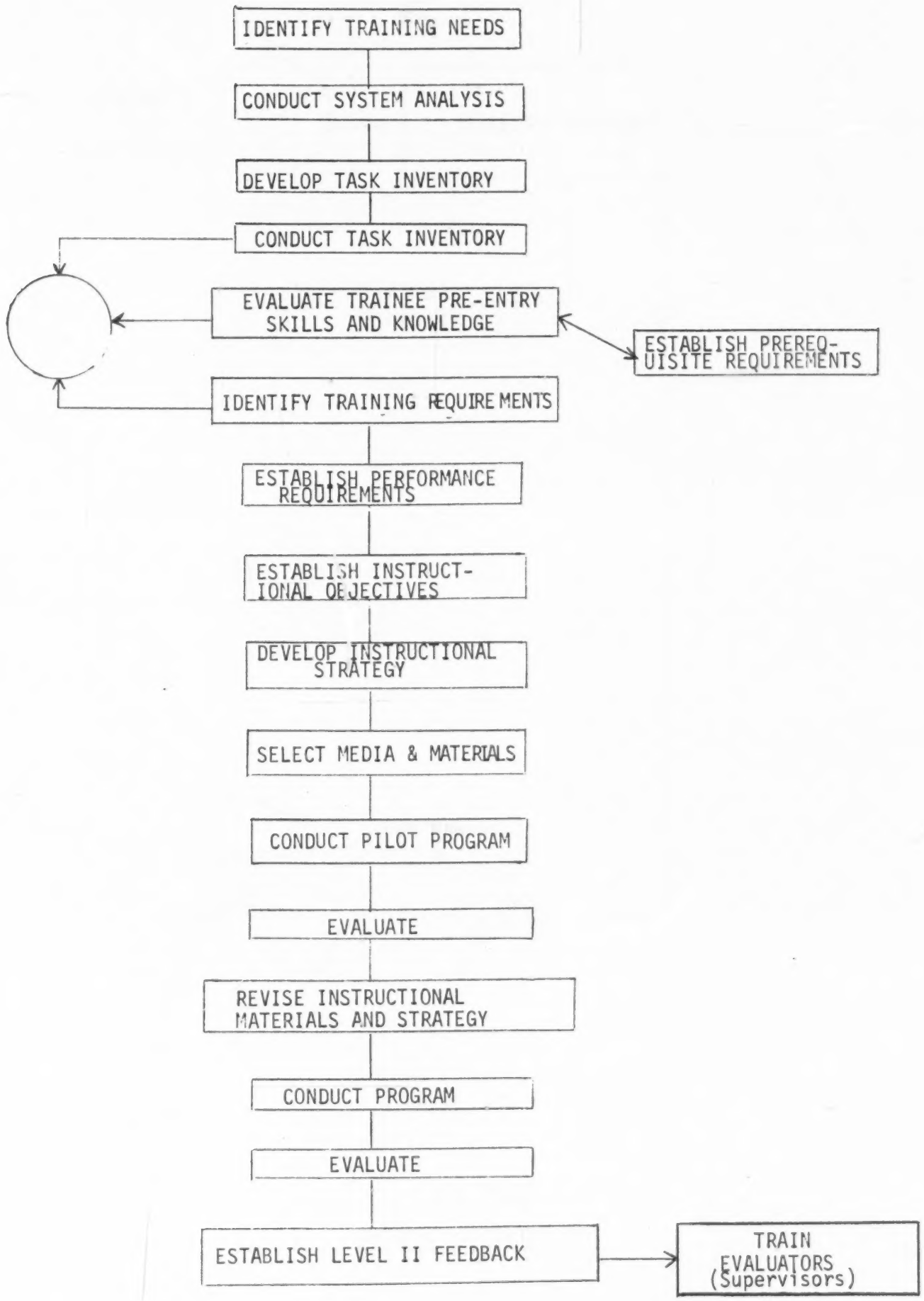

CHART I: ANALYSIS AND DEVELOPMENT OF A TRAINING PROGRAM

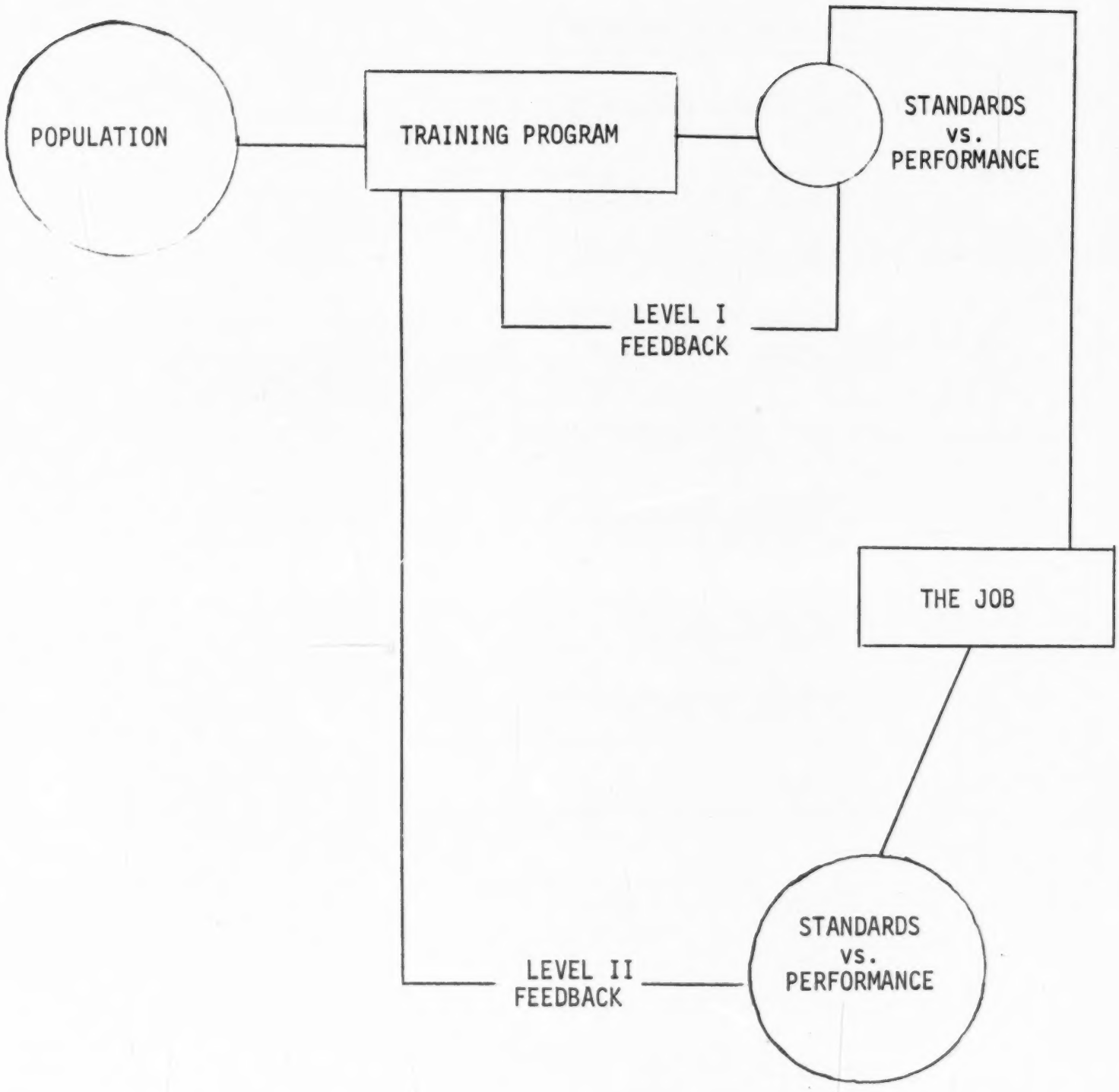

CHART II

THE TRAINING SYSTEM

VT 014 226
EXEMPLARY PROGRAMS OF THE STATE OF NEW MEXICO. ANNUAL REPORT, 1970-71.

NEW MEXICO OCCUPATIONAL RESEARCH AND DEVELOPMENT COORDINATING UNIT, SANTA FE.
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IDENTIFIERS - NEW MEXICO; TITLE I; VOCATIONAL EDUCATIONAL AMENDMENTS OF 1968

ABSTRACT - INCLUDED IN THIS ANNUAL REPORT ARE DESCRIPTIONS AND ASSESSMENTS OF 10 EXEMPLARY PROGRAMS OPERATING IN NEW MEXICO UNDER TITLE I OF THE VOCATIONAL EDUCATION AMENDMENTS OF 1968. THE PROGRAMS REVIEWED ARE: (1) INDUSTRIAL DEVELOPMENT TRAINING, (2) VOCATIONAL ENRICHMENT PROGRAM, (3) PRE-VOCATIONAL BUSINESS EDUCATION, (4) CHILD CARE TRAINING, (5) OCCUPATIONAL HOME ECONOMICS, (6) CAREER SELECTION EDUCATION, (7) PRE-VOCATIONS IN INDUSTRIAL EDUCATION, (8) VOCATIONAL GUIDANCE, (9) DATA PROCESSING, AND (10) VOCATIONAL HORTICULTURE. (JS)

VT 014 226

ANNUAL REPORT

EXEMPLARY PROGRAMS

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1970 — 71

New Mexico Research Coordinating Unit
State Department of Education
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3278

ANNUAL REPORT
EXEMPLARY PROGRAMS
STATE OF NEW MEXICO
1970-71

Prepared By
Research Coordinating Unit
Division of Vocational Education
Department of Education
Santa Fe, New Mexico

PREFACE

A. AUTHORIZATION FOR EXEMPLARY PROGRAMS

In accordance with the provisions of the Vocational Education Act of 1963, as amended by Title I of the Vocational Education Amendments of 1968, the State of New Mexico requested and received funds to initiate Innovative-Exemplary programs. The first series of grants for such programs were authorized in the 1969-70 fiscal year. The second series was authorized in 1970-71. However, funds were not received until April of 1970, and were used for equipment and supplies. The first Exemplary programs, which this report covers, were, therefore, not begun until the 1970-71 school year, utilizing funds for two years.

B. PURPOSE OF EXEMPLARY PROGRAMS

The Act states the purpose of Exemplary programs as follows: "to develop, establish and operate Exemplary and Innovative occupational programs or projects which are designed to broaden occupational aspirations and opportunities for youths, and to serve as models for use in vocational education programs." The Act says that this Exemplary program was established "to stimulate, through Federal financial support, new ways to create a bridge between school and earning a living for young people who are still in school, who have left school either by graduation or by dropping out, or who are in post-secondary programs of vocational preparation, and to promote cooperation between public education and manpower agencies...."

C. NATURE OF EXEMPLARY PROGRAMS

The Act sets forth seven general areas into which Innovative-Exemplary programs may fall. Each of these seven areas are listed below. In parentheses opposite each are the New Mexico Exemplary programs that relate to those general areas.

1. Those designed to familiarize elementary and secondary school students with the broad range of occupations for which special skills are required and the requisites for careers in such occupations. (New Mexico Exemplary Programs No. 3, 4, 6, 7)

2. Programs of projects for students providing educational experiences through work during the school year or in the summer. (New Mexico Exemplary Program No. 5)

3. Programs or projects for intensive occupational guidance and counseling during the last years of school and for initial job placement. (New Mexico Exemplary Program No. 8)

4. Programs or projects designed to broaden or improve vocational education curricula. (New Mexico Exemplary Programs No. 2, 9, 10, 11, 12, 13, 14)

5. Exchanges of personnel between schools and other agencies, institutions, or organizations participating in activities to achieve the purposes of this part, including manpower agencies and industry. (New Mexico Exemplary Program No. 1)

6. Programs or projects for young workers released from their jobs on a part-time basis for the purpose of increasing their educational attainment.

7. Programs or projects at the secondary level to motivate and provide pre-professional preparation for potential teachers for vocational education.

D. CRITERIA FOR SELECTION

The Act itself spells out the criteria for selection of Exemplary programs. The Act stipulates that applications shall be reviewed as to:

1. Impact on meeting vocational education needs of disadvantaged youth.

2. Impact on reducing youth unemployment.

3. Extent to which the project promotes cooperation between public education and manpower agencies.

4. Relevance to priority areas in vocational education specified in the long-range program plan and to vocational education programs, services, and activities described in the State Plan.

5. Adequacy and competency of personnel designated to carry out the program or project.

6. Adequacy of facilities.

7. Reasonableness of cost estimates.

8. Expected potential of the proposed program or project being made a part of the regular vocational education program.

9. Extent to which the project is of sufficient scope and duration to make a significant contribution to vocational education.

10. Adequacy of project evaluation plans.

The above criteria have served as guidelines for the selection of Exemplary programs in New Mexico. Over and above that, however, selection was made in congruence with the explicit purposes of the Act, to wit: To identify effective on-going programs which can serve as models for improving the vocational education of students at all levels, and to stimulate interest in

and meeting the means for creating new, more efficient and effective methods for providing job preparation needs. It should be mentioned here that, it has been difficult at times to apply an operational definition of "innovative" to the selection process. What may be new in a given regional school area may not be new in another. Likewise, what may be new to the State may not be new nationally. In general, "what is innovative to the State" has been applied. In some cases, it was necessary in selection to apply a "degree of innovativeness" criteria.

E. METHOD OF SELECTION

Proposal forms were designed according to the criteria set forth in the Act, and proposals were distributed to administrators and teachers who had previously expressed an interest in submitting particular proposals. Selection was made by the State Director and Deputy Director of the Vocational Education Division, in conjunction with State Supervisors and in conformity with Part I, 6.13-3 of the State Plan. Future Exemplary programs will be selected with the aid and recommendations of an advisory committee.

F. ADVISORY COUNCIL STATEMENTS OF ASSESSMENT

Various members of the New Mexico State Advisory Council to Vocational Education reviewed these reports on the Exemplary-Innovative programs. Excerpts from individual comments follow:

1. "The fact that 2,650 students took advantage of the TVI Mini-Class program has caused administrators to study the programs/courses required for graduation. It is obvious that many students need a different curriculum. Many will not, and need not, prepare for college and should be provided a curriculum that will prepare them for entry into the job market. However, it is doubtful if there was any real significant job entry skill preparation for students in any one of the classes, as they met only four hours a week for one semester. One should look, then at these classes as providing primarily an exploration of the subject area. It is quite obvious that this program was innovative, provided a very definite learning experience for the students, caused administrators to take a more critical look at curriculum offerings, and created a different attitude among the students toward school and education." -- Mr. Nelson Lowrey, Advisory Council Member.

2. "The Pre-Vocational Business Education program at Pecos Junior High appeared to be a very good one. Most junior highs have not offered typing in their curricula, and perhaps this program has shown that it needs to be incorporated as a regular program. Such programs should be funded at high level from State money as they start, but to a smaller degree after several years. A follow-up study of such students for the next 5-7 years would be interesting in order to try to find the real value of such a class." -- Dr. William B. Runge, Advisory Council Secretary.

3. "Like most cooperative training programs, the Occupational Home Economics program at Aztec High School met those objectives of learning what work is all about, how to earn a living, how to relate to other workers, what

the employer requires, and what preparation is necessary. In reviewing the remarks submitted by personnel involved in the program, including the students, it is apparent a great deal of accomplishment was made. Students learned and accepted responsibility, self-confidence improved, and students developed a salable skill. It met a vocational education need for the youth; it most probably reduced youth unemployment; it definitely promoted cooperation between school and the public; and it probably caused school administrators and business firms to be receptive to this type of education and training. Although this program, or at least a very similar type, is not new throughout the country, it definitely was innovative to the Aztec school locale. It was a good investment to motivate schools to change and improve curriculum and work with community resources in providing the training stations." -- Mr. Nelson Lowrey, Advisory Council Member.

4. "The Exemplary program at Weed/Cloudcroft on Career Selection Education might well provide a broad range of information on jobs, with additional provisions made for the following:

   a. The instructor, Mrs. Clendenen, is imaginative and provides stimulating information for the students. Most counselors with whom I have had contact know only one area - college preparation.

   b. Visiting speakers may well provide specific information about their respective occupations if they will take time to analyze their occupations from the standpoint of the beginner, his opportunities for advancement, and the rewards of such occupations.

   c. The approaches in the program should be followed up on a person-to-person basis with individual students who express an interest in a given occupation.

   d. A platoon system might be developed when two students with similar occupational interests could cooperate, with one on the job and the other in school; then, switch places for specific periods." -- Mr. Peter Eissele, Executive Director, Advisory Council.

5. "From the principal's general statement and the selected statements of representative students, one must assume that the project on Pre-Vocational Industrial Education at Portales made a substantial contribution toward meeting the needs of the students involved. The project is certainly compatible with vocational education goals of the State. Undoubtedly this project was quite innovative for the participating school system; however, it is my opinion that it was not particularly so for the field of vocational education as a whole. It would have been helpful to know how the students at the various age and grade levels were involved with each other, how they were exposed to community vocations in local shops and through the appearance in school of local tradesmen." -- Mr. Noah C. Turpen, Advisory Council Member.

3283

6. "The concept of the vocational guidance program at Hobbs is great and needed. It provides the only link between the theory of training and the real world-of-work. While, in general, the needs of the students appear to have been met through the dissemination of vocational information, the full import of reporting the results are vague. How many of those leaving school were actually channeled in the world-of-work for a job? How many have changed over to vocational endeavors as a result of the program? The Career Day planning part of the program is good, as it provides for industry input into the program. I feel this is the core of the endeavor. It would be good if a "tickler file" on all those that participated was set up to see what effect the program has had on the outlook of the students toward the world-of-work. The intent appears to be all-around; however, the format needs much to be desired. I am sure the program had some innovativeness; however, once the real worth of it is established, it should require no fund recycling unless perhaps it helps to supplement the staffing where other means are not available. Any effort toward making the needs of the students compatible with the needs of industry is laudable. Exemplary programs that serve the above need, indeed, are worthwhile and should be continued." -- Mr. I. A. Sanchez, Advisory Council Member.

G. REVIEW OF ADVISORY COUNCIL MEMBERS' STATEMENTS

The foregoing comments, suggestions, and recommendations were favorably received and reviewed by the Division of Vocational Education. Several of the recommendations will be implemented in those programs that are being continued. Others will be kept in mind as programs are further evaluated, and as new programs are instituted. The division feels the comments were exceedingly worthwhile, and would like to see such interchange between the Advisory Council and the Department continue.

DESCRIPTIVE LIST OF EXEMPLARY PROGRAMS

PAGE

EXEMPLARY PROGRAM No. 1: Industrial Development Training 1-1

This exemplary program involved a cooperative effort between the State Division of Vocational Education and four industrial firms in New Mexico to train entry-level employees for the firms.

EXEMPLARY PROGRAM No. 2: Vocational Enrichment Program 2-1

This program involved a cooperative effort between the State Division of Vocational Education and the Technical-Vocational Institute of Albuquerque to provide high school students with the opportunity to explore a multitude of occupational areas on an abbreviated basis.

EXEMPLARY PROGRAM No. 3: Pre-Vocational Business Education 3-1

This program was designed to provide pre-vocational orientation in office occupations to junior high school students in Pecos, New Mexico.

EXEMPLARY PROGRAM No. 4: Child Care Training 4-1

This program was initiated with Washington Junior High School in Albuquerque for long-range planning to train ninth-grade girls for employment in child care and baby sitting.

EXEMPLARY PROGRAM No. 5: Occupational Home Economics 5-1

This program involved a cooperative effort between the State Division of Vocational Education, the Aztec High School, and several firms to train high school students to obtain jobs in the food service and hotel-motel industries.

EXEMPLARY PROGRAM No. 6: Career Selection Education 6-1

This program was designed to expose high school students to a number of vocational opportunities in industry in the surrounding geographical areas near Weed and Cloudcroft, New Mexico.

EXEMPLARY PROGRAM No. 7: Pre-Vocations in Industrial Education 7-1

The objective of this Exemplary program was to offer to high school students a series of courses that would furnish them with occupational informational by which they could better make a career choice.

PAGE

EXEMPLARY PROGRAM No. 8: Vocational Guidance 8-1

The primary purpose of this program was to upgrade vocational guidance services in the elementary, junior, and senior high schools in Hobbs, New Mexico.

EXEMPLARY PROGRAM No. 9: Data Processing 9-1

The objective of this Exemplary program was to explore the feasibility of utilizing terminals in high school data processing courses.

EXEMPLARY PROGRAMS 10-14: Vocational Horticulture 10-1

These five programs, all in Vocational Horticulture at five different schools, were designed to train high school students for employment in Ornamental Horticulture.

INDUSTRIAL DEVELOPMENT TRAINING PROGRAM

Albuquerque, N.M.
Roswell, N.M.
Alamogordo, N.M.

1970-71

EXEMPLARY PROGRAM NO. 1

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

3287

PART I: PROJECT SUMMARY

A. RATIONALE

Joint efforts by the Governor's Office, the Chairman of the Vocational Advisory Committe, and the Division of Vocational Education resulted in the conclusion that a cooperative industrial training program was needed for New Mexico. Prior to its approval and inception, a trip was made to Oklahoma to visit a similar type program in operation there. The people involved in the Oklahoma program feel that it is doing a great service to the people or work force there. The program was funded on the foregoing rationale.

B. PROGRAM OBJECTIVES

The following were set down as overall objectives of the program:

1. To create employment for unemployed and underemployed persons in New Mexico by providing fiscal and program support to new or expanding industries for training entry-level employees.
2. To maintain a significant correlation between vocational education efforts and the needs for the community and its industry through an active role in community development throughout the State.
3. To assure all possible training resources are made available to new and expanding industries by maintaining a viable relationship with all manpower training and industrial development agencies.
4. To investigate and implement innovative training programs unique to a community for the purpose of meeting specific needs of the area and its people.

C. ADMINISTRATIVE OBJECTIVES

Objectives by which the program would be administered were formulated as follows:

1. The State Department will assist an industry or training institution in the development of a training plan, materials, and aids to suit the company's specific needs.
2. The State Department will provide pre-service training for instructors or company personnel selected to conduct such a program, if needed.
3. The State will be responsible for acquiring training facilities outside the plant, if needed, and instructors for related education.
4. The State Department will cooperate with the Employment Security Commission and the company to prepare lead-time schedules with respect to recruiting, testing, and selecting persons for training.
5. The State Department will enter into agreement with a company or local institution to provide funds in accordance with a mutually defined training plan.

6. The State Department will conduct periodic training program reviews to evaluate progress with regard to prescribed objectives and the needs and abilities of the trainees.
7. The State Department will periodically collect data to substantiate industrial training needs.

D. PROGRAM LIST

Training arrangements were made with the following four firms during the 1970-71 fiscal year:

1. Ampex Corporation, Rio Rancho Estates, Sandoval County.
2. General Electric and Sandia Corporation, Albuquerque, New Mexico.
3. Krebs & Sohns, Roswell, New Mexico.
4. Presto Corporation, Alamogordo, New Mexico.

E. TRAINING PROGRAM No. 1

A concerted team effort involving the Albuquerque Industrial Development Service, the Rio Rancho Estates Organization, and many civic leaders of the community, led to a training program agreement between the State Division of Vocational Education and Ampex Corporation of Albuquerque. Funding was authorized for the training of 84 electronic assemblers. Training was conducted by the Albuquerque Technical-Vocational Institute. It was conducted in two phases: (1) The first involved 120 hours of general electronic assembly methods; (2) The second involved 385 hours of instruction specifically oriented to the needs and specifications of the Ampex Corporation. Total training cost was $42,067.66.

F. TRAINING PROGRAM No. 2

This training program involved an introduction to plastics course. It was designed by the evening division staff of the Albuquerque Technical-Vocational Institute in conjunction with the guidelines set forth by an advisory committee. The advisory committee, comprised of representatives from General Electric and Sandia Corporation, to list only two of several participating firms, have identified a shortage of knowledgeable persons for entry-level work in the plastics field. It was agreed to implement the course as an integral part of the evening division program at TVI. Such a program would allow the industries involved in the plastics field to select any trainees who desire employment in that field. Three classes of 25 each are being conducted simultaneously, as a model from which to develop and expand the curriculum.

G. TRAINING PROGRAM No. 3

The program under this contract is designed to train 35-40 persons at the Presto Corporation in Alamogordo in varied metal working and finishing occupations. The training involves selection of trainees from the local area by the company. Total training time is four weeks. Instruction is being conducted through an in-house program, using a full-time management trainer, and company personnel from its plant in Jackson, Mississippi.

H. TRAINING PROGRAM No. 4

This agreement calls for Krebs and Sohns, Inc. of Roswell, New Mexico to train 60 employees as hand decorators in the glassware area, for the purpose of acquiring full-time employment with the firm upon successful completion of the training program. Each trainee is being trained in one of varied skills required in the total decorative glass operation. Each trainee is employed by the company at the rate of $1.60 an hour during the initial phases of the program. This rate is increased to $2.00 an hour when the management believes the trainee has reached full production. All trainees must reach the level of full production within six months or they will not be allowed to continue in the training program.

I. COSTS

Total costs of the industrial development training program is $81,217.66. This cost resolves as follows for each of the four projects:

1. Ampex Corporation-$42,067.66.
2. General Electric and Sandia-$950.00
3. Presto Corporation-$18,200.00
4. Krebs and Sohns-$20,000.00

PART II: PROJECT ASSESSMENT

A. SCOPE OF INTEREST

Assessment of interest in the industrial training program can be gauged somewhat from the number of firms who have requested additional training programs for the following year. Budget limitations for the 1970-71 fiscal year prohibited establishing programs at the request of the following eleven firms.

1. Hacienda Furniture, wood furniture, Albuquerque, New Mexico.
2. Standards Industrial, shoe making, Roswell, New Mexico.
3. Atlantic Products Co., leather goods, Deming, New Mexico.
4. G.T.E. Lenkurt, electronics, Albuquerque, New Mexico.
5. Laguna Rock Industry, heavy equipment operators, Laguna-Acoma.
6. Sandia Indian Industries, metal furniture, Albuquerque, New Mexico.
7. Spartan Aviation, aircraft instruments, Albuquerque, New Mexico.
8. Dima Engineering Company, consulting services, Taos, New Mexico.
9. J.A.T. Industries, electronics, Dulce, New Mexico.
10. Wall Colmny Corp., electronics, Albuquerque, New Mexico.
11. Farah Industries, clothing, Las Cruces, New Mexico.

B. OPERATIONAL ASSESSMENT

A statement assessing the operations of the industrial development training program was made by Peter A. Eissele, former state supervisor of industrial training and now executive director of the State Advisory Council for the Vocational-Technical-Adult Education Division. Mr. Eissele said:

"In light of the objectives set forth at the onset of the project, I would have to classify the effort of the past nine months as generally successful; however, this judgment is relative to our previous effort and not to achievement of other states. The State of New Mexico, although floundering in a low economic base, has not total commitment to industrial development. Their reasons, cultural or political or otherwise, have prohibited any extensive State supported effort in attracting new industries such as job training. Thus, the continuance of this Federally supported effort was not underwritten as a responsibility of the State. Nevertheless, it is generally agreed that the training effort within the State must encourage a job-creating function to assure its goals. It is questionable, however, whether the Department of Education should assume such a responsibility. Funding procedures and needs for the total scope of educational activities versus the fiscal requirements for an industrial development training activity prevents an internal conflict. I would recommend that steps be taken to incorporate the responsibility of industrial development training in the goals of the Industrial Occupations Committee, S.B.82, including the disbursement of any and all funds. Once an operational transition can be made,

a joint effort by the State Planning Office, the Department of Development, the Division of Vocational Education, and other related agencies should be taken to acquire additional funding from the State to create jobs. This may be the only way for this state to compete with other States who have the ability to finance an independent staff. It may also be the most efficient way to tap the extensive resources needed to maintain close communications with the business-industrial community."

VOCATIONAL ENRICHMENT PROGRAM
(Mini-Vocational Classes)

Albuquerque Technical-Vocational Institute
Albuquerque, N.M.

1970-71

EXEMPLARY PROGRAM No. 2

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

PART I: PROJECT SUMMARY

A. RATIONALE

Because public and private high schools in Albuquerque do not have curricula that offer a wide variety of short concentrated courses that will enable students to become conversant with various occupational areas, this program was funded to fill that vacuum.

B. OBJECTIVES

The program had two primary objectives: (1) To provide high school students with the opportunity to explore a multitude of occupational areas on an abbreviated basis, and (2) To enable high school students to enhance their high school programs with some of the technical-vocational courses.

C. INITIATION OF THE PROGRAM

The program was first opened in the fall of 1969 with evening classes at the Technical-Vocational Institute. However, initial response from high school students was poor. The students gave various reasons for lack of participation: Inadequate transportation, other evening school activities, and part-time evening jobs. For those reasons, it was decided to transfer the classes to various senior high schools throughout the city. Administrators were approached for their approval of an "after-school hours" program. Such approval was given by eight public schools and two non-public schools. The eight public schools were: Albuquerque High, Del Norte, Eldorado, Highland, Manzano, Rio Grande, Valley and West Mesa. The two non-public schools were Menaul and St. Pius. The program was under the direction of Harold W. Jackson, director of the evening division. Consultative and technical service was supplied by the State Department of Private and Secondary Schools, Vocational Division, under the direction of Donald Rea.

D. DESCRIPTION

Registration was held the latter part of January, 1970 at eight high schools. A total of 1,775 students enrolled in 87 classes. For the entire year's program, 2,650 students enrolled. Of these, 124 were in the ninth grade, 771 in the tenth, 1,015 in the eleventh, and 740 in the twelfth. Classes were normally held between 3-5 p.m. two days of each week. Some classes were scheduled early in the morning before school.

E. CURRICULUM AND METHODOLOGY

The entire project was referred to as "mini-vocational" classes. Course offerings differed from school to school, depending on what a given school proposed to teach. Classes were offered only if a minimum of 15 students enrolled. Once operational, classes were not terminated unless enrollment dropped below ten students. Teachers were the regular school teachers.

They were, however, under the control and supervision of TVI. They were paid $6 an hour. Students were awarded certificates upon satisfactory completion. Most schools gave one-half credit toward graduation.

F. EQUIPMENT AND FACILITIES

Classes were held in regular classrooms and laboratories. Equipment available at each particular school was used. Before proposals were approved by TVI, the school was required to show they had sufficient equipment. However, TVI did assist in some minor purchases.

G. COSTS

For the first semester of the program, total costs were $39,325, with expenditures as follows: Salaries, $27,200; supplies, $4,600; textbooks, $5,500; and transportation $2,025.

PART II: PROJECT ASSESSMENT

A. ADMINISTRATOR'S STATEMENT

Mr. Harold Jackson, director of the TVI evening division, said, "Based on the written and verbal responses received from students, instructors, and administrators in the Albuquerque Public School System, the program is very practical, useful, and was well received." Mr. Jackson said that without such a program hundreds of young people would have gone through high school without being exposed to some career opportunities. Due to the academic track a student may be in, they may not be able to fit vocational and technical courses into their regular day schedule. "In addition," said Mr. Jackson, "this program has pointed up to hundreds of young people that each human being is both a businessman and a technician." During the 1971 summer school session, TVI is sponsoring various vocational classes under the guidance and direction of the Vocational Enrichment Program.

B. STATEMENT BY NEW MEXICO RESEARCH AND STUDY COUNCIL

"The TVI vocational program holds potential for even greater involvement of high school students while providing an opportunity for implementation of some of the newer concepts in public education. The idea of mini-vocational classes poses a new challenge to education and offers prospects of increased educational opportunity for students."

C. STUDENT COMMENTS

Denise Arvas--Eldorado High-Graphic Arts

"My attitude? Eager! I'm anxious to learn how to use all the equipment. That's what the equipment is here for--for all the students to use. Plus, learning how to operate the equipment, gives the perfect opportunity for getting a job. Also, it made me feel proud whenever I can finish a job--just think, I can print something."

Therese Ayala--Del Norte High--Cashier

"This was a very useful and educational class. The one recommendation would be to purchase more cash registers. The teacher has it set up where the students get a little of everything, workbooks, math, tests, and practice on the cash register. I know this class will help me in my future years."

Max Rule--Manzano High-Typing

"I like this course o.k. I took the course because I wanted the extra half credit, and because typing might be important later on in my life."

Joe Yeske--Highland High--Mechanical Drafting

"This is a very good course. I enjoy it. The teacher is very good, and I don't mind getting the extra half credit either. I am very happy with the course, and I hope to take other TVI courses."

PRE-VOCATIONAL

JUNIOR HIGH

BUSINESS EDUCATION

Pecos Junior High
Pecos, New Mexico

1970-71

EXEMPLARY PROGRAM No. 3

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

PART I: PROJECT SUMMARY

A. RATIONALE

Follow-up studies of high school graduates from the Pecos school system showed that approximately 75 per cent of the graduates did not go to college. Most of them entered the world of work, mostly of a clerical nature. Therefore, this exploratory program was designed and funded to provide pre-vocational orientation in office occupations.

B. OBJECTIVES

The overall objectives of the program were set down as follows:

1. To expose junior high students to the practical needs of business.
2. To expose the students to an early preview of the business world, in case they want to pursue a particular field as a career, especially those that do not believe they will go to college.
3. To provide those students who are college bound with an early business background to prepare them for college business courses.
4. To acquaint students with the relations involved in everyday business life.
5. To instill personal confidence in dealing with people.

C. DESCRIPTION

This program on pre-vocation business education for junior high students was conducted at the Pecos Junior High School in Pecos, New Mexico, under the teaching direction of Mrs. Patricia Vigil. Admitted to the program were 140 seventh and eighth grade students. Consultative and technical assistance was rendered by Robert Gordon of the State Division of Vocational Education.

D. CURRICULUM AND METHODOLOGY

Students received instruction in filing, typewriting, shorthand, business etiquette, sales, spelling, handwriting, communications, vocabulary, advertising and operation and care of machines. The continuing goal of the teacher throughout the instruction was verisimilitude. Multiple methods of instruction were utilized: Drills, role playing, first-hand experience, field trips, games, lectures and guest speakers. The classroom was divided into two groups, primarily because there was a shortage of business machines. Thus, half the students worked at their desks on lesson drills, while the other half received instruction on the machines. Lesson drills were posted on the board so that students could see their drill assignments at all times.

E. EQUIPMENT AND FACILITIES

The following business equipment was used: eight standard manual typewriters, three ten-key adding machines, and a transcribing machine borrowed from the local high school. The facility for the pre-vocational business education program was a single classroom in the junior high building. The classroom was considered average.

F. COSTS

The project was funded for $8,500, of which $7,000 was for the teacher's annual salary and the remaining $1,500 for equipment and supplies.

PART II: PROJECT ASSESSMENT

A. ADMINISTRATOR'S STATEMENT

Mr. Tito Herrera, principal, who initiated the project, said, "It is my belief that the students who were exposed to the program now have a much better idea of knowing whether or not they want to pursue a special field in high school and/or higher education. I think that students who plan to go out into the labor market in this field immediately after high school will have an advantage over the other students who have not been in this program, especially if they continue in follow-on programs. I think the program has accomplished the goals that were set up at the beginning of the year. The most important thing I have seen so far is the meeting with success by students in the program, and their personal confidence gained by the course. We will continue the program next year."

B. STUDENT COMMENTS

Georgia Encinas: "Ever since we started this semester working on typing and other things, I enjoyed working with the other students as a group. What I liked was that all of the students seemed to cooperate as a group. I enjoyed the field trips. I enjoyed seeing all of the different office equipment and how it works."

Jerry Lawless: "I think I am getting a lot out of the class. I know I will be able to type better because of my experience here. The adding machines will help me and so will shorthand."

Wanda Gonzales: "I think I am doing a good job. And hope we can do it again next year. When we went on the trip we saw a keypunch machine. We also saw a computer that gives you all kinds of information. And I would like to go again. And I have got to using all kinds of machines in the office."

Leonore Flores: "I think this class has been the best class I have ever had. I have learned a lot of things from it. I liked going to the Highway Department. They were so nice. I also like typing and I don't like shorthand that good. The teacher is very nice and I hope to be here next year. Because I really had fun."

Roselyn Varela: "I really enjoy business because you sure do learn a lot and it sure will help me a lot in my work when I get to high school and it will be a little easier for me

when I graduate. So far I have learned quite a bit and I have enjoyed it very much."

Erica Leone: "I think the class I took on vocational business was a very good class. I learned how to type, use shorthand, and work all kinds of machines. I thought the one really good idea was hiring us for jobs. That way when we really have to get a job, we will know more about what we are doing."

CHILD CARE TRAINING

Washington Junior High School
Albuquerque, New Mexico

1970-71

EXEMPLARY PROGRAM No. 4

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

PART I: PROJECT SUMMARY

A. RATIONALE

Analysis of the drop-out rate for the Washington Junior High School students in Albuquerque indicated a need for a special training program for students who become homemakers early in life and who usually do not move from the low socio-economic level from which they come. No such programs were being offered in the Albuquerque Public Schools at the time of inception. The long range plans of the program are to train persons for employment in child care centers and for baby-sitting roles.

B. OBJECTIVES

Set down as general objectives were:

1. Students will obtain certain skills in working with small children, which in turn should improve the type of home life they as parents will provide for their families.
2. Students enrolled in the program will have a better knowledge of their progressive development and will be able to apply this knowledge in their relations with others.

Set down as more specific objectives were:

1. Understanding of the sequence of development in young children.
2. Accepts responsibility for providing for the needs of young children.
3. Understanding of the cause and effect relationship in children's behavior.
4. Understanding the importance of the family unit upon the development of the child.
5. Ability to care for children in the nursery school situation.

C. DESCRIPTION

The program was initiated in the fall of 1970 and continued through the spring semester of 1971 at Washington Junior High School in Albuquerque, New Mexico. A total of 51 students in the eighth and ninth grades were enrolled in the program during the two semesters. The assigned teacher was Priscilla Kremer. Mrs. Bettie Lou Snapp was involved as the City Consultant. Supplying consultative and technical service was the State Division of Home Economics, Vocational Division, under the direction of Mrs. Wilma Ludwig.

D. CURRICULUM AND METHODOLOGY

For the first four weeks of the program, enrolled students were given instruction in child development. A nursery school comprised of fifteen pre-school children from the surrounding community was then set up. The students worked actively with the children. Instruction to the students in child development continued throughout the program. Classes met five days a week for two hours each. The average class numbered seventeen students. They were actively involved in the operation of the nursery school each day via assignments in various areas of activity. Field trips were an integral part of the program. Consultations were held three times during the year with the advisory committee to the program.

E. EQUIPMENT AND FACILITIES

It had originally been planned to set aside 1,000 square feet in a separate building. However, this could not be arranged, and one mobile classroom was set aside for instruction and for inside play equipment. The space allowed less than the required 35 square feet of space per child. Outdoor play equipment was provided.

F. COSTS

Total costs of the program for the year was $34,358. Of this, Federal funds absorbed $3,000; State funds $10,008; and local funds $21,350. Cost per pupil resolved to an average $510.

PART II: PROJECT EVALUATION

A. ADMINISTRATORS' STATEMENT

Evaluative comments about the program came from three administrative sources:

1. Patrick J. Baca, Principal, Washington Junior High School, said he felt that the program was such a success that the program should be continued and enlarged next year. "I think all the objectives that were set up for the program have been met," he said. Mr. Baca said he felt the program is training the girls in a skill they can market, as well as having the side benefits of training them to be good mothers. "With additional training in high school, they will be able to get jobs in the field of child care," he added. He credited the major part of the success of the program to the dedication and hard work of the teacher, Mrs. Priscilla Kremer.
2. Dr. Florence Schroeder, Professor, Department of Home Economics, University of New Mexico, said, "I feel this is a worthwhile program, and I urge its expansion to other schools in Albuquerque." Dr. Schroeder said Mrs. Kremer was doing an admirable job but classes were too large for the space. Dr. Schroeder suggested several revisions and additions for next year, but said the program went smoothly despite its limitations.
3. Nelson W. Lowery, Director, Vocational Education, Albuquerque Public Schools, said that both the junior high students and the pre-school children profited from the program, and he hoped more programs of this type will be implemented in the Albuquerque Public Schools. "In my opinion," he said, "the program has been successful. It will be expanded to a full day program next year. This expansion will provide the students with more varied experiences with the children, which will eventually make them more valuable employees."

B. STUDENT COMMENTS

Terry Newman: "I enjoyed the course very much. You learn how to control your temper when you are working with children. I learned also that children have many different ways of learning. I think I would take this course again."

Charlotte Kaiser: "I think I got a great deal out of this class. I've learned several ways of talking to children in a kind way, to see what is wrong if they are sad. I've enjoyed this class but sometimes it was boring."

Caroline Lucero: "Yes, I would take this course again. I like working with children, and try to teach them all I know. And now I know how to take care of children and what to do when

trying to teach them."

C. PARENT COMMENTS

Mrs. Phillip Lucero: "I think this class has helped Betty as far as talking to the children and telling them stories. Betty is a lot better with an 18-month-old baby than with a second grader and pre-schooler. I think if the student has the desire to learn in this class, it can some day be of great value to them."

Mrs. Jaramillo: "I feel that Rosemary has improved on children. She knows how to protect them. To tell you the truth, she has to babysit this summer. I want her to take the course again because she really learned a lot this year."

Mrs. Clemente Garcia: " Well, I think this class my daughter is taking is a very nice class for any young girl to participate in. She tells me that her class shows her to work with children 3-5 years old. It also has helped her learn how to babysit and use the right language with them."

Mrs. Max D. Aragon: "My attitude toward this class is very favorable particularly in regards to the benefits it has brought our son. We have certainly enjoyed his progress in all the various new experiences that you are giving him. Please keep up the good work."

OCCUPATIONAL HOME ECONOMICS

Aztec High School
Aztec, New Mexico

1970-71

EXEMPLARY PROGRAM No. 5

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

PART I: PROJECT SUMMARY

A. RATIONALE

In an attempt to determine needs in the business community of Aztec, Bloomfield, Kirtland, and Farmington, New Mexico, the Aztec Vocational Business Education class combined their efforts with those of the Aztec and Farmington Chambers of Commerce in conducting a survey in San Juan County. Results of that survey strongly indicated an area need for food service and hotel-motel workers, especially for disadvantaged students. On this rationale, the program was funded.

B. OBJECTIVES

Program objectives were set up as follows:

1. To prepare students to be able to obtain jobs in the areas of waitress, food service workers, housekeeping aides, and day care aides.
2. To help the girls become aware of the potential employment opportunities in the local area.
3. To help the girls prepare themselves for seeking jobs by providing instruction in filling out applications, how to conduct themselves in interviews;and so forth.
4. To help the girls develop self-confidence in their skills by actual on-the-job practice.

C. DESCRIPTION

This occupational preparation program was initiated in the fall semester of 1970 and continued through the spring semester of 1971. A total of 22 girls enrolled in the program; 18 completed the course. Coordinator for the program was Mrs. Emilia Burns of Aztec High School. Consultative and technical service was provided by the State Department of Home Economics, Vocational Division, under the direction of Mrs. Wilma Ludwig.

D. CURRICULUM AND METHODOLOGY:

The first two weeks of the program were spent in orientation. The schedule for each girl in the program was to spend one day a week in class, from 8:35 a.m. until noon, then spend the remaining four days of the week at various work stations. Each girl spent six weeks at six different work stations. Programs were set up in cooperation with businesses, firms, institutions, and agencies in Aztec and Farmington. The six work station areas were: waitress, school cafeteria, day care or Head Start, motel or hospital housekeeping, hospital dietary service, and one of the following: dry cleaners, short order cook, private kindergarten or nursing home. The girls received three hours of credit for successful completion of the course. They received no pay. Grades were based on evaluation by their work supervisors.

on the quality of their classroom work, and on general appearance and deportment.

E. COST

Total cost of the program was $17,650. Of this, Federal funds absorbed $10,000; local funds absorbed the remainder. Cost per pupil averaged $928.94.

PART II: PROJECT ASSESSMENT

A. ADMINISTRATORS' STATEMENTS

Mr. Joe Boettcher, Principal, Aztec High School, said the school felt the program has served a real need. He said the organization accomplished by Mrs. Burn was exceptional, and the program received very good cooperation from all participating agencies. Mr. Boettcher said, "The effect on the attitude of the young ladies who took part in the program was very noticeable. Some of these students had been having attendance problems and had been exhibiting a poor attitude toward the school. The program had been in operation only a short time when the attendance of the girls improved markedly."

Mr. H. L. Willoughby, Superintendent, Aztec Municipal Schools, said "We have been extremely pleased with the program. Students who participated in the program have generally been those who do not progress satisfactorily in a regular academic program. These students have shown a great interest in their work and have developed marketable skills. We feel that no other program could have met their needs. Seventeen girls have already been pre-enrolled for the 1971-72 class. However, without State or Federal funds this school district will be unable to continue the program for those educationally deprived students."

B. WORK SUPERVISOR COMMENTS

Pearl Sisson, Chairman, Aztec School Program: "I have worked with and trained many young girls in restaurant work and I can see where this program helps. Girls are shy and don't have confidence in themselves when asking for a job. With this program, they have a chance to overcome this by working with someone they know, and customers they know. I hope we can continue this program."

Flora Matthews, Supervisor, Head Start: "The girls were often quite helpful, especially after they became acquainted with expected duties. I noticed an improvement in acceptance of responsibility and in improvement of self-confidence. Insofar as I can judge, the program has been beneficial."

Mary Foutz, Food Service Supervisor, San Juan Hospital: I consider the program beneficial to the community. I feel that on-the-job training helps the student. It teaches them to work well with others, and teaches them responsibility and self-confidence. It prepares them to meet the public."

Mrs. Margo Lockley, Registered Nurse, San Juan Manor: "The program is of great value to the student and to the community, and I think it is a very worthwhile project. It teaches the students self-reliance, and improves their character and personality in many ways. It teaches them

to understand the needs of human beings in institutions as well as out of institutions."

C. STUDENT COMMENTS

Karen Wells: "This course in vocational home economics has been a lot of fun and I've honestly learned a lot. We get acquainted with what the business world is like as well as meeting a lot of people. This course has helped me a lot."

Arlene Brown: "I feel like this course has been very beneficial to me. I got experience in many fields, and I have learned many things. I have learned what working is like. It is hard and you must do many things you don't want to do. I think this program should be continued."

Eva La Mone: "I think this course is the best that was ever offered to high school girls. If we lose this course, it would be a terrible thing. Please give next year's senior girls a chance to get a training. We want to keep the course."

Peggy George: "I was surprised to know that they won't have this program next year, because, in my opinion, I think it really benefitted me. I also have been talking to other teachers about this program. They, too, think it's worthwhile."

CAREER SELECTION EDUCATION

Cloudcroft, New Mexico
Weed, New Mexico

1970-71

EXEMPLARY PROGRAM NO. 6

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

PART I: PROJECT SUMMARY

A. RATIONALE

The Cloudcroft-Weed area is largely a farm and ranch area where it can be expected that 80 percent of the graduating students will be leaving the area to obtain work after graduation. In the immediate community, there is no opportunity for them to observe industrial relations of any sort. Furthermore, the school population is too small to justify offering a variety of technical-vocational courses. So that students might be exposed to a number of vocational opportunities for possible career selection, this program was funded.

B. OBJECTIVES

Objectives for the program were set down as follows.

1. To enhance the student's ability to make career choices by:

   a. Knowing himself, his abilities, his limitations.
   b. Knowing, as empirically as possible, pertinent facts about many careers.
   c. Learning how to get along with others.

2. To help students realistically make decisions about further education, and help them to handle details of selection, application, and financial aid.

C. DESCRIPTION

The program began in the fall semester of 1970 and ran through the spring semester of 1971. A total of 61 students enrolled in and successfully completed the program. Of these, 37 were at Cloudcroft and 24 at Weed. The program was conducted at Cloudcroft High School and offered to students of Weed High School on a share plan. The program was administered under the Guidance Department of Cloudcroft High under the direct supervision of Superintendent Wesley Lane, Principal James Johnston, and Counselor Mary Joe Clendenin. Consultative, technical, and supervisory support was provided by Sheldon Weissman, State Supervisor, Vocational Education.

D. CURRICULUM AND METHODOLOGY

The program was set up so as to augment the regular school program. The classes were one hour long and consisted primarily of discussion periods about career selection, and about tests and inventories having to do with career selection. During the year, three hours of career-oriented films and filmstrips were shown. Special field trips and trips were as follows: Roswell Technical School, Holloman Air Force Bases, Sunspot Solar Observatory, Special Session of State Legislature, Career Conference in Alamogordo, and College Day in Alamogordo. Throughout the year, about ten speakers from various

scientific fields and industries were scheduled.

E. COST

Total cost of the program for the year at Cloudcroft was $5,964, of which $1300 was Federal funds and the remainder state and local funds. Average cost per pupil was $149.10. Total cost of the program for Weed was $800, all Federal monies. Average cost per pupil was $66.33.

PART II: PROJECT ASSESSMENT

A. TEACHER'S STATEMENT

Mrs. Mary Jo Clendenin, guidance counselor at Cloudcroft who taught the class, said she thought the program was very worthwhile. She said the number enrolled in the class did not reflect the scope of the program, because several other groups of students, who visited the class during the year, also benefitted from the program. This really included the entire senior class, and many freshmen and sophomores. She said that next year they are going to schedule it so that it will be available to more students. Mrs. Clendenin felt that one of the most important aspects of the program was the close association with the students. She said she felt she and the students, because of the closeness, had a wonderful relationship. She said that she felt one of the weaknesses of the program was the lack of its involvement and cooperation with other teachers. She said that this was due to the limited amount of time available to keep other teachers informed. Mrs. Clendenin indicated that steps would be taken the next year to rectify that.

B. STUDENT COMMENTS

Herby Gage

"It has started me thinking about a career for the future and has suggested some careers in which I might be interested. I think that the counseling has brought the students to a better understanding of the world around them and the world which they face."

Debbie Trone

"She brings pamphlets about programs that normally we might not hear about and it might mean missing a valuable opportunity."

Peggy Johnson

"Mrs. Clendenin has talked to us about many different fields of careers. She has also brought us information telling us about many different fields of careers. She has also brought us information about opportunities."

Linda Jackson

"It has helped me to understand different types of fields that I can get into. Listening to the speakers gave me a lot of information about jobs that I didn't know."

Anna Teel

" I have enjoyed the speakers this past year, and I think the program would be improved if we could have more speakers. "

Louis Peters

" Before I was in this counseling program, I had no intentions of going to college, but now I have gotten everything ready for college next year. "

PRE-VOCATIONS

IN

INDUSTRIAL EDUCATION

Portales Municipal Schools
Portales, New Mexico

1970-71

EXEMPLARY PROGRAM No. 7

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

3318

PART I: PROJECT SUMMARY

A. RATIONALE

The need for this program was determined through program evaluations by the State Department of Vocational Education, from requests from local school administrators, from information disseminated by the Federal office and the State Advisory Council, and from information obtained on vocational education surveys by Eastern New Mexico University.

B. OBJECTIVES

The general objective of the program was to offer a series of courses that would allow students to make an intelligent choice of occupational training. Specific objectives set down were:

1. To instill an interest and basic understanding of industry.
2. To develop an appreciation of good design and workmanship.
3. To develop in the student a strong sense of self-reliance and resourcefulness.
4. To develop an understanding of man's interdependence in society.
5. To develop desirable attitudes in safety.
6. To develop an interest in achievement and leisure time occupations.
7. To develop an organized and efficient performance of tasks.
8. To develop an understanding of drawing and design as a means of communication.
9. To develop a measure of skill in the use of tools and machines that are basic to industrial processes.

C. DESCRIPTION

The program was initiated in the fall semester of 1970 and continued through the spring semester of 1971. A total of 111 students were enrolled in the program. Of these, there were 49 freshmen, 10 sophomores, 27 juniors and 25 seniors. The proposal was initiated by George C. Hughes, Assistant Superintendent, Portales Municipal Schools. Instructor was Glen Fields. Consultative, technical and supervisory assistance was provided by the Vocational Education Division, under the direction of Mr. Waymond Smith, State Supervisor Industrial Arts.

D. CURRICULUM AND METHODOLOGY

The curriculum was divided into six units, each of six weeks duration comprising 30 hours of instruction. Each student studied drafting, then electricity, power mechanics, general metals, woods; then, each student was allowed six weeks of instruction on an interest unit of his choice for advanced research or practice in his chosen area. Special emphasis was placed on occupational information in the areas covered.

E. EQUIPMENT AND FACILITIES

The program was conducted at the Portales High School in a new shop facility that included an adjoining classroom separated from the shop by a glass wall. Major equipment included: two circular saws, five lathes, one bandsaw, one jointer, one surfacer, one scroll saw, one air compressor, one spray and exhaust system, six woodworking tables and vices, one lot of woodworking hand tools, one shaper, two grinders, three drill presses, and one stationary belt and disc sander.

F. COST

Total cost of the program was $10,577, of which $3,500 was from Federal funds and the remainder from State and local funds. Average cost per pupil was $95.

PART II. PROJECT ASSESSMENT

A. ADMINISTRATOR'S STATEMENT

Mr. Russell Knudson, Principal, Portales High School, said that he felt the program was very effective. "Most of our outlined objectives are being met," he said. Mr. Knudson went on to say that student interest in the Industrial Arts program is very high. Unfortunately, they could not enroll all interested students because of limited facilities and teacher load. Mr. Knudson commended the instructor, Glen Fields, for the fine job he did on the program.

B. STUDENT COMMENTS

Joseph Chavez: "I like this course because it has helped me learn what I can do and what I cannot do. For example, I did not even know how engines worked, and I didn't know that they are so easy to work. In woods, I learned what different woods looked like, and in electricity I learned how the current flows and what makes a motor run."

Robert Slatter: "This course has helped me in many ways. I have learned a lot in all the fields. But, I learned the most in the woods department because we went out and made a project all by ourselves."

Chuck James: "I feel as though this class has helped me more than any other class I have been in this year. I think this class will help prepare me for life in the future."

Harold Baker: "I like this course very much. It teaches you to use your hands. It also gives you a broad view of industry, and by this you will know more about the kind of work that you want to do."

Francis H. Day, Jr.: "I feel that this course has helped me in everyday life. And if everybody had a chance to take it, I think they would feel the same way."

Paul Bender: "I think this course had good benefits in helping you decide what field of work to go into. This course can help me a lot in the way of choosing the field I think I'll be best at. I think that everyone who has taken the course benefitted highly."

Richard Rasser: "Industrial Arts is one of the most interesting subjects anyone can take. The teacher is one of the greatest. I think that Industrial Arts connects us to industry and also to the changing world."

Ronnie Roberts: "This is one of the best classes I have all day. Overall, I think this class would be very helpful to anyone.

VOCATIONAL GUIDANCE

Hobbs High School
Hobbs, New Mexico

1970-71

EXEMPLARY PROGRAM No. 8

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

PART I: PROJECT SUMMARY

A. RATIONALE

From a series of discussions between administrators, counselors, and teachers in the Hobbs school area, in which local evaluative follow-up data was reviewed, it was determined that a need existed for a vocational guidance program to improve and upgrade existing guidance services.

B. OBJECTIVES

The objectives of this program were set down as follows:

1. To extend vocational guidance to as many high schools, junior high, and elementary students as possible.

2. To update material and services of the present guidance program.

3. To provide occupational information, and to promote interest in vocational occupations, by updating material and purchasing new equipment conducive to career planning.

C. DESCRIPTION

The program began with the fall semester of 1970 and continued through the spring semester of 1971. A total of 1,241 students participated in the program. Of these, 686 students were sophomores and 555 were juniors. The program was initiated by Edward DeJarnet, coordinator of Evaluation, and W.W. Easley, Director of Special Services, of the Hobbs Municipal Schools, under direction of R.N. Tydings, Superintendent, Hobbs Municipal Schools. Consultative and technical service was furnished by the Special Needs Department of the Division of Vocational Education, under the direction of Shelley Weissman.

D. CURRICULUM AND METHODOLOGY

The program plan did not involve students attending class on a given curriculum. The essence of the program was to improve vocational guidance services, both vertically and horizontally, by providing service and materials to teachers, administrators, guidance counselors, and the like, thereby, preparing each informationally for roles in vocational guidance. Several video tapes were developed of various work situations and of interviews between employees and employers. Procedures were developed to better utilize counseling personnel trained to communicate vocational and occupational information. A Career Day was held;

local people came in on that day to talk about their vocation and give the students a chance to hear and ask questions about careers they might be interested in. One member of each vocational advisory committee was appointed in the local area to insure a cross-communication from all different vocational areas of instruction.

E. COSTS

Total cost of the program was $27,594. Of this, $13,000 was Federal monies and the remainder State and local.

PART II: PROJECT ASSESSMENT

A. STUDENT COMMENTS ON VIDEO TAPES

David Newman

"It helps the students more than any other course because it deals with on-the-job training. Very educational."

Gary Skinner

"These films are very interesting, and I think they will be helpful to anyone who is considering going into a certain field, or if a person is undecided, it might help him decide."

Randy Holmes

"This film was excellent for anyone interested in a career in diesel mechanics. It showed the work and told of method of operation."

Ray Naseff

"I think films are real good, and can help the ones who have never seen them. It can help more people to understand more about different kinds of work."

Joey Herrington

"I think these films should be shown to all of the students in school. I find them interesting because of what is learned."

B. STUDENT COMMENTS ON SLIDES, CASSETTES

Debbie Page

"I think the slides we saw were good; they helped me in getting a job, and told me how I should go about being interviewed."

Neil Fagan

"I think the slides show you a lot about jobs and what you should look for. I think the slides are good for the student."

Danny Seymore

"I think the slides are interesting and I wish we could see them more often. The slides are helpful in making a decision."

Gerald Bell

"I think they may be very helpful in the future. They even help you think about what you want to do. It is very important to most of the younger generation, and I think everyone really got something out of it."

Kim Shells

"I think they were very interesting as well as helpful to me. The only thing I dislike about them was that they didn't show too much of the women's jobs, and they were too short."

DATA PROCESSING

Eastern New Mexico University
Portales, New Mexico

1970-71

EXEMPLARY PROGRAM No. 9

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

PART I: PROJECT SUMMARY

A. RATIONALE

The need for the program was determined by comparing the costs of each individual high school having its own computer for instruction, versus the cost of each high school utilizing one or more terminals connected to one large central computer. It was determined that the latter could be more feasible, and the program was funded.

B. OBJECTIVES

The overall objectives of the program were to teach computer programming to high schools, by utilizing an IBM 2740 terminal. More basically, it was to be a pilot program to explore the feasibility of utilizing terminals in high school data processing courses.

C. DESCRIPTION

The program was initiated in the fall semester of 1970 and continued through the spring of 1971. Sixty students in the eleventh and twelfth grades went through the program. Mario Trujillo of Clovis High School taught the class. The program was in charge of Gene Newton, Chairman of the Data Processing Department at Eastern New Mexico University, with consultative and technical service supplied by the Department of Office Education, under the direction of Robert Gordon, State Supervisor.

D. CURRICULUM AND METHODOLOGY

None of the enrollees had any prior instruction in data processing. It was, therefore, determined that much of the first semester would be used to provide introductory knowledge. Following this, the students were instructed in simple computer language and flowcharting. The students were then given instruction in RPG computing language, and were required to input and program by utilizing the 2740 terminal. However, it was soon discovered that because of the short time-allotment and the large number of students, it was not feasible to accomplish the program objectives. Therefore, it was necessary to back-process all of the programs written by the students and to provide a rotation in use of the terminal.

E. COST

Total cost of the program was $5,000, at an average cost per pupil of $83.30.

PART II: PROJECT ASSESSMENT

A. ADMINISTRATOR'S STATEMENT

Mr. Gene Newton, Chairman of the Data Processing Department at Eastern New Mexico University, who supervised the project, said "I do not feel that we accomplished our stated objectives because we only had one terminal with limited access to the computer. Therefore, the exposure which each individual received was insufficient. I now feel that shipping punched programs to the central computer system would have been better. I do still feel, however, that with more terminals, the objectives could be met."

B. TEACHER'S STATEMENT

Mr. Mario Trujillo, instructor, said, "I feel that what made the program at Clovis weak was the fact that there was not too much time spent on planning it. There were no books that I could use in the advanced portion of the course. We had to order them and they didn't come in until right before the semester ended." Mr. Trujillo had several recommendations if a similar program were attempted again: Have the equipment next to the classroom; the logistics of sharing the terminal should be more carefully worked out; students selected for such a program should be able to type at least because, if they can't the difficulties of teaching keypunching are compounded; and reduce the course length from two to one hour if it is to run an entire year.

VOCATIONAL HORTICULTURE

Valley High School, Albuquerque, New Mexico
Espanola High School, Espanola, New Mexico
Belen High School, Belen, New Mexico
Los Lunas High School, Los Lunas, New Mexico
Las Cruces High School, Las Cruces, New Mexico

1970-71

EXEMPLARY PROGRAMS No. 10-14

VOCATIONAL EDUCATION DIVISION
State Department of Education
Santa Fe, New Mexico

PART I: PROJECT SUMMARY

A. RATIONALE

For these five programs in Horticulture, the needs in each area were determined by an assessment of employment opportunities, and upon the advice of administration and advisory committees. Also, each program was set up on a continuing three-year plan.

B. OBJECTIVES

In all five cases, the overall objective was to train students for employment in the various areas of Ornamental Horticulture. Specific objectives were set down as follows:

1. To teach the student plant processes, plant propagation, the growing of plants and identification of ornamental plants.
2. To teach the student about soils, soil fertility and plant-growing media.
3. To teach leadership activities.
4. To teach business procedures and relations.
5. To have student gain experiences by working in a horticulture business.

C. DESCRIPTION

Each of the five programs was initiated in the fall semester of 1970 and continued through the spring semester of 1971. A total of 273 students participated in the five programs. Of these, 93 were enrolled at Valley High, 71 at Espanola, 39 at Las Cruces, 31 at Los Lunas and 39 at Belen. Due to the popularity of the programs, a substantial increase in enrollments is expected in the fall of 1972.

D. INSTRUCTORS

Instructors for each of the five programs were as follows:

1. Valley High, Albuquerque: Mr. George Head
2. Espanola High, Espanola: Mr. Gene Thornton
3. Las Cruces High, Las Cruces: Mr. Jon L. Nunn
4. Los Lunas High, Los Lunas: Mr. D. Gonzales
5. Belen High, Belen: Mr. Gilbert Mireles

Consultative and technical service was furnished by the State Department of Vocational Agriculture, Vocational Education Division, under the direction of Mr. Charles Morrison, State Supervisor.

E. CURRICULUM AND METHODOLOGY

Although objectives were identical for each of the five programs, curricula and methods differed somewhat. Each program was identical, however, in one respect. Greenhouses were designed and built at each high school by the teachers and students. This construction was done during class hours and instruction was slow during this period. At Las Cruces and Belen, the primary idea was to give as broad an understanding of the field of horticulture as possible. About 65-80 percent of the instruction was lab work. Their curricula emphasized the problem-solving approach; wherein, certain hypothetical problems were drawn up and the students were the experts who would solve the problems. At Las Cruces, one project was to have each student grow a lily and sell it. At Valley High in Albuquerque, for the first semester, the students were introduced to the field of horticulture with a multi-media approach of slides, filmstrips and textbooks. The students were taught plant identification, basic soils, fertilizers and irrigation. Instruction was given on greenhouse drawings, on surveying, bills of materials and rafter framing. The second semester of instruction covered construction of coldframes, construction of greenhouses and research reports on some area of horticulture were required. Espanola followed the same general procedure with a mixture of classroom instruction, lab work, and home projects. At Los Lunas, students were required to identify and verbalize five or more ornamental horticulture career areas; home garden projects were required, with emphasis on the students learning to plant, grow, care and identify greenhouse and outdoor plants.

F. COST

Exemplary program funds of $5,000 were allotted for each of the five programs. This amount, in most cases, covered the construction of the greenhouses. An additional $10,008 State funds were allotted for salaries and supplies to each program.

PART II: PROJECT ASSESSMENT

A. ADMINISTRATORS' STATEMENTS

Harry B. Foltz, Principal, Las Cruces High School: "The Horticulture program that was initiated at Las Cruces High School during the 1970-71 school year has had a great deal of success, beginning with the instructor, Jon Nunn, and continuing through the efforts of Luitt K. Miller and Lewis Keith from the central office, who built the greenhouse and helped plan other facets of the physical plant. Jon Nunn effectively planned and implemented the program. Through the efforts of the central office personnel, a small, but adequate facility has been provided for this program." Mr. Foltz had two recommendations: (1) That the schools be given more lead time for the preparation and implementation of the program, and (2) that the size of the greenhouse shall be increased, to accommodate a greater number of enrollees.

David D. White, Principal, Valley High School, Albuquerque: "This will affirm the fact that our Horticulture teacher, Mr. George Head, has implemented an extremely satisfactory program this school year. The program involved students in the design and actual construction of a greenhouse facility. This facility has been reserved by fencing and consists of several coldframes which are presently in use. The students, staff, parents and community in general are quite enthusiastic about this program. The implications of it in terms of student training and job placement are great. Since Mr. Head has been primarily responsible for the success of this program, I would recommend a continuance of the funding level for it."

Merce Villareal, Principal, Espanola High School: "This note is to convey to you that our Vocational Horticulture program at Espanola High School is progressing toward the objectives set forth. I am personally convinced that it can in the future be improved. I am recommending to our our instructors that we exert all our efforts in selling our program to the community."

B. STUDENT COMMENTS

Sandra Miller, Las Cruces: "Although this is a new course, I feel we accomplished a great deal. I feel that if this course is to really succeed we will have to have more equipment and larger areas to walk in."

Yvette T. Baca, Las Cruces: "To me, this course was very worthwhile. It taught me to take care of certain plants and flowers. This information will come in handy later when I become a home owner."

Leland George, Las Cruces: "The class was very informative and it will help many students. It was handled in a fantastic way. It was a good class and taught me a lot. Some things we need are more money, plants and more greenhouse space."

Terry Clifton, Los Lunas: "I took the course because I wanted to learn about plants and how to work in a greenhouse. If I am here next year, I will take horticulture again. I liked the course. When I get out of school, I am going to work in some type of greenhouse."

Michael Armijo, Los Lunas: "It was sure interesting when we built the greenhouse. I am going to take it again next year. The course would have been better if we would have had a greenhouse all year."

Leonard Perea, Los Lunas: "I took this course because I thought that I would learn a little about plants. I am planning to take this class again next year."

Henry Winkles, Los Lunas: "When I took this class, at first, I didn't know that much about plants, and I didn't know how to make a greenhouse. Yes, I plan to take horticulture next year."

VT 014 248
ASSOCIATE DEGREE EDUCATION FOR NURSING.
INFORMATION ABOUT STATE-APPROVED ASSOCIATE
DEGREE PROGRAMS IN NURSING.

NATIONAL LEAGUE FOR NURSING, NEW YORK, N.Y.
DEPT. OF ASSOCIATE DEGREE PROGRAMS.
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COLUMBUS CIRCLE, NEW YORK, NEW YORK 10019
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(INSTITUTIONS); *DIRECTORIES; OCCUPATIONAL
GUIDANCE; EDUCATIONAL GUIDANCE; VOCATIONAL
COUNSELING; PROGRAM LENGTH; PROGRAM COSTS;
CERTIFICATION

ABSTRACT - THIS PUBLICATION LISTS BY STATE
APPROXIMATELY 500 STATE AND IN SOME CASES
NATIONAL LEAGUE FOR NURSING APPROVED
ASSOCIATE DEGREE PROGRAMS IN NURSING.
INFORMATION FOR EACH ENTRY INCLUDES: (1)
SCHOOL ADDRESS, (2) NAME AND TITLE OF
SCHOOL'S DIRECTOR, (3) PROGRAM LENGTH, (4)
POSSIBILITY OF ADVANCED PLACEMENT AND PART-
TIME OR EVENING STUDY, (5) LIVING
ARRANGEMENTS, (6) PROGRAM COSTS FOR TUITION,
FEES, BOOKS, AND UNIFORMS, (7) MAXIMUM NUMBER
OF FRESHMEN ADMISSIONS, AND (8) ADDRESS FOR
APPLICATION FORM AND/OR CATALOG. AN
INTRODUCTORY SECTION DESCRIBES FEATURES BASIC
TO ASSOCIATE DEGREE PROGRAMS. (SB)

VT 014 248

Associate Degree Education For Nursing

Information About
State-Approved Associate Degree
Programs in Nursing

NATIONAL LEAGUE FOR NURSING
Department of Associate Degree Programs
10 Columbus Circle, New York, New York 10019

971

Publication Number 23-1309 Price: 35 cents

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INTRODUCTION

If you have read much about nursing or have h
recently, you know that a great many more registe
needed to care for patients in our nation's hospita
other health agencies. Factors that have helped to
are well known: increased population, scientific and
more health insurance programs, and growth and
and other health facilities. It is a fact that whil
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It is also a fact that nurses are privileged in a r
always being assured of a job. Their work is endle
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Preparation for nursing is available in a variety
one of which is the community college that offers
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degree preparation for nursing; lists all institutions
programs of this type; indicates those that have
National League for Nursing, which is the nationa
nursing education programs; and presents certain sp
the nursing program offered by each institution list

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INTRODUCTION

If you have read much about nursing or have had contacts with nurses recently, you know that a great many more registered nurses are urgently needed to care for patients in our nation's hospitals, nursing homes, and other health agencies. Factors that have helped to bring about this need are well known: increased population, scientific and technological advances, more health insurance programs, and growth and expansion of hospitals and other health facilities. It is a fact that while you are reading this paragraph, new job opportunities are being created and the need for more registered nurses is increasing.

It is also a fact that nurses are privileged in a number of ways besides always being assured of a job. Their work is endlessly interesting, both in itself and in that it keeps them in constant contact with people of every description; they are valued by society; and their work gives them a sense of personal worth, the inner satisfaction that comes out of helping people.

Preparation for nursing is available in a variety of educational settings, one of which is the community college that offers an associate degree program in nursing. This pamphlet gives general information about associate degree preparation for nursing; lists all institutions that offer state-approved programs of this type; indicates those that have been accredited by the National League for Nursing, which is the national accrediting agency for nursing education programs; and presents certain specific information about the nursing program offered by each institution listed.

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ASSOCIATE DEGREE PROGRAMS IN NURSING

Although this type of program is relatively new, the first having been instituted in 1952, it has multiplied rapidly and is now proliferating at a rate faster than that of any other type of nursing program.

Although there are variations, a number of features are basic to associate degree programs:

- The majority are conducted and controlled by public junior or community colleges, some are in senior colleges or universities, some are in technical institutes, and a few are in private institutions.
- The programs vary in length from two academic years to two calendar years.
- The program of study combines nursing courses and supportive college courses.
- Students must meet requirements of the college to be admitted to the nursing program.
- Costs and living arrangements for nursing students are comparable to those for students in other curriculums in the college. The costs are usually minimal for local students.
- The associate degree nursing program prepares students to be eligible to write the state licensure examination to become registered nurses.

The last feature is especially important to note, for within the field of nursing today there are many kinds of nurses with different types of education and equally different job responsibilities. Despite this variety, however, the majority of registered nurses work in hospitals or other institutions and are engaged in giving direct nursing care to the sick. These nurses are usually called general duty or staff nurses and sometimes "bedside" nurses. Since staff nurses give direct care to patients, they must possess a high degree of technical nursing knowledge and skill and have an understanding of the scientific principles of the nursing care they give.

An associate degree program will meet your needs if:

- You would like to give direct nursing care to the sick.
- Your goal is to become a registered nurse.
- You want both a nursing education and some college-level general education.
- You want to complete your education in a relatively short period of time.
- You would like to have a college degree.
- You would like to obtain your nursing education in a college in your own community.

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The unique features of associate degree education for nursing also mean that the programs are attractive to married women and others whose family responsibilities require them to live at home, to men who wish to pursue nursing careers, and to older students.

Although the associate degree program in nursing is complete for the purpose described, some of the college credits earned in the program can be applied toward a baccalaureate degree in nursing should a graduate decide later to pursue education for professional nursing. The amount of credit granted will depend on the policies of the senior college or university that offers the particular baccaureate degree program.

Admission Requirements

High school graduation or a high school equivalency certificate is the minimum requirement for admission to an associate degree program in nursing. A school may establish any requirements it wishes above the minimum. A good academic average is desirable. Since admission requirements vary, you should obtain specific information by writing to schools for their catalogs or bulletins.

Licensure

All states regulate by law the practice of nursing and other health occupations. Licensure, therefore, has a *legal* meaning. A license is not a degree.

A graduate of a state-approved associate degree program in nursing is eligible to take the state licensure examination to become a registered nurse. Licensure as a registered nurse (R.N.) means that the nurse has met legal requirements to practice in the state in which the license is issued.

To become a licensed nursing practitioner—an R.N.—you must be a graduate of a state-approved school or program in nursing. State-approved schools have met *legal* standards set by a state board of nursing. This applies in each of the 50 states.

The protection of the public is the basic reason for licensing laws, since the public cannot be expected to know the difference between a competent or an incompetent practitioner. In terms of public safety, a licensed practitioner of nursing, a registered nurse, is assumed to be a safe practitioner. Note especially that a registered nurse's license does not indicate the type of education the nurse has had, since the R.N. may be a graduate of an associate degree, baccalureate degree, or diploma program in nursing.

Nationally Accredited Schools

Before a program in nursing can be opened, it must establish that it meets the legal requirements set by the state. In addition, there is a professionally

oriented approval, or accreditation, sought by many programs. This type of approval is national in scope and voluntary rather than required by law. The standards set by the accrediting body are uniform throughout the United States. The recognized agency for the accreditation of programs in nursing is the National League for Nursing. The achievement of NLN accreditation by a program signifies that it has met the national standards of excellence for programs in nursing of its type.

Scholarships

If you are going to need financial assistance, write to the college of your choice for a listing of available scholarship funds.

STATE-APPROVED ASSOCIATE DEGREE PROGRAMS

Listed on the following pages are the institutions that offer state-approved programs in nursing education leading to an associate degree and specific information about each program. The information was supplied by the programs in response to a questionnaire distributed by the Department of Associate Degree Programs of the National League for Nursing. As in all publications of this kind, the information is subject to change.

The names of institutions offering programs accredited by the National League for Nursing are printed in boldface type. Almost all of the programs are coeducational; the few exceptions are noted in column 1 below the name and address of the particular college.

The name and title of the nurse administrator who is responsible for the management of the program appears in column 2. The approximate length of the program is indicated in column 3.

If you have already taken some advanced high school or college courses or have had some education in nursing, check column 4 to learn whether or not advanced placement is possible at the college in which you are interested. If it is possible, write to the college for information about placement examinations or other evaluation procedures and to request an evaluation. The granting of advanced standing is the prerogative of the school, and each school sets its own criteria for the evaluation of work done at other schools.

If you cannot afford to study full time, columns 5 and 6 will tell you whether the college permits part-time study during the day or has evening division classes.

Column 7 indicates whether dormitory residence is required or available to students who do not live at home in the community or living arrangements must be made by the students.

In order to help you plan realistically for
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Column 10 tells you the person or office t
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work done at other

and 6 will tell you
day or has evening

required or available
r living arrangements

In order to help you plan realistically for your preparation, estimated costs for the total program are shown in column 8. Community college tuition costs are for local students. These colleges have other cost schedules for out-of-town residents of the state and for out-of-state students. Private colleges have the same costs for all students. The figures shown should not be interpreted as complete costs. The school catalog will give a more detailed picture of the costs. If you select a college outside your community, you must plan for room and board in addition to tuition and fees. As costs rise, these figures will become out of date.

Column 9 shows the maximum number of freshmen admitted to the program each year. Many of the community colleges admit on the basis of "first come, first served." When the number of qualified applicants reaches the capacity of the program, no more are admitted. Therefore, it is to your advantage to apply early.

Column 10 tells you the person or office to write to for an application form, a catalog, or other information about the college and the nursing program.

This publication was designed to provide preliminary guidance in the selection of a program. Study the information given about each of the programs in the state or area in which you wish to obtain your preparation, select two or three programs that seem to suit your needs, and write to each for a catalog or bulletin. Then study and compare the programs. The school catalogs or bulletins are the only source of all the information you will need in order to make a final selection.

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements		
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only
ALABAMA											
Gadsden State Junior College George Wallace Dr. Gadsden, Ala. 35903	Sister Anne Joachim (Hogan) Chairman Department of Nursing Education	7 qtr.	X								X
George C. Wallace State Technical Junior College Napier Field Dothan, Ala. 36301	Cleo Freeman Director Associate Degree Nursing Program	7 qtr. 1 s.s.		X			X				X
Jefferson State Junior College 2601 Carson Rd. Birmingham, Ala. 35031	Naomi R. Huggins Chairman Department of Nursing Education	7 qtr.		X	X	X	X	X		X	
John C. Calhoun State Junior College P.O. Box 548 Decatur, Ala. 35601	Emogene W. Jasper Director Associate Degree Nursing Program	6 qtr.			X	X	X				X
Theodore Alfred Lawson State Junior College Rte. 10, Box 486 Birmingham, Ala. 35228	Charlie Jones Dickson Chairman Associate Degree Nursing Program	7 qtr. 1 s.s.	X	X	X	X	X			X	
ALASKA											
Anchorage Community College of University of Alaska 2533 Providence Ave. Anchorage, Alaska 99504	LoRaine Carlson Coordinator Associate Degree Nursing Program	4 sem. 1 s.s.			X		X				
ARIZONA											
Arizona Western College P.O. Box 929 Yuma, Ariz. 85364	Virginia A. Smith Director Nursing Program	4 sem.			X		X			X	
Central Arizona College Overfield & Woodruff Rds. Coolidge, Ariz. 85228	Bonnie Powers Coordinator Nursing Program	4 sem.	X	X	X	X				X	
Cochise College Douglas, Ariz. 85607	June S. Barreras Director Associate Degree Nursing Program	4 sem.	X	X	X		X		X	X	
Glendale Community College 6000 West Olive Ave. Glendale, Ariz. 85301	Ruby D. Gordon Chairman Department of Nursing	4 sem.	X	X	X	X	X				
Maricopa Technical College 106 E. Washington St. Phoenix, Ariz. 85004	Betty L. Walden Director Associate Degree Nursing Program	2 sem.			X		X				X
Mesa Community College 1833 W. Southern Ave. Mesa, Ariz. 85201	Helen A. Bush Chairman Associate Degree Nursing Program	4 sem.		X	X	X	X				X
Navajo Community College Many Farms Rural P.O. Via Chinle, Ariz. 86503	M. Grace Daniel Coordinator Associate Degree Nursing Program	4 sem. 2 s.s.	X		X	X	X			X	
Northern Arizona University C.U. Box 5639 Flagstaff, Ariz. 86001	Roberta L. Clegg Chairman Department of Nursing	4 sem. 1 s.s.			X		X			X	
Phoenix College 1202 W. Thomas Rd. Phoenix, Ariz. 85013	Lorayne Clifton Chairman Department of Nursing	4 sem.	X		X		X				X
Pima College 2202 W. Anklam Rd. Tucson, Ariz. 85709	Edna H. Ross Curriculum Specialist Nursing Program	4 sem.	X		X	X	X				X
Yavapai College 1100 E. Sheldon Prescott, Ariz. 86301	Barbara Kitchens Director Department of Nursing	4 sem.			X		X			X	

	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
ogan)	7 qtr.	X								X	420	35	150	65	30	Chairman
ng	7 qtr. 1 s.s.		X			X				X	420	15	245	50	20	Director
	7 qtr.		X	X	X	X	X		X		472		160	60	90	Division of Student Personnel Services
ng	6 qtr.			X	X	X				X	360	8	150	60	80	Director
ng	7 qtr. 1 s.s.	X	X	X	X	X			X		60	7	75	52	40	M. H. Lawson Registrar
ng	4 sem. 1 s.s.			X		X					500	10	250	100	25	Coordinator
	4 sem.			X		X			X			300	200	36	30	Donald Bradshaw Registrar
	4 sem.	X	X	X	X				X			240	50	35	36	Herbert L. Alexander Registrar
ng	4 sem.	X	X	X		X		X	X			320	150	50	24	Director
	4 sem.	X	X	X	X	X						200	75	25	64	Robert Heuser Dean of Admissions
g	2 sem.			X		X				X		80	80		22	Program Director
ng	4 sem.		X	X	X	X				X		45	85	15	60	Ross A. Owens Dean of Admissions
g	4 sem. 2 s.s.	X		X	X	X			X		800	60	100		15	Director of Admissions
	4 sem. 1 s.s.			X		X			X		544	20	100	36	40	Chairman
	4 sem.	X		X		X				X		180	160	45	105	Edward Lindquist Dean of Admissions
	4 sem.	X		X	X	X				X		240	200	30	80	Curriculum Specialist in Nursing
	4 sem.			X		X			X			60			30	Director

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Total Fees (in d[illegible]): Tuition	(8) Estimated Total Fees (in d[illegible]): Fees
ARKANSAS													
Arkansas A & M College College Heights, Ark. 71655	Ernestine Brooks Director Associate Degree Nursing Program	4 sem.			X					X		750	41
Arkansas State University Box E State University, Ark. 72467	Leon E. Eldredge, Jr. Chairman Division of Nursing	4 sem.		X	X		X			X		600	64
Phillips County Community College Box 785 Helena, Ark. 72342	Grace Lachowsky Director Associate Degree Nursing Program	5 sem.		X	X		X				X	500	45
Southern State College Magnolia, Ark. 71753	Pat Williams Director Department of Nursing	4 sem. 2 s.s.		X	X	X				X		900	
University of Arkansas at Little Rock 33d & University Ave. Little Rock, Ark. 72204	Bonnie Rae Grant Director Associate Degree Nursing Program	4 sem. 1 s.s.			X		X				X	.....	1500
University of Arkansas, Northwest Arkansas Fayetteville, Ark. 72701	Betty L. Battenfield Chairman Associate Degree Nursing Program	4 sem. 1 s.s.			X		X			X	X	690	
Westark Junior College 5210 Grand Ave. Fort Smith, Ark. 72901	Carolyn Moore Chairman Associate Degree Nursing Program	4 sem.		X	X	X	X				X	480	
CALIFORNIA													
American River College 4700 College Oak Dr. Sacramento, Calif. 95841	Frances Ratcliff Chairman Division of Nursing	4 sem. 1 s.s.	X	X	X		X				X		
Antelope Valley College 3041 W. Ave. K Lancaster, Calif. 93534	Marion E. Saunders Director Associate Degree Nursing Program	4 sem.	X	X			X				X		40
Bakersfield College 1801 Panorama Dr. Bakersfield, Calif. 93305	Doreen T. Chan Chairman Associate Degree Registered Nursing Program	4 sem.	X	X	X	X	X			X			110
Cabrillo College 6500 Soquel Dr. Aptos, Calif. 95003	Gordon L. Ogden Director Associate Degree Nursing Program	4 sem. 1 s.s.	X	X			X				X		75
Cerritos College 11110 E. Alondra Blvd. Norwalk, Calif. 90650	Nancy Cheng Director Associate Degree Nursing Program	4 sem.	X	X	X		X				X		20
Chabot College 25555 Hesperian Blvd. Hayward, Calif. 94545	Glenys Wilson Head Associate Degree Nursing Program	6 qtr.			X		X				X		
Chaffey College 5885 Haven Ave. Alta Loma, Calif. 91701	Ruth P. Schindler Coordinator Allied Health Programs	6 qtr. 2 s.s.	X	X	X		X				X		
City College of San Francisco Ocean & Phelan San Francisco Calif. 94112	Ganelle Griffin Chairman Department of Nursing	4 sem.	X	X	X		X				X		62
College of Marin Kentfield, Calif. 95904	Lyla Cromer Coordinator Registered Nursing Program	4 sem.	X	X	X		X				X		...
College of San Mateo 1700 W. Hillsdale Blvd. San Mateo, Calif.	Anne Grubbs Chairman Associate Degree Nursing Program	4 sem.	X		X		X				X		

Nursing nd Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms		
Nursing	4 sem.			X					X		750	41	50	100	40	Hubert McKeown Director of Admissions
Jr. ng	4 sem.		X	X		X			X		600	64	200	48	120	Field Services Box FFFF Arkansas State University Ark. 72467
Nursing	5 sem.		X	X		X				X	500	45	60	55	30	Director
ursing	4 sem. 2 s.s.		X	X	X				X		900		200	36	75	Director
Nursing	4 sem. 1 s.s.			X		X				X	1500	....		35	75	Director
ld Nursing	4 sem. 1 s.s.			X		X			X	X	690		200	60	open	Chairman
Nursing	4 sem.		X	X	X	X				X	480		150	50	75	Chairman
ng	4 sem. 1 s.s.	X	X	X		X				X			...300...		40	Chairman
ers Nursing	4 sem.	X	X			X				X		40	184	54	48	Director
Registered am	4 sem.	X	X	X	X	X			X			110	150	50	33	Chairman
Nursing	4 sem. 1 s.s.	X	X			X				X		75	80	70	35	Admissions Office
Nursing	4 sem.	X	X	X		X				X		20	20	32	70	Coordinator of Health Occupation Programs
Nursing	6 qtr.			X		X				X			150	40	50	V. Willitts Registrar
r rograms	6 qtr. 2 s.s.	X	X	X		X				X			150	56	50	David Hafiz Registrar
Nursing	4 sem.	X	X	X		X				X		62	140	50	64	Chairman
ing Program	4 sem.	X	X	X		X				X		.....350.....			55	Coordinator
Nursing	4 sem.	X		X		X				X			25	200	64	Chairman

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters, qtr.-quarters, tri.-trimesters, s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only
CALIFORNIA—Continued											
College of the Desert 43-500 Monterey Palm Desert, Calif. 92260	Dorothy Mottweiler Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X	X	X				X
College of the Redwoods Eureka, Calif. 95501	Betty J. Wiley Chairman Health Occupations & Associate Degree Nursing Program	6 qtr. 1 s.s.			X		X			X	
College of the Sequoias Mooney Blvd. Visalia, Calif. 93277	Margaret White Director Associate Degree Nursing Program	4 sem.	X		X	X	X				
Compton College 1111 E. Artesia Blvd. Compton, Calif. 90221	Chairman Department of Nursing	4 sem. 2 s.s.	X	X	X		X				X
Contra Costa College 2600 Mission Bell Dr. San Pablo, Calif. 94806	Bernice H. Hunn Director Division of Health Sciences & Associate Degree Nursing Program	4 sem. 2 s.s.	X	X	X		X				X
Cuesta College Box J San Luis Obispo, Calif. 93401	Juanita A. Booth Director Associate Degree Nursing Program	4 sem.	X	X	X		X				X
De Anza College 21250 Stevens Creek Blvd. Cupertino, Calif. 95014	Frances J. Herring Executive Head Department of Nursing	6 qtr.			X		X				X
East Los Angeles College 5357 E. Brooklyn Ave. Los Angeles, Calif. 90022	Phyllis Linden Chairman Department of Nursing	4 sem.	X	X	X	X	X				X
El Camino College Via Torrance, Calif. 90506	Margaret G. Brant Coordinator Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X				X
Fresno City College 1101 E. University Ave. Fresno, Calif. 93704	Martha L. Hoard Director Registered Nursing Program	4 sem. 2 s.s.		X		X	X				X
Fullerton Junior College 321 E. Chapman Ave. Fullerton, Calif. 92634	Evelyn M. Maddox Acting Coordinator Associate Degree Nursing Program	4 sem.	X		X		X				X
Golden West College 15744 Golden West St. Huntington Beach, Calif. 92647	Olive M. Rees Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X				X
Grossmont College 8800 Grossmont College Dr. El Cajon, Calif. 92020	Joy Freeman Chairman Department of Health Sciences	4 sem.	X	X	X		X				X
Hartnell College 156 Homestead Ave. Salinas, Calif. 93901	Barbara Palmerton Director Registered Nursing Program	4 sem. 2 s.s.	X	X	X	X	X				X
Loma Linda University Riverside, Calif. 92505	Ruth M. Munroe Director Associate Degree Program in Nursing	6 qtr. * For single students.			X				X*		
Long Beach City College 4901 E. Carson St. Long Beach, Calif. 90808	Viola A. Sampert Head Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X				X
Los Angeles City College 855 N. Vermont Ave. Los Angeles, Calif. 90029	Fay O. Wilson Chairman Department of Nursing	4 sem. 1 s.s.	X	X	X	X	X	X			X
Los Angeles Harbor College 1111 Figueroa Pl. Wilmington, Calif. 90744	Barbara Wright Chairman Division of Nursing	4 sem. 2 s.s.		X	X		X				X

* Covers uniforms, books, and su
Association, and malpractice i

ing Title	(3) Usual Length of Program: Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Costs for Total Program (in dollars): Tuition	(8) Fees	(8) Books	(8) Uniforms	(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
rsing	4 sem. 1 s.s.	X	X	X	X	X				X			240	40	60	John MacMillan
& Associ- g Program	6 qtr. 1 s.s.			X		X			X				495*		24	Carl Lude Dean of Admissions
	* Covers uniforms, books, and supplies, membership in Student Nurses' Association, and malpractice insurance.															
rsing	4 sem.	X		X	X	X						10	275	67	41	Director
ng	4 sem. 2 s.s.	X	X	X		X				X		9	70	70	60	Chairman
ences & Nursing	4 sem. 2 s.s.	X	X	X		X				X		20	150	70	95	Wayne Johnson Director of Health Sciences
rsing	4 sem.	X	X	X		X				X		40	200	50	26	Ernest Cementano Director of Counseling
ng	6 qtr.			X		X				X		.....	350	.....	50	Health Sciences Admissions
ng	4 sem.	X	X	X	X	X				X		7	100	50	35	Chairman
rsing	4 sem. 1 s.s.	X	X	X		X				X		5	90	35	60	Coordinator
ogram	4 sem. 2 s.s.		X		X	X				X	40	25	150	60	60	Director
rsing	4 sem.	X		X		X				X			250		80	Coordinator
rsing	4 sem. 1 s.s.	X	X	X		X				X		15	125	62	85	Admissions Office
n Sciences	4 sem.	X	X	X		X				X		60	150	70	50	Chairman
ogram	4 sem. 2 s.s.	X	X	X	X	X				X		20	250	90	34	Director
gram in	6 qtr.			X				X*			..1650..			60	40	Director
	* For single students.															
rsing	4 sem. 1 s.s.	X	X	X		X				X		58	150	80	85	Albert Derian Dean of Admissions
g	4 sem. 1 s.s.	X	X	X	X	X	X			X		28	250	75	130	Counselor's Office
	4 sem. 2 s.s.		X	X		X				X		7	200	60	90	Chairman

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements		
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only
CALIFORNIA—Continued											
Los Angeles Pierce College 6201 Winnetka Ave. Woodland Hills, Calif. 91364	Mildred B. Holloway Chairman Department of Nursing	4 sem.	X	X	X		X				X
Los Angeles Southwest College 11514 S. Western Ave. Los Angeles, Calif. 90047	Helen E. Perkins Chairman Associate Degree Nursing Program	4 sem.	X	X	X		X				X
Los Angeles Trade Technical College 400 W. Washington Blvd. Los Angeles, Calif. 90015	Virginia Crispin Chairman Registered Nursing Program	2 sem. 1 s.s.					X				X
Los Angeles Valley College 5800 Fulton Ave. Van Nuys, Calif. 91401	Mae M. Johnson Chairman Associate Degree Nursing Program	4 sem.	X		X		X				X
Merritt College 12500 Campus Dr. Oakland, Calif. 94519	Margaret P. Gingrich Director Associate Degree Nursing Program	6 qtr.	X	X	X		X				
Modesto Junior College College & Stoddard Aves. Modesto, Calif. 95350	Dorothy Carvalho Director Associate Degree Nursing Program	4 sem.		X		X	X				X
Mt. San Antonio College 1100 N. Grand Ave. Walnut, Calif. 91789	Zelma A. McKibben Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X				X
Napa College 2277 Napa Vallejo Hwy. Napa, Calif. 94558	Doris Zylinski Director Associate Degree Nursing Program	6 qtr.	X	X	X	X	X				X
Pacific Union College Angwin, Calif. 94508	Ellen L. Gibson Chairman Department of Nursing	7 qtr.	X	X	X		X		X		
Palomar College San Marcos, Calif. 92069	Mary B. Fulton Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X				X
Pasadena City College 1570 E. Colorado Blvd. Pasadena, Calif. 91106	Joan M. Davidson Chairman Department of Nursing	4 sem.	X	X	X		X				X
Rio Hondo College 3600 Workman Mill Rd. Whittier, Calif. 90608	Genevieve Johnson Coordinator Associate Degree Nursing Program	4 sem.	X	X	X		X				X
Riverside City College 3650 Fairfax Ave. Riverside, Calif. 92506	Margaret N. Colangelo Director Associate Degree Nursing Program	4 sem. 1 s.s.	X		X	X	X				X
Sacramento City College 3835 Freeport Blvd. Sacramento, Calif. 95822	Elizabeth D. Joseph Chairman Associate Degree Nursing Program	4 sem. 2 s.s.			X		X				X
San Bernardino Valley College 701 S. Mt. Vernon Ave. San Bernardino, Calif. 92403	Betty Jacobson Nursing Education Coordinator Associate Degree Nursing Program	4 sem. 2 s.s.	X	X	X	X	X				X
San Joaquin Delta College 3301 Kensington Way Stockton, Calif. 95204	Rena Gifford Director Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X				X
San Jose City College 2100 Moorpark Ave. San Jose, Calif. 95120	Joan H. Ballard Supervisor Department of Nursing Education	4 sem. 1 s.s.	X	X	X		X				X

	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
ng tle	4 sem.	X	X	X		X				X	26	20	200	75	70	Leonora Johnson Counselor
ng	4 sem.	X	X	X		X				X		7	...400...		60	Chairman
rsing	2 sem. 1 s.s.					X				X		7	250	50	50	Thomas Williams Dean of Admissions
rogram	4 sem.	X		X		X				X		26	150	80	120	Admissions Office
rsing	6 qtr.	X	X	X		X								50	45	Director
rsing	4 sem.		X		X	X				X		15	200	65	70	Donald Duncan Dean of Admissions
rsing	4 sem. 1 s.s.	X	X	X		X				X		29	300	45	75	Chairman
rsing	6 qtr.	X	X	X	X	X				X			50	40	55	Director
ing	7 qtr.	X	X	X		X		X			1500		100	35	80	Chairman
rsing	4 sem. 1 s.s.	X	X	X		X				X		25	100	65	40	Chairman
ing	4 sem.	X	X	X		X				X			100	60	100	Irving Lewis Dean of Admissions
ursing	4 sem.	X	X	X		X				X		50	250	50	72	Coordinator
elo ursing	4 sem. 1 s.s.	X		X	X	X				X		30	300	75	72	John Matulich Dean of Admissions
ursing	4 sem. 2 s.s.			X		X				X			275	80	80	Chairman
Coordinator ursing	4 sem. 2 s.s.	X	X	X	X	X				X		26	200	75	60	Coordinator
ursing	4 sem. 1 s.s.	X	X	X		X				X			140	65	60	Chairman Division of Health Sciences
sing	4 sem. 1 s.s.	X	X	X		X				X		14	200	75	70	Supervisor

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements	
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college
CALIFORNIA—Continued										
Santa Barbara City College 721 Cliff Dr. Santa Barbara, Calif. 93105	Shirley L. Conklin Chairman Associate Degree Nursing Program	4 sem.		X	X		X			
Santa Monica College 1815 Pearl St. Santa Monica, Calif. 90405	Margaret Bilynskyj Coordinator Associate Degree Nursing Program	4 sem.	X	X	X	X	X			
Santa Rosa Junior College 1501 Mendocino Ave. Santa Rosa, Calif. 95401	Margretta N. Fortuin Director Associate Degree Nursing Program	4 sem. 2 s.s.			X		X			
Shasta College 299 E and Oregon Trail Redding, Calif. 96001	Martha J. Holmes Chairman Health Occupations	4 sem.	X	X	X		X			X
Solano Community College Suisun Valley Rd. Suisun City, Calif. 94585	Donna E. Harris Coordinator Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X			
Southwestern College 5400 Otay Lakes Rd. Chula Vista, Calif. 92010	Myrna Huenergardt Chairman Associate Degree Registered Nursing Program	4 sem.	X	X	X	X	X			
Ventura College 4667 Telegraph Rd. Ventura, Calif. 93003	Margaret E. McCann Chairman & Director Department of Nursing Education	4 sem. 1-2 s.s.	X	X	X		X			
COLORADO										
Arapahoe Community College 5900 S. Santa Fe Dr. Littleton, Colo. 80120	Esther T. Dion Chairman Health Occupations Programs	6 qtr.			X		X			
Community College of Denver, North Campus 1001 E. 62d Ave. Denver, Colo. 80216	Ruth M. Harboe Coordinator Associate Degree Nursing Program	6 qtr.	X	X	X		X			
El Paso Community College 2200 Bott St. Colorado Springs, Colo. 80904	R. Booton Brown Coordinator of Nursing Program	6 qtr.	X	X	X	X	X			
Mesa College Grand Junction, Colo. 81501	Louise Moser Chairman Division of Health Programs	6 qtr. 1 s.s.	X	X	X		X			X
Metropolitan State College 250 W. 14th Ave. Denver, Colo. 80204	Jean B. Mash Chairman Department of Nursing	7 qtr.	X		X		X			
Southern Colorado State College, Belmont Campus Pueblo, Colo. 81001	Estelle Singleton Director Associate Degree Nursing Program	6 qtr.			X		X			X
CONNECTICUT										
Junior College of Connecticut, University of Bridgeport Park Ave. Bridgeport, Conn. 06602	Allison M. Bailey Director Associate Degree Nursing Program	4 sem. 2 s.s.	X	X	X	X	X			X
Norwalk Community College 300 Highland Ave. Norwalk, Conn. 06859	Sylvia Schudy Director Department of Nursing	4 sem. 2 s.s.			X		X			
Quinnipiac College Mount Carmel Ave. Hamden, Conn. 06518	Helen Webster Director Nursing Program	4 sem. 2 s.s.	X		X	X	X			X

3350

ng tle	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
sing	4 sem.		X	X		X				X			150	75	45	Shirley L. Conklin Assistant Dean Health Occupations
sing	4 sem.	X	X	X	X	X				X		40	150	100	40	Coordinator
sing	4 sem. 2 s.s.			X		X				X		100	200	50	48	Director
	4 sem.	X	X	X		X			X			....	450	....	25	Michael Black Counselor
sing	4 sem. 1 s.s.	X	X	X		X				X	200	10	125	75	48	Registrar's Office
istered	4 sem.	X	X	X	X	X				X		125	175	50	40	Chairman
g	4 sem. 1-2 s.s.	X	X	X		X				X			200	60	55	Richard Meierding Dean of Admissions & Records
rograms	6 qtr.			X		X				X	432	27	200	20	60	Student Services Office
sing	6 qtr.	X	X	X		X				X	360	55	240	30	70	Coordinator
g	6 qtr.	X	X	X	X	X				X	420		250	14	60	Wilma J. Newcomer Registrar
grams	6 qtr. 1 s.s.	X	X	X		X			X			735			55	Jack Scott Director of Admissions
g	7 qtr.	X		X		X				X	85	30	250	55	75	Office of Admissions or Director of Nursing Program
sing	6 qtr.			X		X			X		465	20	200	60	90	Director
sing	4 sem. 2 s.s.	X	X	X	X	X			X		6000		125	65	60	Donald W. Kern Director of Admissions
g	4 sem. 2 s.s.			X		X				X	300	153	125	62	50	Peter O'Hara Director of Admissions
	4 sem. 2 s.s.	X		X	X	X			X		3780	305		47	75	Muriel Oberg Recruiter & Counselor

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangement		
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-
DELAWARE											
Wesley College Dover, Del. 19901	Elizabeth W. Roeder Chairman Department of Nursing	4 sem.	X		X	X	X			X	
DISTRICT OF COLUMBIA											
Washington Technical Institute 4100 Connecticut Ave., N.W. Washington, D.C. 20008	Martha E. Lewis Coordinator Nursing Program, Department of Health Technology	6 qtr.	X	X	X	X	X				X
FLORIDA											
Brevard Community College Cocoa, Fla. 32922	Marjorie M. Stephenson Coordinator Associate Degree Nursing Program	5 sem.	X		X		X				X
Broward Community College 3501 S.W. Davie Rd. Fort Lauderdale, Fla. 33314	Edith H. West Head Department of Nursing Technology	4 sem. 1 s.s.	X	X	X		X				X
Central Florida Junior College P.O. Box 1388 Ocala, Fla. 32670	Daisy S. Reaves Chairman Department of Nursing Education	5 tri.	X	X	X						X
Daytona Beach Community College P.O. Box 1111 Daytona Beach, Fla. 32015	Barbara A. Warren Chairman Associate Degree Nursing Program	4 sem.	X	X	X	X	X				
Edison Junior College Cypress Lake Dr. Fort Myers, Fla. 33901	Helen M. DeVictor Coordinator Associate Degree Nursing Program	4 sem. 1 s.s.			X	X	X				
Florida Junior College at Jacksonville, North Campus Jacksonville, Fla. 32218	Mary R. McCandless Director Associate Degree Program in Technical Nursing	4 sem.	X	X	X		X				
Florida Keys Community College Stock Island, Key West, Fla. 33040	Madge Emmerton Chairman Department of Nursing	6 tri.	X	X	X	X	X			X	
Gulf Coast Community College Panama City, Fla. 32401	Ann S. Syfrett Chairman Division of Nursing	4 sem. 1 s.s.		X	X	X	X				
Hillsborough Junior College 39 Columbia Dr. Tampa, Fla. 33609	Olive Galloway Coordinator Nursing Program	6 qtr.	X		X	X	X				
Indian River Junior College 3209 Virginia Ave. Fort Pierce, Fla. 33450	Vivian Deitz Chairman Associate Degree Nursing Program	4 sem.	X				X				
Lake City Community College Lake City, Fla. 32055	Elizabeth K. Webster Director Associate Degree Nursing Program	4 sem. 1 s.s.			X		X			X	
Manatee Junior College 5840 26th St., W. Bradenton, Fla. 33505	Georgeen H. DeChow Director Department of Nursing	4 sem.	X	X	X	X	X				
Miami-Dade Junior College 11380 27th Ave., N.W. Miami, Fla. 33167	Dorothy C. Stratton Chairman Department of Nursing	4 sem. 1 s.s.		X	X		X				
Miami-Dade Junior College, South Campus 11011 S.W. 104th St. Miami, Fla. 33157	Cora E. Mazzagatti Chairman Department of Nursing	4 tri. 1 s.s.	X	X	X	X	X				
Palm Beach Junior College Congress Ave. Lake Worth, Fla. 33460	Betty Morgan Chairman Department of Nursing	4 sem. 1 s.s.	X	X	X	X	X				

(2)	(3)	(4)		(5)		(6)		(7)			(8)				(9)	(10)
	Usual Length of Program	Advanced Placement Possible		Part-Time Study Possible		Evening Division Classes Possible		Living Arrangements			Estimated Costs for Total Program (in dollars)					
d of Nursing ram and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
W. Roeder nt of Nursing	4 sem.	X		X	X	X			X		1954		100	50	30	Joseph R. Slights Director of Admissions
Lewis or rogram, Department h Technology	6 qtr.	X	X	X	X	X				X	25	5	50	39	60	William H. Bell Director of Admissions
M. Stephenson or Degree Nursing n	5 sem.	X		X		X				X	125	29	200	75	50	Coordinator
Vest nt of Nursing logy	4 sem. 1 s.s.	X	X	X		X				X	515	30	175	50	100	Head
eaves nt of Nursing on	5 tri.	X	X	X						X	450	36	150	75	50	Chairman
A. Warren Degree Nursing n	4 sem.	X	X	X	X	X				X	480	70	100	65	60	Director of Admissions
DeVictor or Degree Nursing m	4 sem. 1 s.s			X	X	X				X	450	75	150	50	30	Robert Barnes Director of Admissions
McCandless Degree Program in al Nursing	4 sem.	X	X	X		X				X		420	300	53	125	Director
mmerton nt of Nursing	6 tri.	X	X	X	X	X			X	X	685		250	38		Chairman
frett t Nursing	4 sem. 1 s.s.		X	X	X	X				X	90	6	150	32	35	Chairman
oway tor rogram	6 qtr.	X		X	X	X				X		575	100	75	60	Howard Sinsley Director of Admissions
itz Degree Nursing m	4 sem.	X				X				X	115	10	50	50	25	Registrar's Office
K. Webster Degree Nursing m	4 sem. 1 s.s.			X		X			X		250		100	50	35	Martha Brown Director of Admissions
H. DeChow nt of Nursing	4 sem.	X	X	X	X	X				X	600	355	200	45	120	Office of the Registrar
. Stratton n nt of Nursing	4 sem. 1 s.s.		X	X		X				X	500	10	100	26	160	Chairman
Mazzagatti n nt of Nursing	4 tri. 1 s.s.	X	X	X	X	X				X	430	24	125	45	100	Tom Stewart Registrar
rgan n nt of Nursing	4 sem. 1 s.s.	X	X	X	X	X				X		625	200	25	120	Larry Mayfield Registrar

3353

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		Arr
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required
FLORIDA—Continued									
Pensacola Junior College 1000 College Blvd. Pensacola, Fla. 32504	Irene F. Workman Head Department of Nursing	4 sem. 1 s.s.	X	X	X		X		
Polk Community College 999 Ave. H, N.E. Winter Haven, Fla. 33880	Bonnie L. Finton Chairman Division of Nursing	4 sem. 1 s.s.	X	X	X		X		
St. Petersburg Junior College P.O. Box 13489 St. Petersburg, Fla. 33733	Almeda B. Martin Chairman Department of Nursing	4 sem.		X	X	X	X	X	
Santa Fe Junior College 723 W. University Ave. Gainesville, Fla. 32601	Carol E. Bradshaw Coordinator Nursing Programs	8 qtr.	X		X		X		
Tallahassee Community College 444 Appleyard Dr. Tallahassee, Fla. 32304	E. Christine Watson Chairman Nursing Education Program	7 qtr.	X	X	X		X		
GEORGIA									
Abraham Baldwin Agricultural College ABAC Sta. Tifton, Ga. 31794	Fanny E. Dewar Acting Head Department of Nursing Education	6 qtr.		X	X	X	X		
Albany Junior College Gillionville Rd. Albany, Ga. 31705	E. A. Tarratus Dean of Instruction	7 qtr.	X	X	X	X	X		
Armstrong State College 11935 Abercon St. Savannah, Ga. 31406	Rose Marie Blase Head Department of Nursing	6 qtr.	X	X	X		X		
Augusta College 2500 Walton Way Augusta, Ga. 30904	Louise D. Bryant Chairman Department of Nursing Education	6 qtr.	X	X	X	X	X		
Brunswick Junior College Altama & Fourth Brunswick, Ga. 31520	S. Helen Bloodworth Chairman Division of Nursing	6 qtr. 1 s.s.	X	X	X	X	X		
Clayton Junior College Morrow, Ga. 30260	Doris W. Bates Director of Nursing	6 qtr.	X		X	X	X		
Columbus College Columbus, Ga. 31907	Helen T. Milian Director Department of Nursing	6 qtr.	X	X	X		X		
Dalton Junior College P.O. Box 1740 Dalton, Ga. 30720	Majorie E. Sczekan Director Division of Nursing	7 qtr.	X		X	X	X		
DeKalb College 555 N. Indian Creek Dr. Clarkston, Ga. 30021	Mildred R. Burns Head Associate Degree Nursing Program	6 qtr.	X		X	X	X		
Georgia College at Milledgeville Milledgeville, Ga. 31061	Mary Pilcher Chairman Department of Nursing Education	6 qtr.	X	X	X	X	X		
Georgia Southwestern College Americus, Ga. 31709	Rosella Deriso Chairman Division of Nursing	6 qtr.							
Georgia State University 33 Gilmer St., S.E. Atlanta, Ga. 30303	Evangeline B. Lane Head Department of Nursing, School of Allied Health Sciences	7 qtr.			X	X	X		
Kennesaw Junior College Marietta, Ga. 30060	Charlotte S. Sachs Director Associate Degree Nursing Program	6 qtr.			X		X		
South Georgia College Douglas, Ga. 31533	Chairman Division of Nursing	6 qtr.	X	X	X		X		

(2)	(3)	(4)		(5)		(6)		(7)			(8)				(9)	(10)
	Usual Length of Program	Advanced Placement Possible		Part-Time Study Possible		Evening Division Classes Possible		Living Arrangements			Estimated Costs for Total Program (in dollars)				Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
ad of Nursing ram and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms		
orkman nt of Nursing	4 sem. 1 s.s.	X	X	X		X			X		465	20	200	40	80	Head
inton f Nursing	4 sem. 1 s.s.	X	X	X		X				X		530	200	27	120	Chairman
Martin t of Nursing	4 sem.		X	X	X	X	X			X	500	43	260	40	130	Chairman
adshaw r rograms	8 qtr.	X		X		X				X	75		75	30	60	Coordinator
Watson ducation Program	7 qtr.	X	X	X		X				X	490	50	70	50	25	Chairman
Dewar ad nt of Nursing n	6 qtr.		X	X	X	X			X		320	150	240	30	60	J. William Massengale Director of Admissions
atus nstruction	7 qtr.	X	X	X	X	X				X	560	70	250	70	45	Department of Nursing
Blase nt of Nursing	6 qtr.	X	X	X		X				X	720	120	150	40	85	Director of Admissions
ryant nt of Nursing on	6 qtr.	X	X	X	X	X			X		320	42	125	100	33	J. L. McNeal Director of Admissions
oodworth f Nursing	6 qtr. 1 s.s.	X	X	X	X	X				X	560	85	175	65	60	Chairman
ates f Nursing	6 qtr.	X		X	X	X				X	480	36	240	92	70	Director
ilian nt of Nursing	6 qtr.	X	X	X		X				X	630	90	300	100	90	Director
Sczekan f Nursing	7 qtr.	X		X	X	X				X	560	70	350	75		Director
Burns Degree Nursing n	6 qtr.	X		X	X	X				X	666	66	180	62	150	Seaborn Thompson Director of Admissions
er nt of Nursing on	6 qtr.	X	X	X	X	X			X		105	22	50	36	24	Linton Cox Director of Admissions
riso f Nursing	6 qtr.								X		762		240	78	40	Admissions Officer
B. Lane nt of Nursing, School d Health Sciences	7 qtr.			X	X	X			X		1000		150	85	100	Admissions Office
S. Sachs Degree Nursing n	6 qtr.			X		X				X	480	100	250-300	60	65	Thomas H. Rogers, Jr. Registrar & Director of Admissions
f Nursing	6 qtr.	X	X	X		X			X		480	25	120	60	50	Chairman

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters, qtr.-quarters, tri.-trimesters, s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Total (in d[illegible]): Tuition	(8) Estimated Total (in d[illegible]): Fees
GUAM													
University of Guam Box EK Agana, Guam 96910	Head Department of Nursing Education	4 sem. 2 s.s.	X	X	X	X	X			X		370	150
HAWAII													
Maui Community College 310 Kaahumanu Ave. Kahului, Hawaii 96732	Duane D. Alexenko Coordinator Technical Nursing Program	4 sem.	X	X	X	X	X			X		60	4
University of Hawaii 2528 The Mall Honolulu, Hawaii 96822	Jacqueline B. Johnson Chairman Department of Technical Nursing, School of Nursing	4 sem.	X	X	X	X	X			X		340	12
IDAHO													
Boise State College Boise, Idaho 83707	Florence M. Miles Chairman Department of Nursing	4 sem.	X		X		X			X		1700	70
College of Southern Idaho P.O. Box 1238 Twin Falls, Idaho 83301	Judith Roberts Chairman Nursing Department	4 sem. 1 s.s.	X		X	X	X			X		250	17
Lewis-Clark Normal School Lewiston, Idaho 83501	Grace Smith Director Division of Nursing	4 sem. 1 s.s.	X	X	X		X			X		75	1
North Idaho College 1000 W. Garden Coeur d'Alene, Idaho 83814	Beverly Hatrock Director Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X			X		330	35
Ricks College Rexburg, Idaho 83440	Lucy Legg Head Department of Nursing	4 sem. 1 s.s.		X	X		X			X		270 * Nursing	3
ILLINOIS													
Amundsen-Mayfair College 4626 N. Knox Ave. Chicago, Ill. 60630	Carol E. Dittambl Chairman Department of Nursing	4 sem.	X		X		X				X		12
Belleville Area College 2555 West Blvd. Belleville, Ill. 62221	Ina Ingwersen Coordinator Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X	X	X				X	355	13
Black Hawk College 6600 34th Ave. Moline, Ill. 61265	Marilyn Keener Director Associate Degree Nursing Program	4 sem.	X	X	X		X				X	520	5
Carl Sandburg College P.O. Box 1407 S. Lake Storey Rd. Galesburg, Ill. 61401	Frances I. Tamimie Director Associate Degree Nursing Program	6 qtr.			X		X				X	420	4
College of DuPage Glen Ellyn, Ill. 60137	Mary Ann Santucci Coordinator Associate Degree Nursing	6 qtr.	X	X	X	X	X				X	630	
College of Lake County 19351 W. Washington St. Grayslake, Ill. 60030	Marie Costello Head Associate Degree Nursing Program	4 sem.			X		X				X	644	
Elgin Community College 373 E. Chicago St. Elgin, Ill. 60120	Margaret Gabler Director Department of Nursing	4 sem.	X		X		X				X	10	
Illinois Central College P.O. Box 2400 East Peoria, Ill. 61611	Joanne Ryan Coordinator Associate Degree Nursing Program	4 sem.			X	X	X				X	320	
Illinois Valley Community College Rte. 1 Oglesby, Ill. 61348	Crystal Springborn Director Associate Degree Nursing Program	4 sem.	X	X	X	X	X				X	260	

) Nursing and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms		
Nursing	4 sem. 2 s.s.	X	X	X	X	X			X		370	150	75	32	30	Head
enko ing Program	4 sem.	X	X	X	X	X			X		60	40	60	40	16	Registrar
ohnson Technical ool of Nursing	4 sem.	X	X	X	X	X			X		340	125	200	40		Admissions & Records Office University of Hawaii 2444 Dole St. Honolulu, Hawaii 96822
iles f Nursing	4 sem.	X		X		X			X		1700	700	175	60	106	Chairman
tment	4 sem. 1 s.s.	X		X	X	X			X		250	175	300	48	40	Chairman
rsing	4 sem. 1 s.s.	X	X	X		X			X		75	10	60	58	35	Director
ck ree Nursing	4 sem. 1 s.s.	X	X	X		X			X		330	350	200	10[illegible]	35	Itsuko Nishio Registrar
f Nursing	4 sem. 1 s.s.		X	X		X			X		270	35	150*	32	50	Director of Admissions & Registrar
											* Nursing only.					
nbl f Nursing	4 sem.	X		X		X				X		120	188	47	110	Chairman
ree Nursing	4 sem. 1 s.s.	X	X	X	X	X				X	355	138	125	36	75	Admissions Office
er ree Nursing	4 sem.	X	X	X		X				X	520	50	200	65	60	Director
mimie ree Nursing	6 qtr.			X		X				X	420	40	350	45	40	K. G. Klinck Director of Student Personnel Services
ntucci ree Nursing	6 qtr.	X	X	X	X	X				X	630	5	240	80	110	Coordinator of Nursing
o ree Nursing	4 sem.			X		X				X	644	40	200	35	70	Director of Admissions
ler f Nursing	4 sem.	X		X		X				X	10	10	60	65	100	Director
ree Nursing	4 sem.			X	X	X				X	320	25	320	30	58	Chairman
uborn ree Nursing	4 sem.	X	X	X	X	X				X	260	75	125	50	60	Office of Admissions

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		A
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required
ILLINOIS—Continued									
Joliet Junior College Rte. 3, Houbolt Ave. Joliet, Ill. 60436	Emily Zabrocki Director Associate Degree Nursing Program	4 sem.	X	X	X	X	X		
Kankakee Community College Box 888 Kankakee, Ill. 60901	Jane A. Travis Director Associate Degree Nursing Program	4 sem. 1 4-wk. winter session	X		X	X	X		
Kaskaskia College Shattuc Rd. Centralia, Ill. 62801	Shirley Lampe Director Associate Degree Nursing Program	4 sem.	X		X	X	X		
Kennedy-King College, Chicago City College 7047 S. Stewart Ave. Chicago, Ill. 60621	Cecile B. Smith Director Associate Degree Nursing Program	4 sem.			X		X		
Lincoln Land Community College 3865 S. Sixth St. Springfield, Ill. 62703	Catherine M. Leahy Director Associate Degree Nursing Program	6 qtr. 1 s.s.	X	X	X		X		
Malcolm X Community College 1900 W. Van Buren St. Chicago, Ill. 60612	Christine Allen Chairman Associate Degree Nursing Program	4 sem.			X		X		
Moraine Valley Community College 10900 S. 88th Ave. Palos Hills, Ill. 60465	Kathryne A. Dockstader Coordinator Associate Degree Nursing Program	4 sem. 1 s.s.	Write to Coordinator for additional						
Morton College 2500 S. Austin Blvd. Cicero, Ill. 60650	Mary A. Scopacasa Director Department of Nursing	4 sem.		X	X		X		
Olive-Harvey College City College of Chicago 10001 S. Woodlawn Ave. Chicago, Ill. 60628	Rose Greenberg Director Nursing Program	4 sem.	X	X	X		X		
Olney Central College 305 N. West St. Olney, Ill. 62450	Ann Furr Director Department of Nursing	7 qtr.	X	X	X		X		
Parkland College 2 Main St. Champaign, Ill. 61820	Sr. Julia Moriarty Director Associate Degree Nursing Program	6 qtr.	X	X	X		X		
Prairie State College P.O. Box 487 Chicago Heights, Ill. 60411	Phyllis Welnetz Director Associate Degree Nursing Program	4 sem.	X	X	X	X	X		
Rock Valley College 3301 N. Mulford Rd. Rockford, Ill. 61101	Lena A. Williams Director Associate Degree Nursing Program	4 sem.	X	X	X	X	X		
Sauk Valley College Rte. 1 Dixon, Ill. 61021	Adelaide M. Fritz Director Associate Degree Nursing Program	4 sem.	X	X	X		X		
Thornton Community College 50 W. 162d. St. South Holland, Ill. 60473	Carolyn Fraser Director Associate Degree Nursing Program	4 sem.	X		X	X	X		
Triton College 2000 N. Fifth Ave. River Grove, Ill. 60171	Carol Casten Coordinator Associate Degree Nursing Program	4 sem.	X		X		X		
Waubonsee Community College Illinois Rte. 47 & Harter Rd. P.O. Box 508 Sugargrove, Ill. 60554	Dolorita Gray Director Associate Degree Nursing Program		Write to Director of Admissions & Rec						

3358

(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms		
ly Zabrocki ector ociate Degree Nursing Program	4 sem.	X	X	X	X	X				X	490	75	50	15	100	Vera C. Smith Director of Admissions & Records
e A. Travis ector ociate Degree Nursing rogram	4 sem. 1 4-wk. winter session	X		X	X	X				X	740	196	415	50	100	Richard Frey Director of Admissions
ley Lampe ector ociate Degree Nursing rogram	4 sem.	X		X	X	X					260	44	100	46	60	James Hooper Director, Student Services
ie B. Smith ector ociate Degree Nursing rogram	4 sem.			X		X				X	400					Director
therine M. Leahy ector ociate Degree Nursing rogram	6 qtr. 1 s.s.	X	X	X		X					550	65	250	75	28	Director
istine Allen irman ociate Degree Nursing rogram	4 sem.			X		X						..600..			100	Chairman
hryne A. Dockstader rdinator ociate Degree Nursing rogram	4 sem. 1 s.s.	Write to Coordinator for additional information.														Admissions Records Center
y A. Scopacasa ector artment of Nursing	4 sem.		X	X		X				X	400	21	125	47	55	Robert Bergstrom Associate Dean for Admissions & Records
e Greenberg ector sing Program	4 sem.	X	X	X		X				X		125	225	55	45	Director
Furr ctor artment of Nursing	7 qtr.	X	X	X		X				X		105	112	46	50	Beverly Shelton Counselor
Julia Moriarty ector ociate Degree Nursing rogram	6 qtr.	X	X	X		X				X	816	75	85	25	85	Thomas Neal Director of Admissions
llis Welnetz ector ociate Degree Nursing rogram	4 sem.	X	X	X	X	X				X	900	150	220	65	90	Director
a A. Williams ector ociate Degree Nursing rogram	4 sem.	X	X	X	X	X				X	1020	56	100	39	50	Director
laide M. Fritz ector ociate Degree Nursing rogram	4 sem.	X	X	X		X				X	748	112	125	52	48	Mack Warren Director of Admissions
blyn Fraser ctor ociate Degree Nursing rogram	4 sem.	X		X	X	X				X	924	100	200	60	120	F. Prist Office of Admissions
bl Casten rdinator ociate Degree Nursing rogram	4 sem.	X		X		X				X	450	60	300	45	90	Coordinator
rita Gray ctor ciate Degree Nursing rogram	Write to Director of Admissions & Records for information.															Director of Admissions & Records

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	Estimated Total (in d: Tuition	Estimated Total (in d: Fees
ILLINOIS—Continued													
William Rainey Harper College Algonquin & Roselle Rds. Palatine, Ill. 60067	Joanne L. Heinly Coordinator Associate Degree Nursing Program	4 sem.		X	X		X				X	900	30
INDIANA													
Indiana Central College 4001 Otterbein Indianapolis, Ind. 46227	Virginia R. Sims Director Associate Degree Nursing Program	4 sem.	X	X	X		X			X		3200	45
Indiana University at Kokomo 2300 S. Washington Kokomo, Ind. 46901	Florence Gardner Director Associate Degree Nursing Program	4 sem. 1 s.s.	X		X	X	X				X	1400	20
Indiana University, Northwest Campus 3400 Broadway Gary, Ind. 46408	Doris R. Blaney Director Division of Nursing	4 sem. 1 s.s.		X	X	X	X						1350
Indiana University–Purdue University at Indianapolis 38th Street Campus 1201 E. 38th St. Indianapolis, Indiana 46205	Janet Barber Chairman Department of Nursing	4 sem.	X	X	X		X			X		1600	75
Indiana University–Purdue University at Indianapolis, Downtown Campus 1812 N. Capitol Ave. Indianapolis, Ind. 46202	Patricia Haase Chairman Associate Degree Nursing Program	4 sem.	X		X	X	X			X		1400	
Indiana University, Southeast Campus Warder Park Jeffersonville, Ind. 47130	Helen C. Baumann Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X		X	X	X				X	1420	20
Purdue University, Calumet Campus 2233 171st St. Hammond, Ind. 46323	Joyce A. Ellis Chairman Associate Degree Nursing Program	4 sem.	X	X	X	X	X				X	1800	
Purdue University, North Central Campus Westville, Ind. 46391	Section Chairman Department of Nursing	4 sem.	X	X	X		X				X	350	25
Purdue University, Regional Campus at Fort Wayne 2101 E. Colisium Blvd. Fort Wayne, Ind. 46805	Doris Mack Chairman Nursing Section	4 sem.	X	X	X		X				X	1555	35
Purdue University, South Campus Courts-C West Lafayette, Ind. 47907	Helen Johnson Head Department of Nursing	4 sem.	X	X	X	X				X		1400	
University of Evansville P.O. Box 329 Evansville, Ind. 47701	Helen H. Shrode Assistant to Dean Cooperative Associate Degree Program in Nursing	11 qtr.	X		X		X			X		450	1
Vincennes University Vincennes, Ind. 47591	Lee Godare Director Associate Degree Nursing Program	4 sem.	X	X	X		X			X		300	6
IOWA													
Eastern Iowa Community College, Clinton Campus 1000 Lincoln Blvd. Clinton, Iowa 52732	Marjorie A. Bottoms Coordinator Associate Degree Nursing Program	8 qtr.	X		X						X	960	6
Indian Hills Community College, Iowa Technical Campus Ottumwa Industrial Airport Ottumwa, Iowa 52501	Ruby M. Holton Director Associate Degree Nursing Program	4 sem. 2 s.s.	X	X						X		600	3
Iowa Central Community College 330 Ave. M Fort Dodge, Iowa 50501	Kathryn M. Hyllengren Coordinator Associate Degree Nursing Program	4 sem. 2 s.s.								X		175	10

ng itle	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
sing	4 sem.		X	X		X				X	900	30	200	60	80	Coordinator or Admissions Office
sing	4 sem.	X	X	X		X			X		3200	45	300	70	85	Dave Huffman Director of Admissions
sing	4 sem. 1 s.s.	X		X	X	X				X	1400	20	175	45	35	Raymond Echols Assistant to Dean, Student Affairs Department
	4 sem. 1 s.s.		X	X	X	X						1350	160	45	90	Director
ng	4 sem.	X	X	X		X			X		1600	75	150	75	200	Admissions Office
rsing	4 sem.	X		X	X	X			X		1400		200	40	250	Admissions Officer 1201 E. 38th St. Indianapolis, Ind. 46205
rsing	4 sem. 1 s.s.	X		X	X	X				X	1420	20	198	42	50	Charles R. Lamb Director of Records & Admissions
rsing	4 sem.	X	X	X	X	X				X	1800		100	50	80	Chairman
ng	4 sem.	X	X	X		X				X	350	25	50	60	50	Section Chairman
	4 sem.	X	X	X		X				X	1555	35	175	34	75	John Halbert Director of Admissions
ng	4 sem.	X	X	X	X				X		1400		200	50	120	Admissions Office Purdue University Lafayette, Ind. 46207
e Degree g	11 qtr.	X		X		X			X		450	18	50	50	50	Thornton Patberg Director of Admissions
rsing	4 sem.	X	X	X		X			X		300	65	75	50	100	Stephen Violante Dean, Office of Admissions
rsing	8 qtr.	X		X						X	960	60	140	40	20	Director of Student Personnel
rsing	4 sem. 2 s.s.	X	X						X		600	35	100	60	30	Donald Palmer Coordinator of Admissions
ren rsing	4 sem. 2 s.s.								X		175	100	130	36	35	Donald Culbertson Director of Admissions

3361

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			Estim To
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition
IOWA—Continued												
Iowa Western Community College 321 16th St. Council Bluffs, Iowa 51501	Coordinator Associate Degree Nursing Program	8 qtr.	X	X	X	X	X				X	1000
Kirkwood Community College P.O. Box 2068 Cedar Rapids, Iowa 52406	Phyllis Drennan Coordinator Associate Degree Nursing Program	8 qtr.			X		X				X	1000
Northeast Area One Vocational-Technical School P.O. Box 400 Calmar, Iowa 52135	Donna Story Head Associate Degree Nursing Program	8 qtr.	X	X								600
North Iowa Area Community College 220 E. State Mason City, Iowa 50401	Virginia Lawrence Coordinator Associate Degree Nursing Program	2 sem. 2 s.s.	X	X	X		X				X	
Southeast Community College 727 Washington St. Keokuk, Iowa 52632	Barbara J. Georges Coordinator Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X	X				X	X	1016
KANSAS												
Barton County Community Junior College Great Bend, Kans. 67530	Sr. Mary Ann Klein Director Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X	X	X				X	426
Butler County Community Junior College El Dorado, Kans. 67042	Marilynn V. Mettler Director Department of Nursing	4 sem. 1 s.s.	X	X	X	X	X			X		284
Garden City Community Junior College Box 977 Garden City, Kans. 67846	Dorothy Knox Director Associate Degree Nursing Program	4 sem.			X	X	X			X		350
Hesston College Hesston, Kans. 67062	Ray E. Showalter Chairman Division of Nursing	4 sem. 1 s.s.	X	X	X					X		2740
Kansas City Community Junior College 824 State Ave. Kansas City, Kans. 66101	Irene Minor Director Associate Degree Nursing Program	4 sem. 1 s.s.			X	X	X				X	402
Labette Community Junior College Broadway & 14th St. Parsons, Kans. 67357	Bessie Vediz Director Department of Nursing	4 sem. 1 s.s.	X	X	X	X	X				X	93
KENTUCKY												
Eastern Kentucky University Richmond, Ky. 40475	Paulina F. Sloane Coordinator Associate Degree Nursing Program	4 sem.	X	X	X		X			X		130
Hopkinsville Community College North Drive Hopkinsville, Ky. 42240	Kathleen Lodzinski Chairman Pennyrile Regional Associate Degree Nursing Program	4 sem.			X						X	600
Jefferson Community College P.O. Box 1036 Louisville, Ky. 40201	Martha H. Lyon Chairman Associate Degree Nursing Program	4 sem.			X		X				X	150
Kentucky State College Frankfort, Ky. 40601	Dorothy J. McAdory Director Department of Nursing	4 sem.			X	X	X			X		480
Lexington Technical Institute of the University of Kentucky 309 Breckinridge Hall University of Kentucky Lexington, Ky. 40506	Mary E. Flowers Chairman Associate Degree Nursing Program	4 sem.			X	X	X			X		140

Nursing and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms		
Nursing	8 qtr.	X	X	X	X	X				X	1000	35	150	50	27	Ralph Morrow Student Personnel Services
Nursing	8 qtr.			X		X				X	1000	450	220	46	25	James Miller Coordinator of Admissions
Nursing	8 qtr.	X	X								600	15	100	45	20	Admissions Office
Nursing	2 sem. 2 s.s.	X	X	X		X				X		48	155	45	40	Paul Casey Registrar
s Nursing	4 sem. 1 s.s.	X	X	X	X				X	X	1016	144	211	75	25	John Adkins College Registrar
n Nursing	4 sem. 1 s.s.	X	X	X	X	X				X	426	170	175	40	36	Admissions Office
er ursing	4 sem. 1 s.s.	X	X	X	X	X			X		284	173	162	58	15	Director
Nursing	4 sem.			X	X	X			X		350	140	200	50	60	Director
g	4 sem. 1 s.s.	X	X	X					X		2740	110	200	55	40	Chairman
Nursing	4 sem. 1 s.s.			X	X	X				X	402	90	180	45	60	Office of Admissions
rsing	4 sem. 1 s.s.	X	X	X	X	X				X	93	4	10	75	30	Director
Nursing	4 sem.	X	X	X		X			X		130		50	40	100	Charles Ambrose Dean of Admissions
l Associate Program	4 sem.			X						X	600		150	38	40	Chairman
Nursing	4 sem.			X		X				X	150		130	45	175	Chairman
ry rsing	4 sem.			X	X	X			X		480		120	39	25	Director
Nursing	4 sem.			X	X	X			X		140	11	41	40	60	Chairman

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Total Pr (in dol	
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees
KENTUCKY—Continued													
Madisonville Community College W. Center St. Madisonville, Ky. 42431	Kathleen Lodzinski Chairman Pennyrile Regional Associate Degree Nursing Program	4 sem.			X						X	600	
Midway Junior College Midway, Ky. 40347 (Women only)	Polly B. Johnson Director Department of Nursing Education	4 sem.	X	X	X	X			X			730	168
Northern Kentucky State College 1401 Dixie Hwy. Covington, Ky. 41011	Dixiana Smith Chairman Associate Degree Nursing Program	4 sem.	X		X	X	X				X	150	
Paducah Community College Blandville Paducah, Ky. 42001	Effie Kemp Chairman Associate Degree Nursing Program	4 sem.			X		X				X	600	
Somerset Community College Somerset, Ky. 42501	Patricia A. Tipton Chairman Associate Degree Nursing Program	4 sem.			X	X	X				X	150	
University of Kentucky, Elizabethtown Community College Elizabethtown, Ky. 42701	Martha A. T. Knudson Chairman Associate Degree Education in Nursing	4 sem.			X	X					X	600	5
University of Kentucky, Henderson Community College Henderson, Ky. 42420	Claudia B. Watson Chairman Associate Degree Nursing Program	4 sem.	X	X	X		X				X	600	40
Western Kentucky University Bowling Green, Ky. 42101	Lucy A. Erwin Head Department of Nursing	4 sem. 1 s.s.	X	X	X	X	X			X			663
LOUISIANA													
Louisiana State University at Alexandria Alexandria, La. 73101	Barbara Odom Director Division of Nursing	4 sem. 2 s.s.	X	X	X	X					X	450	
Nicholls State University P.O. Box 2143 Thibodaux, La. 70301	Mary G. Blackmon Acting Head Department of Nursing	4 sem. 2 s.s.			X	X	X			X		150	42
MAINE													
Westbrook College 716 Stevens Ave. Portland, Me. 04103 (Women only)	Deborah L. Pratt Chairman Department of Nursing Education	4 sem.	X		X	X				X		3000	
MARYLAND													
Allegany Community College Willow Brook Rd., Box 870 Cumberland, Md. 21502	Margaret B. Keller Director Nursing Education	4 sem.	X		X		X				X	125	45
Anne Arundel Community College Jones Station Rd. Arnold, Md. 21012	Vera Martin Acting Chairman Associate Degree Program in Nursing	4 sem.			X		X				X	600	180
Catonsville Community College 800 S. Rolling Rd. Catonsville, Md. 21228	Mary Lou Stromer Chairman Division of Nursing	4 sem.	X	X	X		X				X	450	40
Community College of Baltimore 2901 Liberty Heights Ave. Baltimore, Md. 21215	Sr. M. Damian Faller Chairman Department of Nursing	4 sem.	X	X	X	X	X				X	300	64
Essex Community College Baltimore County, Md. 21237	Helen V. Kramer Chairman Division of Nursing	4 sem.	X		X	X	X				X	450	28

ursing d Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms		
ki l Associate Program	4 sem.			X						X	600		150	38	40	Chairman
ursing	4 sem.	X	X	X	X			X			730	168	25	16	45	Jane McDaniels Director of Admissions
Nursing	4 sem.	X		X	X	X				X	150		85	55	60	Admissions Office
Nursing	4 sem.			X		X				X	600		120	38	60	Chairman
Nursing	4 sem.			X	X	X				X	150		40	38	30	Chairman
dson Education	4 sem.			X	X					X	600	5	270	45	50	Harry Lee Office of Admissions
n Nursing	4 sem.	X	X	X		X				X	600	40	200	40	36	Chairman or Bob Park, Director of Admissions
ursing	4 sem. 1 s.s.	X	X	X	X	X			X			663	60	50	100	Head
ng	4 sem. 2 s.s.	X	X	X	X					X	450		150	40	100	Director
n ursing	4 sem. 2 s.s.			X	X	X			X		150	42	40	83	60	Dan C. Montz Registrar
ursing	4 sem.	X		X	X				X		3000		100	60	50	Myron Hager Director of Admissions
er on	4 sem.	X		X		X				X	125	45	75	60	75	Kathryn Greever Admissions Counselor
n e Program	4 sem.			X		X				X	600	180	150	38	40	Marsh H. Myers Registrar & Director of Admissions
er ing	4 sem.	X	X	X		X				X	450	40	150	50	120	Admissions Office
aller Nursing	4 sem.	X	X	X	X	X				X	300	64	120	42	100	Joseph Stein Director of Admissions
r ing	4 sem.	X		X	X	X				X	450	28	200	65	100	Director of Admissions

3365

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	Est Tuition
MARYLAND—Continued												
Frederick Community College O'Possumtown Pike, Rte. #3 Frederick, Md. 21701	Dorothy V. Elliott Director Associate Degree Nursing Program	4 sem.	X		X		X				X	600
Hagerstown Junior College 751 Robinwood Dr. Hagerstown, Md. 21740	Thelma C. Harding Director Associate Degree Nursing Program	4 sem.	X		X		X				X	125
Harford Community College 401 Thomas Run Rd. Bel Air, Md. 21014	Judith P. Westing Nursing Director Associate Degree Nursing Program	4 sem.	X	X	X	X	X				X	600
Montgomery College Takoma Park Campus Takoma Park, Md. 20012	Helen A. Statts Chairman Department of Nursing	4 sem. 1 s.s.	X	X	X	X	X				X	660
Prince George's Community College 301 Largo Rd. Largo, Md. 20870	Viola Levitt Director Associate Degree Nursing Program	4 sem.	X		X		X				X	683
MASSACHUSETTS												
Atlantic Union College South Lancaster, Mass. 01561	Ruth Haller Chairman Division of Nursing	4 sem. 1 s.s.	X	X	X	X				X		3500
Berkshire Community College Second St. Pittsfield, Mass. 01201	Gwendolyn W. Lawson Chairman Department of Nursing	4 sem.			X	X	X				X	400
Bristol Community College 64 Durfee St. Fall River, Mass. 02722	Edith R. Thomas Director Associate Degree Nursing Program	4 sem.	X	X	X	X	X				X	400
Cape Cod Community College West Barnstable, Mass. 02668	Veronica A. Charbonneau Chairman Division of Nursing	4 sem.	X	X	X		X			X	X	400
Greenfield Community College 125 Federal St. Greenfield, Mass. 01301	William R. Peters Coordinator Associate Degree Nursing Program	4 sem.			X		X				X	400
Holyoke Community College 170 Sargeant St. Holyoke, Mass. 01040	Doris M. Kemble Chairman Department of Nurse Education	4 sem.			X		X				X	400
Lasell Junior College 1844 Commonwealth Ave. Auburndale, Mass. 02166	Constance W. Milner Chairman Associate Degree Nursing Program	4 sem.								X		1550
Massachusetts Bay Community College 57 Stanley Ave. Watertown, Mass. 02173	Helen B. Langton Coordinator Nursing Program	4 sem. 1 s.s.			X		X				X	440
Massasoit Community College West Bridgewater, Mass. 02379	Jo Ann F. Morici Chairman Nurse Education Department	4 sem.			X		X				X	100
Newton Junior College Washington Park Newtonville, Mass. 02160	Anne K. Collins Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X		X		X				X	1790
Northeastern University 360 Huntington Ave. Boston, Mass. 02115	Juanita O. Long Dean College of Nursing, Associate Degree Program	10 qtr.								X		3100
Northern Essex Community College Chadwick St. Haverhill, Mass. 01830	Dolores J. Haritos Chairman Associate Degree Nursing Program	4 sem.			X						X	400

3366

(2) Head of Nursing Program and Title	(3) Usual Length of Program: Abbreviations: sem.-semesters, qtr.-quarters, tri.-trimesters, s.s.-summer sessions	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Costs for Total Program (in dollars): Tuition	(8) Fees	(8) Books	(8) Uniforms	(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
ny V. Elliott or ate Degree Nursing gram	4 sem.	X		X		X				X	600	100	160	64	35	Duval W. Sweadner Director of Admissions
a C. Harding or ate Degree Nursing ogram	4 sem.	X		X		X				X	125	125	200	75	40	Max E. Creager Registrar
P. Westing g Director ate Degree Nursing ogram	4 sem.	X	X	X	X	X				X	600	120	160	45	60	Ralph Jordan Director of Admissions
A. Statts nan rment of Nursing	4 sem. 1 s.s.	X	X	X	X	X				X	660	60	200	70	70	Admissions Office
Levitt or ate Degree Nursing gram	4 sem.	X		X		X				X	683	100	50	35	100	Roy Christenson Director of Admissions
Haller nan n of Nursing	4 sem. 1 s.s.	X	X	X	X				X		3500	300	100	40	50	Chairman
olyn W. Lawson nan rment of Nursing	4 sem.			X	X	X				X	400	90	180+	50+	55	Richard Gerlach Director of Admissions
. Thomas or ate Degree Nursing ogram	4 sem.	X	X	X	X	X				X	400	100	125	32	180	Patricia Scott Admissions Officer
ca A. Charbonneau nan n of Nursing	4 sem.	X	X	X		X			X	X	400	50	300	42	60	Chairman
n R. Peters nator ate Degree Nursing ram	4 sem.			X		X				X	400	100	200	50	48	Donald W. Brown Director of Admissions
M. Kemble nan ment of Nurse ation	4 sem.			X		X				X	400	78	200	50	50	James Trace Director of Admissions
nce W. Milner nan ate Degree Nursing ram	4 sem.								X		1550	35	200	70	43	Chairman
B. Langton nator a Program	4 sem. 1 s.s.			X		X				X	440	62	190	65	57	Admissions Office
F. Morici nan Education Department	4 sem.			X		X				X	100	75	100	40	60	Francis Peter Roman Director of Admissions
. Collins nan ate Degree Nursing gram	4 sem. 1 s.s.	X		X		X				X	1790	84	225	55	52	Dean Leo Judge Admissions Office
O. Long of Nursing, Associate ee Program	10 qtr.								X		3100	252	300	40	115	Admissions Department
J. Haritos nan te Degree Nursing ram	4 sem.			X						X	400	75	148	68	45	Cecilia Furlotte Director of Admissions

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program: Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	Est Tuition
MASSACHUSETTS—Continued												
North Shore Community College 3 Essex St. Beverly, Mass. 01915	Margaret Harris Chairman Department of Nurse Education	4 sem.	X				X				X	400
Quinsigamond Community College 251 Belmont St. Worcester, Mass. 01605	Betty L. Forest Chairman Department of Nursing	4 sem.	X		X		X				X	400
Springfield Technical Community College 1 Armory Sq. Springfield, Mass. 01105	Mary E. O'Leary Chairman Division of Nursing	4 sem.			X		X				X	400
MICHIGAN												
Delta College University Center, Mich. 48710	Therese G. Seaman Chairman Division of Nursing	5 sem.	X	X	X	X	X			X		680
Ferris State College Big Rapids, Mich. 49307	Esther R. Sherrod Coordinator Department of Nursing	8 qtr.		X	X		X		X			1280
Genesee Community College 1401 E. Court St. Flint, Mich. 48503	Mary Jo Manley Coordinator Associate Degree Nursing Program	4 sem.	X	X	X		X				X	640
Grand Rapids Junior College 143 Bostwick, N.E. Grand Rapids, Mich. 49503	Dorothy Koelbl Director Department of Nursing	4 sem. 1 s.s.	X		X	X	X				X	660
Henry Ford Community College 5101 Evergreen Dearborn, Mich. 48128	Eleanor A. Tourtillott Director Associate Degree Nursing Program	4 sem. 1 s.s.	X				X				X	
Highland Park College Glendale & Third Highland Park, Mich. 48203	Una J. Sain Chairman Department of Nursing	4 sem. 1 s.s.			X		X				X	120
Kellogg Community College 450 North Ave. Battle Creek, Mich. 49016	Edith M. Larson Chairman Associate Degree Nursing Program	4 sem.	X	X	X	X	X				X	68
Lake Michigan College 2755 Napier Ave. Benton Harbor, Mich. 49022	Lucy Mayer Chairman Associate Degree Nursing Program	4 sem.		X	X		X				X	48
Lake Superior State College Saulte Sainte Marie, Mich. 49783	Margaret Pieper Director Associate Degree Nursing	6 qtr.	X	X	X	X	X			X		16
Lansing Community College 419 N. Capitol Ave. Lansing, Mich. 48914	Michael F. Lenkowski Chairman Associate Degree Nursing Program	6 qtr. 1 s.s.	X	X	X	X	X				X	
Macomb County Community College, Center Campus 16500 Hall Rd. Mt. Clemens, Mich. 48043	Dolores Keyser Coordinator Associate Degree Nursing Program	4 sem.			X		X				X	58
North Central Michigan College 1515 Howard St. Petoskey, Mich. 49770	Imogene Gerrie Director Department of Nursing Education	4 sem. 1 s.s. * For students under 21 years of age.	X	X	X	X	X		X*			72 90
Northwestern Michigan College 1701 E. Front St. Traverse City, Mich. 49684	Ernestine F. Johnson Head Department of Nursing	8 qtr.	X	X	X		X			X		14
Oakland Community College 7350 Cooley Lake Rd. Union Lake, Mich. 48058	Marie A. Weng Chairman Associate Degree Nursing Program	4 sem. 2 spring sessions	X	X	X	X	X					69
St. Clair County Community College 323 Erie St. Port Huron, Mich. 48060	Charlotte Davidson Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X		X		X				X	90

(2)	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
ot Nursing m and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
arris of Nurse	4 sem.	X				X				X	400	65	300	60	72	Harry L. Siegel Director of Admissions
est of Nursing	4 sem.	X		X		X				X	400	55	340	36	100	E. Jay Tierney Chairman, Committee on Admissions
tary Nursing	4 sem.			X		X				X	400	200	300	35	50	Paul Berwick Director of Admissions
caman Nursing	5 sem.	X	X	X	X	X			X		680	34	250	50	300	Dean Scott Director of Admissions
errod of Nursing	8 qtr.		X	X		X		X			1280		200	60	26	Karl Walker Director of Admissions
nley egree Nursing	4 sem.	X	X	X		X				X	640	78	120	40	144	Earl Mahoney Admissions Officer
ibl of Nursing	4 sem. 1 s.s.	X		X	X	X				X	660	85		50	60	Anthony LaPenna Director of Admissions
ourtillott egree Nursing	4 sem. 1 s.s.	X				X				X		45	200	40	112	Alfred E. Foster Admissions Officer
of Nursing	4 sem. 1 s.s.			X		X				X	1200	20	250	52	75	Chairman
rson egree Nursing	4 sem.	X	X	X	X	X				X	682	82	250	25	75	Admissions Office
egree Nursing	4 sem.		X	X		X				X	480	50	200	50	50	Thomas McCourt Director of Admissions
eper gree Nursing	6 qtr.	X	X	X	X	X			X		164	15	200	50	45	James Honkanen Director of Admissions
enkowski egree Nursing	6 qtr. 1 s.s.	X	X	X	X	X				X		5		35	80	Director of Admissions
ser egree Nursing	4 sem.			X		X				X	585	10	125	48	100	Admissions Department
rrie of Nursing n	4 sem. 1 s.s. * For students under 21 years of age.	X	X	X	X	X		X*			720-900	100	150	50	30	Boyd Baughman Dean of Students
Johnson of Nursing	8 qtr.	X	X	X		X			X		141	24	40	42	50	Edna Sargent Registrar
eng egree Nursing	4 sem. 2 spring sessions	X	X	X	X	X					693	77	100	50	150	Office of Admissions & Records Bloomfield Hills, Mich. 48013
avidson egree Nursing	4 sem. 1 s.s.	X		X		X				X	900	108	150	50	80	Chairman

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program: Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Total P (in do: Tuition	(8) Estimated Total P (in do: Fees
MICHIGAN—Continued													
Schoolcraft College 18600 Haggerty Rd. Livonia, Mich. 48151	Harriett H. Sattig Director Associate Degree Nursing Program	5 tri.	X		X		X				X	640	48
Southwestern Michigan College Cherry Grove Rd. Dowagiac, Mich. 49047	M. Eileen Parks Chairman Associate Degree Nursing Program	4 sem.	X		X	X	X				X	660	32
MINNESOTA													
Anoka-Ramsey State Junior College 11200 Mississippi Blvd., N.W. Coon Rapids, Minn. 55433	Ann Appert Shiely Chairman Associate Degree Nursing Program	6 qtr.	X		X		X					585	120
Hibbing State Junior College Hibbing, Minn. 55746	Audrey B. Fay Chairman Department of Nursing	6 qtr.			X	X	X			X		700	125
Metropolitan State Junior College 50 Willow St. Minneapolis, Minn. 55403	Martha Schelling Director Nursing Program	6 qtr.			X	X	X				X	293	45
Rochester State Junior College Rochester, Minn. 55901	Linnea Morrison Chairman Associate Degree Nursing Program	6 qtr.	X	X	X	X	X	X		X		850	125
St. Mary's Junior College 2600 S. 6th St. Minneapolis, Minn. 55406	Ruby C. Hass, Mary Killalea Codirectors Nursing Program	6 qtr.	X		X	X				X		2900	50
MISSISSIPPI													
Hinds Junior College Raymond, Miss. 39154	Eunice Pace Director Department of Nursing	4 sem.		X	X		X			X	X		
Jones County Junior College Ellisville, Miss. 39437	Joan McConnell Director Associate Degree Nursing Program	6 qtr. 1 s.s.	X	X	X		X			X		48	
Meridian Junior College 5500 Hwy. 19, N. Meridian, Miss. 39301	Margaret Armstrong Chairman Division of Nursing	4 sem. 1 s.s.		X	X		X				X	302	15
Mississippi Delta College Moorhead, Miss. 38761	Beverly R. Eidson Director Department of Nursing	4 sem. 1 s.s.					X			X			375
Mississippi Gulf Coast Junior College, Jackson County Campus U.S. Hwy. 90 Gautier, Miss. 39553	Lois E. Dickson Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X		X			X		125	20
Mississippi Gulf Coast Junior College, Jefferson Davis Campus Handsboro Sta. Gulfport, Miss. 39501	Margaret Kingman Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X	X	X	X	X				X	552	20
Mississippi Valley State College Itta Bena, Miss. 38941	Eula Hope Aiken Chairman Department of Nursing Education	4 sem.								X			
Northeast Mississippi Junior College Conningham Blvd. Booneville, Miss. 38829	Christine Maxcy Chairman Department of Nursing	4 sem. 1 s.s.			X	X	X			X			329
Pearl River Junior College Poplarville, Miss. 39470	Charlotte Odom Director Department of Nursing Education	4 sem. 1 s.s.			X		X			X		645	60
University of Southern Mississippi Natchez Resident Center Natchez, Miss. 39120	Flora Posey Director School of Nursing	6 qtr. 1 s.s.	X	X	X		X				X	1500	50

(2)	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
of Nursing m and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
Cattig egree Nursing	5 tri.	X		X		X				X	640	48	174	27	50	Director of Admissions
rks egree Nursing	4 sem.	X		X	X	X				X	660	32	150	50	40	Chairman
Shiely egree Nursing	6 qtr.	X		X		X					585	120	240	15	125	Office of Admissions
ay of Nursing	6 qtr.			X	X	X			X		700	125	200	60	60	Admissions Office
illing gram	6 qtr.			X	X	X				X	293	45	120	16	140	Admissions Officer
ison egree Nursing	6 qtr.	X	X	X	X	X	X		X		850	125	155	50	325	Chairman
s, Mary Killalea gram	6 qtr.	X		X	X				X		2900	50	200		200	Sr. St. Joseph Registrar
of Nursing	4 sem.		X	X		X			X	X					58	Director
nell egree Nursing	6 qtr. 1 s.s.	X	X	X		X			X		48		60	40	35	Director
mstrong Nursing	4 sem. 1 s.s.		X	X		X				X	302	15	150	30	36	George R. Bahr Dean of Student Services
idson of Nursing	4 sem. 1 s.s.					X			X			375	200	30	24	Registrar
son egree Nursing	4 sem. 1 s.s.	X	X	X		X			X		125	20	165	50	25	Chairman
ngman egree Nursing	4 sem. 1 s.s.	X	X	X	X	X				X	552	20	150	45	32	Clifton Taylor Counselor
iken of Nursing	4 sem.								X				100	40	50	Chairman
xcy of Nursing	4 sem. 1 s.s.			X	X	X			X			329	215	64	62	Chairman
dom of Nursing	4 sem. 1 s.s.			X		X			X		645	60	75	39	40	Director
ursing	6 qtr. 1 s.s.	X	X	X		X				X	1500	50	185	60	25	Director

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters, qtr.-quarters, tri.-trimesters, s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Costs Total Program (in dollars): Tuition	(8) Fees	(8) Books
MISSOURI														
Florissant Valley Community College 3400 Pershall Rd. St. Louis, Mo. 63135	Marion L. Kretzer Chairman Nursing Department	4 sem.	X		X		X				X	896	68	250
Forest Park Community College 5600 Oakland Ave. St. Louis, Mo. 63110	Elizabeth E. McIntosh Chairman Associate Degree Program in Nursing	4 sem.	X	X			X				X	624	85	150
Lincoln University of Missouri 820 Chestnut St. Jefferson City, Mo. 65101	Helen L. Monroe Director Department of Nursing Education	4 sem.	X	X	X		X			X			575	155
Maryville College 13550 Conway Rd. St. Louis, Mo. 63141	Sr. M. Robert Edwards Chairman Mercy Department of Nursing	4 sem. 1 s.s.	X		X	X				X		2650	200	100
Meramec Community College 959 S. Geyer Rd. St. Louis, Mo. 63122	Sue Petrovich Chairman Associate Degree Nursing Program	4 sem.	X	X	X	X	X				X	960	52	200
Mineral Area College Flat River, Mo. 63601	Una Rice Thomas Chairman Department of Nursing	4 sem. 1 s.s.			X	X	X				X	380	40	190
Missouri Southern College Newman & Duquesne Rds. Joplin, Mo. 64836	Billie A. Legg Director Associate Degree Nursing Program	4 sem. 1 s.s.	X		X		X			X		364		136
Penn Valley Community College 560 Westport Rd. Kansas City, Mo. 64111	Adeline Marshall Chairman Department of Nursing Education	4 sem.			X		X				X	100	10	100
St. Mary's College of O'Fallon 200 N. Main St. O'Fallon, Mo. 63366	Sr. Bernard Quinn Director Department of Nursing	4 sem. 1 s.s.	X	X	X		X				X	1870	100	240
Southeast Missouri State College Cape Girardeau, Mo. 63701	Helen E. Kinney Head Associate Degree Nursing Program	4 sem. 2 s.s.	X		X				X				110	
MONTANA														
Miles Community College 2600 Dickinson Miles City, Mont. 59301	Mildred C. Hom Director Associate Degree Nursing Program	6 qtr. 1 s.s.	X		X	X	X				X	240	70	50
Northern Montana College Havre, Mont. 59501	Helen L. Kiesling Chairman Associate Degree Nursing Program	7 qtr.			X	X			X*				134	50
		* Except for residents of college town, who may live at home, and students over 2												
NEBRASKA														
College of Saint Mary 72d & Merry Rd. Omaha, Neb. 68124	Sr. Mary Carol McVancy Chairman Associate Degree Nursing Program	4 sem. 1 s.s.	X			X		X		X		960		200
University of Nebraska School of Nursing 42d & Dewey Omaha, Neb. 68105	Lois J. Merrill Associate Dean Associate Degree Nursing Program	4 sem. 1 s.s.	X		X	X	X			X		800		200
NEVADA														
University of Nevada, College of Allied Health Professions 4505 Maryland Pkwy. Las Vegas, Nev. 89109	Margaret E. Simon Chairman Nursing Department	4 sem.	X	X	X	X	X			X		243		80

lursing d Title	(3) Usual Length of Program: Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrange-ments only	(8) Estimated Costs for Total Program (in dollars): Tuition	(8) Fees	(8) Books	(8) Uniforms	(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
ent	4 sem.	X		X		X				X	896	68	250	36	30	Gordon Benson Associate Dean of Admissions
tosh Program in	4 sem.	X	X			X				X	624	85	150	45	100	Elizabeth Halpin Registrar
ursing	4 sem.	X	X	X		X			X			575	155	50	35	Director or Admissions Office
vards t of Nursing	4 sem. 1 s.s.	X		X	X				X		2650	200	100	50	65	Sr. M. Jeremy Buckman Director of Admissions
Nursing	4 sem.	X	X	X	X	X				X	960	52	200	25	100	Admissions Office
ursing	4 sem. 1 s.s.			X	X	X				X	380	40	190	40	25	Dean of Admissions
Nursing	4 sem. 1 s.s.	X		X		X			X		364		136	80	30	Director
ursing	4 sem.			X		X				X	100	10	100	25	100	Chairman
ursing	4 sem. 1 s.s.	X	X	X		X				X	1870	100	240	16	80	Director
Nursing	4 sem. 2 s.s.	X		X				X				110		65	30	Admissions Officer
Nursing	6 qtr. 1 s.s.	X		X	X	X				X	240	70	50	25	45	Director
Nursing	7 qtr.			X	X			X*				134	50	28	40	Registrar
	* Except for residents of college town, who may live at home, and students over 21 years of age.															
cVancy Nursing	4 sem. 1 s.s.	X			X		X		X		960		200	60	60	Chairman
Nursing	4 sem. 1 s.s.	X		X	X	X			X		800		200	45	75	Associate Dean
on nent	4 sem.	X	X	X	X	X			X		243		80	35	50	Chairman

3373

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	Estimate Total (in Tuition	Fees
NEW HAMPSHIRE													
New Hampshire Technical Institute Fan Rd. Concord, N.H. 03301	Goldie Crocker Chairman Department of Nursing	6 qtr. 1 s.s.			X		X			X		700	2
NEW JERSEY													
Atlantic Community College Mays Landing, N.J. 08330	Margaret Wright Chairman Associate Degree Nursing Program	5 sem.			X		X				X	640	8
Bergen Community College 400 Paramus Rd. Paramus, N.J. 07652	Chairman Associate Degree Nursing Program	4 sem.	X	X	X	X	X				X	185	3
Brookdale Community College 765 Newman Springs Rd. Lincroft, N.J. 07738	Arlene Sherman Director Associate Degree Nursing Program	4 sem.	X		X	X	X				X	.....	
County College of Morris Rte. 10 & Center Grove Rd. Dover, N.J. 07801	Agnes Anne Clark Chairman Department of Nursing	4 sem.	X		X	X	X				X	650	6
Cumberland County College P.O. Box 512 Vineland, N.J. 08360	Johanna Roode Chairman Department of Nursing	4 sem.			X		X				X	600	2
Essex County College 31 Clinton St. Newark, N.J. 07112	Hazle W. Blakeney Divisional Director Allied Health	4 sem. 1 s.s.	X		X		X				X	720	5
Felician College South Main St. Lodi, N.J. 07644	Sr. Mary Alma Director Associate Degree Nursing Program	4 sem. * Limited.			X	X	X			X*		2400	20
Gloucester County College Tanyard & Salina Rds. Sewell, N.J. 08080	Sue Pantis Chairman Nursing	4 sem.	X		X		X				X	175	3
Mercer County Community College 101 W. State St. Trenton, N.J. 08608	Helenmarie Dolton Chairman Department of Nursing & Allied Health	4 sem.	X		X		X				X	660	8
Middlesex County College Mill Rd. Edison, N.J. 08817	Jean M. Buckley Chairman Department of Nurse Education	4 sem.	X	X	X	X	X				X	660	17
Ocean County College Hooper Ave. Toms River, N.J. 08753	Ethel M. Hiross Chairman Associate Degree Nursing Program	4 sem.	X	X	X		X					325	5
Somerset County College Box 3300 Somerville, N.J. 08876	Carol A. Murtaugh Chairman Division of Nurse Education	4 sem.			X	X	X				X	300	
NEW MEXICO													
Eastern New Mexico University at Roswell Box 6761 Roswell, N. Mex. 88201	Martha Cress Director Associate Degree Nursing Program	4 sem. 1 s.s.			X		X			X		900	6
New Mexico Junior College Lovington Hwy. Hobbs, N. Mex. 88240	Florence L. Hachmeier Director Associate Degree Nursing Program	4 sem. 1 s.s.			X	X	X				X	268	6
University of Albuquerque St. Joseph Pl., N.W. Albuquerque, N. Mex. 87120	Sr. Alma Rihm Director Associate Degree Nursing Program	4 sem. * For out-of-town students under age 21 (if facilities available).	X	X	X		X		X*	X		2376	14

3374

(2) Nursing and Title	(3) Usual Length of Program: Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Costs for Total Program (in dollars): Tuition	(8) Fees	(8) Books	(8) Uniforms	(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
Nursing	6 qtr. 1 s.s.			X		X			X		700	25	175	45	60	James Box Dean of Admissions
ght ee Nursing	5 sem.			X		X				X	640	85	100	50	60	Walter Kaenzig Director of Admissions
ee Nursing	4 sem.	X	X	X	X	X				X	185	35		45	100	F. Prisco Registrar & Admissions Officer
n ee Nursing	4 sem.	X		X	X	X				X	.....1200.....				75	David Smith Admissions
ark Nursing	4 sem.	X		X	X	X				X	650	60	200	40	75	D. Patton Director of Admissions
e Nursing	4 sem.			X		X				X	600	20	200	35	54	William T. Housum Director of Admissions
eney ctor	4 sem. 1 s.s.	X		X		X				X	720	50	175	40	180	Registrar
ee Nursing	4 sem. * Limited.			X	X	X			X*		2400	200	200	50	75	Doris Sipos Director of Admissions
	4 sem.	X		X		X				X	175	30	125	30	70	Robert Mossman Director of Admissions
lton Nursing alth	4 sem.	X		X		X				X	660	80	200	45	75	Michael J. Schaefer Director of Admissions
ey Nurse	4 sem.	X	X	X	X	X				X	660	178	215	65	175	Gordon Harrower Director of Admissions
ee Nursing	4 sem.	X	X	X		X					325	50	100	60	60	James Beatty Director of Admissions
ugh se	4 sem.			X	X	X				X	300		200	100	30	Thomas Bridegum Director of Admissions
ee Nursing	4 sem. 1 s.s.			X		X			X		900	60	200	40	30	Director
chmeier ee Nursing	4 sem. 1 s.s.			X	X	X				X	268	68	290	75	30	Director
ee Nursing	4 sem. * For out-of-town students under age 21 (if facilities available).	X	X	X		X		X*	X		2376	145	150	40	100	James Greer Registrar

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Cos Total Progr (in dollars		
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books
NEW YORK														
Adirondack Community College Bay Rd. Glen Falls, N.Y. 12801	Margaret R. Felmly Director	4 sem.	X	X	X	X	X				X	900		50
Broome Community College Upper Front St. Binghamton, N.Y. 13092	Lois S. Roach Chairman Department of Nursing	6 qtr.	X	X	X	X	X				X	900	50	350
City University of New York, Borough of Manhattan Community College 134 W. 51st St. New York, N.Y. 10020	Lelia D. Howard Chairman Department of Nursing	4 sem.	X	X	X		X						47	85
City University of New York, Bronx Community College 120 E. 184th St. Bronx, N.Y. 10468	Beatrice Perlmutter Head Department of Nursing	4 sem.	X	X	X	X	X			X			140	100
City University of New York, New York City Community College 300 Jay St. Brooklyn, N.Y. 11201	Rita J. McGinnis Chairman Associate Degree Nursing Program	4 sem.	X	X	X	X	X	X			X		168	150
City University of New York, Queensborough Community College Springfield Blvd. & 56th Ave. Bayside, N.Y. 11364	Marie R. Traetta Chairman Associate Degree Nursing Program	4 sem.	X		X	X	X				X		45	100
City University of New York, Staten Island Community College 715 Ocean Ter. Staten Island, N.Y. 10301	Harriet Levine Chairman Department of Nursing	4 sem.	X	X			X				X		48	200
Community College of the Finger Lakes Canandaigua, N.Y. 14424	Margaret M. Brady Chairman Associate Degree Nursing Program	4 sem.		X	X		X				X	900	120	150
Corning Community College Spencer Hill Corning, N.Y. 14830	Bernadene Hallinan Chairman Division of Nurse Education	4 sem.	X	X	X	X	X				X	800	221	250
Dutchess Community College Pendell Rd. Poughkeepsie, N.Y. 12601	John Demenkoff Department Head Health Technologies	4 sem.	X	X	X	X	X	X			X	1050	120	22
Erie Community College Main St. & Youngs Rd. Buffalo, N.Y. 14221	Genevieve K. McQuillin Head Associate Degree Nursing Program	4 sem.	X				X				X	1000	200	24
Fulton-Montgomery Community College Johnstown, N.Y. 12095	Robert Jacques Director Associate Degree Nursing Program	4 sem.	X	X	X	X	X				X	400	50	10
Genesee Community College 3837 W. Main Street Rd. Batavia, N.Y. 14020	Lorraine W. Fischer Director Associate Degree Nursing Program	4 sem.	X	X	X		X				X	1100	100	20
Hudson Valley Community College 80 Vandenburgh Ave. Troy, N.Y. 12180	Patricia A. Beck Chairman Department of Nursing	4 sem.	X	X	X	X	X				X	400	60	10
Jamestown Community College 525 Falconer St. Jamestown, N.Y. 14701	Luella K. Fox Chairman Associate Degree Nursing Program	4 sem.		X	X		X				X	400	80	10
Jefferson Community College P.O. Box 255 Watertown, N.Y. 13601	Carole F. Cashion Chairman Associate Degree Nursing Program	4 sem.	X		X	X	X				X	800	150	20
Junior College of Albany 1240 New Scotland Ave. Albany, N.Y. 12208	Patricia A. Taugher Chairman Division of Nursing	4 sem.	X	X	X		X				X	2400	100	30

sing Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms		
	4 sem.	X	X	X	X	X				X	900		50	50	70	Director of Admissions
ing	6 qtr.	X	X	X	X	X				X	900	50	350	60	80	R. Pufky Director of Admissions
ing	4 sem.	X	X	X		X						47	85	21	250	Maurice Purcell Coordinator of Admissions
ing	4 sem.	X	X	X	X	X			X			140	100	60	300	John D'Andrea Admissions Office
ursing	4 sem.	X	X	X	X	X	X			X		168	150	30	80	Thomas Buckley Director of Admissions
ursing	4 sem.	X		X	X	X				X		45	100	66	252	A. J. Calise In Charge of Admissions
ing	4 sem.	X	X			X				X		48	200	50	130	Frank Ballweg, Jr. Registrar
ursing	4 sem.		X	X		X				X	900	120	150	39	60	John M. Mueser Director of Admissions
ducation	4 sem.	X	X	X	X	X				X	800	221	250	25	100	Director of Admissions
s	4 sem.	X	X	X	X	X	X			X	1050	120	225	40	90	D. Dempster Director of Admissions
illin ursing	4 sem.	X				X				X	1000	200	245	40	60	Francis Berst Director of Admissions
ursing	4 sem.	X	X	X	X	X				X	400	50	100	65	45	Director of Admissions
ursing	4 sem.	X	X	X		X				X	1100	100	200	75	64	Malcolm T. Wormley Director of Admissions
sing	4 sem.	X	X	X	X	X				X	400	60	100	70	80	Admissions Officer
ursing	4 sem.		X	X		X				X	400	80	100	20	90	James A. Gallagher Director of Admissions & Registrar
ursing	4 sem.	X		X	X	X				X	800	150	200	45	60	Chairman
r	4 sem.	X	X	X		X				X	2400	100	300	50	50	Chairman

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			Estimate Total (in	
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees
NEW YORK—Continued													
Kingsborough Community College 2001 Oriental Blvd. Brooklyn, N.Y. 11235	Sophia Yaczola Administrator Department of Nursing	4 sem.	X	X	X	X	X				X		6
Maria College of Albany 700 New Scotland Ave. Albany, N.Y. 12208	Esther McEvoy Chairman Department of Nursing	4 sem.	X	X	X	X				X		1000	10
Mohawk Valley Community College 1101 Sherman Dr. Utica, N.Y. 13501	Beverly A. Warner Head Associate Degree Nursing Program	6 qtr.			X		X			X		1100	10
Monroe Community College Box 9720 Rochester, N.Y. 14623	Virginia Shea Chairman Department of Nursing	4 sem.			X		X				X	800	8
Nassau Community College Stewart Ave. Garden City, N.Y. 11530	Patricia A. Hyland Chairman Department of Nursing	4 sem.	X	X	X	X	X				X	800	15
Niagara County Community College 430 Buffalo Ave. Niagara Falls, N.Y. 14303	Elene Perone Chairman Department of Health Sciences	4 sem.	X	X	X		X				X	800	6
Onondaga Community College 700 E. Water St. Syracuse, N.Y. 13210	Nancy S. Tobin Chairman Associate Degree Nursing Program	4 sem.	X	X	X		X				X	880	10
Orange County Community College 115 South St. Middletown, N.Y. 10940	Margaret June Simpson Chairman Associate Degree Nursing Program	4 sem.	X	X	X		X				X	1100	13
Pace College, Manhattan Pace College Plaza New York, N.Y. 10038	Ruth K. Pell Dean Department of Nursing	4 sem.	X	X	X	X	X			X		2900	14
Pace College, Westchester 861 Bedford Rd. Pleasantville, N.Y. 10570	Alice L. Reilly Chairman Department of Nursing	4 sem.	X	X	X	X	X			X		2900	14
State University of New York, Agricultural and Technical College at Alfred Alfred, N.Y. 14802	A. Donald Insley Chairman Associate Degree Nursing Program	6 qtr. 1 s.s.	X	X	X		X			X		550	10
State University of New York, Agricultural and Technical College at Canton Canton, N.Y. 13617	Virginia McAllister Chairman Associate Degree Nursing Program	4 sem.	X		X	X				X		400	13
State University of New York, Agricultural and Technical College at Farmingdale Melville Rd. Farmingdale, N.Y. 11735	Barbara H. Steinbaum Chairman Department of Nursing	4 sem.	X		X	X	X	X		X		800	
State University of New York, Agricultural and Technical College at Morrisville Morrisville, N.Y. 13408	Harriet Babcock Acting Chairman Nursing Department	4 sem.	X	X	X	X	X			X		575	7
State University of New York, Rockland Community College 145 College Rd. Suffern, N.Y. 10901	Alice M. Perry Chairman Department of Nursing	4 sem.		X	X	X	X				X	1000	10
State University of New York, Upstate Medical Center 766 Irving Ave. Syracuse, N.Y. 13210	Maja C. Anderson Director School of Nursing	4 sem.	X	X	X					X		1100	6
Suffolk County Community College 533 College Rd. Selden, N.Y. 11784	Marjorie P. Doyle Chairman Department of Nursing	4 sem.	X	X	X		X	X			X	940	10
Trocaire College 110 Red Jacket Pkwy. Buffalo, N.Y. 14220	Marian Meyers Chairman Associate Degree Nursing Program	4 sem.	X	X	X	X	X			X		1900	15

(2)	(3)	(4)		(5)		(6)		(7)			(8)				(9)	(10)
	Usual Length of Program	Advanced Placement Possible		Part-Time Study Possible		Evening Division Classes Possible		Living Arrangements			Estimated Costs for Total Program (in dollars)				Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
ad of Nursing gram and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms		
aczola ator nt of Nursing	4 sem.	X	X	X	X	X				X		65	250	35	200	Chairman Department of Nursing
Evoy nt of Nursing	4 sem.	X	X	X	X				X		1000	100	75	60		Sr. Jane McCullough Dean of Admissions
Warner Degree Nursing m	6 qtr.			X		X			X		1100	100	215	35	105	Ian Lindsey Acting Director of Admissions
hea nt of Nursing	4 sem.			X		X				X	800	80	150	50	119	Robert C. Collins Director of Admissions P.O. Box 9892 Rochester, N.Y. 14623
Hyland nt of Nursing	4 sem.	X	X	X	X	X				X	800	150	175	75	150	Edward Jones Director of Admissions
one nt of Health Sciences	4 sem.	X	X	X		X				X	800	60	150	50	80	Ronald Mirabelli Director of Admissions
Tobin Degree Nursing m	4 sem.	X	X	X		X				X	880	100	250	40	70	Paul Brown Director of Admissions
June Simpson Degree Nursing m	4 sem.	X	X	X		X				X	1100	136	200	40	open	William P. Morrison Admissions-Registrar Officer
ell nt of Nursing	4 sem.	X	X	X	X	X			X		2900	145	200	35	80	Director of Admissions
eilly nt of Nursing	4 sem.	X	X	X	X	X			X		2900	145	200	35	100	Hazel Lynch Director of Admissions
Insley Degree Nursing m	6 qtr. 1 s.s.	X	X	X		X			X		550	100	110	60	105	D. Gibbs Admissions Officer
cAllister Degree Nursing m	4 sem.	X		X	X				X		400	130	271	55	45	Charles Holland Director of Admissions
Steinbaum nt of Nursing	4 sem.	X		X	X	X	X		X		800		...200..		120	Paula Shaer Acting Director of Admissions
abcock airman Department	4 sem.	X	X	X	X	X			X		575	75	97	20	65	Director of Admissions
Perry nt of Nursing	4 sem.		X	X	X	X				X	1000	100	150	27	open	Thomas J. Hand Associate Director of Admissions
nderson Nursing	4 sem.	X	X	X					X		1100	65	225	50	80	Director
P. Doyle nt of Nursing	4 sem.	X	X	X		X	X			X	940	100	300	40	95	Henry Marx Director of Admissions
eyers Degree Nursing m	4 sem.	X	X	X	X	X			X		1900	150	250	45	80	Mary Jo O'Sullivan Director of Admissions

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)		
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books
NEW YORK—Continued														
Ulster County Community College Stone Ridge, N.Y. 12484	Florence Irwin Chairman Department of Nursing Education	4 sem.	X	X	X	X	X				X	800	140	275
NORTH CAROLINA														
Asheville-Buncombe Technical Institute 340 Victoria Rd. Asheville, N.C. 28801	Ann L. Scofield Chairman Associate Degree Nursing Program	7 qtr. 1 s.s.										224	80	200
Central Piedmont Community College Box 4009 Charlotte, N.C. 28204	Jessie P. Kiser Director Associate Degree Nursing Program	7 qtr. 1 s.s.	X	X	X		X				X	33		200
Chowan College Murfreesboro, N.C. 27855	Almira H. Ockerman Chairman Department of Nursing	6 sem. 2 s.s.	X							X		1000	20	85
Davidson County Community College P.O. Box 1083 Lexington, N.C. 27292	Juanita M. Yarborough Director Associate Degree Nursing Program	6 qtr. 1 s.s.		X			X				X	230	60	
Fayetteville Technical Institute P.O. Box 5236 Fayetteville, N.C. 28303	Mercedes R. O'Hale Chairman Associate Degree Nursing Program	6 qtr.	X	X	X	X					X	128	135	200
Gardner-Webb College Boiling Springs, N.C. 28017	Grace C. Lee Director Department of Nursing	4 sem.	X	X	X	X	X			X		2200		150
Guilford Technical Institute Jamestown, N.C. 27282	Marguerite N. Guin Chairman Associate Degree Nursing Program	7 qtr.	X	X	X		X				X	224	175	280
Rockingham Community College Wentworth, N.C. 27375	Jean E. Irving Chairman Department of Nurse Education	6 qtr.	X	X	X	X	X				X	200	30	150
Sandhills Community College P.O. Box 1379 Southern Pines, N.C. 28387	Antoinette Rogan Chairman Associate Degree Nursing Program	6 qtr.	X	X	X		X				X	192	50	160
Southeastern Community College Whiteville, N.C. 28472	Pauline C. Ashley Coordinator Associate Degree Nursing Program	6 qtr.	X	X	X		X				X		264	180
Surry Community College Box 304 Dobson, N.C. 27017	Mary K. Patten Director Martin Memorial Nursing Program	7 qtr. 1 s.s.	X	X	X		X				X	300	36	150
University of North Carolina at Wilmington Wilmington, N.C. 28401	Luetta N. Booe Director James Walker Memorial Associate Degree Nursing Program	4 sem. 1 s.s.		X	X						X	750*		150
												*N.C. Resident.		
Western Piedmont Community College Morganton, N.C. 28655	Mary E. Hanig Director Associate Degree Nursing Program	6 qtr.	X		X	X	X				X	192	36	100
NORTH DAKOTA														
Dickinson State College Dickinson, N. Dak. 58601	Irene E. Sage Chairman Associate Degree Nursing Program	6 qtr. 1 s.s.			X	X				X		95	40	10
North Dakota State University University Sta. Fargo, N. Dak. 58102	Sr. Mary Heinen Director Department of Nursing	6 qtr.			X	X	X			X		970	200	150

(2)	(3)	(4)		(5)		(6)		(7)			(8)				(9)	(10)
	Usual Length of Program	Advanced Placement Possible		Part-Time Study Possible		Evening Division Classes Possible		Living Arrangements			Estimated Costs for Total Program (in dollars)				Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
of Nursing m and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms		
in of Nursing	4 sem.	X	X	X	X	X				X	800	140	275	50	55	Charles Schenck Director of Admissions
ield egree Nursing	7 qtr. 1 s.s.										224	80	200	60	45	Thomas Hansen Counseling Service
ser egree Nursing	7 qtr. 1 s.s.	X	X	X		X				X	33		200	58	160	Director
ckerman of Nursing	6 sem. 2 s.s.	X							X		1000	20	85	80	35	Director of Admissions
Yarborough egree Nursing	6 qtr. 1 s.s.		X			X				X	230	60		60	30	Norman Mills Director of Admissions
O'Hale egree Nursing	6 qtr.	X	X	X	X					X	128	135	200	70	40	Niles Compton Dean, Student Affairs
e of Nursing	4 sem.	X	X	X	X	X			X		2200		150	45	45	Robert Abrams Director of Admissions
N. Guin egree Nursing	7 qtr.	X	X	X		X				X	224	175	280	60	50	Al Lochra Admissions Officer
ng t of Nurse n	6 qtr.	X	X	X	X	X				X	200	30	150	45	40	Admissions Officer, Office Student Affairs
Rogan egree Nursing	6 qtr.	X	X	X		X				X	192	50	160	70	50	James Halstead Dean, Student Services
Ashley r egree Nursing	6 qtr.	X	X	X		X				X		264	180	46	45	Pauline N. Moore Director of Admissions
tten morial Nursing	7 qtr. 1 s.s.	X	X	X		X				X	300	36	150	70	20	George E. Stockton Dean of Student Personnel
Booe ker Memorial e Degree Nursing	4 sem. 1 s.s.		X	X						X	750* *N.C. Resident.		150	58	32	Director of Admissions
anig egree Nursing	6 qtr.	X		X	X	X				X	192	36	100	60	66	Director
ge Degree Nursing	6 qtr. 1 s.s.			X	X				X		95	40	10		35	Neil Ableidinger Registrar
einen t of Nursing	6 qtr.			X	X	X			X		970	200	150	30	100	Director

3381

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs to Total Program (in dollars)		
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books
OHIO														
Clark County Technical Institute 570 E. Leffel Ln. Springfield, Ohio 45505	Constance Murphy Chairman Associate Degree Nursing Program	6 qtr.	X	X	X	X	X				X	150	15	200
Columbus Technical Institute 550 E. Spring St. Columbus, Ohio 43202	Jean K. Kintgen Chairman Nursing Technology	7 qtr.	X		X	X	X						1300	200
Cuyahoga Community College, Metropolitan Campus 2900 Community College Ave. Cleveland, Ohio 44115	Nancy J. Voelker Chairman Associate Degree Nursing Program	6 qtr.			X	X	X				X	700		200
Cuyahoga Community College, Western Campus 7300 York Rd. Parma, Ohio 44130	Ann G. Stroth Director School of Nursing	6 qtr.	X	X	X		X				X	660		150
Kent State University, Ashtabula Branch 3325 W. 13th St. Ashtabula, Ohio 44004	Mary Ellen Kocis Director Associate Degree Nursing Program	6 qtr.			X		X			X		1080		240
Kent State University, Tuscarawas County Branch University Dr., N.E. New Philadelphia, Ohio 44663	Roslyn Messerly Coordinator Associate Degree Nursing Program	6 qtr.			X		X			X		1080		200
Kettering College of Medical Arts 3737 Southern Blvd. Kettering, Ohio 45429	Anna May Vaughan Chairman Department of Nursing	4 sem. 1 s.s.	X	X	X	X				X		2600	75	100
Lakeland Community College Mentor, Ohio 44060	Rogene E. Shoffner Director Associate Degree Nursing Program	6 qtr.			X		X			X		350	125	75
Lima Technical Center Division, Penta County Technical Institute Ohio State University, Lima Campus 4300 Campus Dr. Lima, Ohio 45804	Peggy Bensman Chairman Health Service Division	6 qtr.	X	X	X	X	X				X	1050	45	150
Lorain County Community College 1105 N. Abbe Rd. Elyria, Ohio 44035	Charlotte J. Burge Coordinator Associate Degree Nursing Program	6 qtr.	X	X	X	X	X	X			X	810	215	300
Miami University, Hamilton 1601 Peck Blvd. Hamilton, Ohio 45011	Ruth Ann Busald Chairman Department of Nursing	6 qtr.	X		X	X	X				X	1350		150
Miami University, Middletown Branch 4200 Manchester Rd. Middletown, Ohio 45042	Ruth Ann Busald Chairman Associate Degree Nursing Program	6 qtr.			X	X	X				X	1350		150
Ohio University 1425 Newark Rd. Zanesville, Ohio 43701	Alice C. Tom Director Associate Degree Nursing Program	6 qtr.	X		X	X	X				X	1080		240
Ohio University, Portsmouth 940 Second St. Portsmouth, Ohio 45662	Gladys Scott Coordinator Associate Degree Nursing Program	6 qtr.					X			X		1100		100
Penta County Technical Institute Oregon Rd. Perrysburg, Ohio 43551	Peggy Bensman Chairman Associate Degree Nursing Program	6 qtr.		X	X		X						165	150-200
Sinclair Community College 117 W. Monument Ave. Dayton, Ohio 45402	Eleanor M. Carlson Director Associate Degree Nursing Program	6 qtr.		X	X		X				X	850	10	100

3382

) Nursing and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms		
phy e Nursing	6 qtr.	X	X	X	X	X				X	150	15	200	30	80	Margaret Riley Student Services Officer
logy	7 qtr.	X		X	X	X						1300	200	45	60	Dale Tippitt Vice-President, Student Services
er e Nursing	6 qtr.			X	X	X				X	700		200	50	60	John Tsolainos Director of Admissions
ng	6 qtr.	X	X	X		X				X	660		150	40	70	Ernest H. Mielke Director of Admissions & Records
s e Nursing	6 qtr.			X		X			X		1080		240	60	40	John K. Mahan Admissions
e Nursing	6 qtr.			X		X			X		1080		200	60	40	Harold Shade Director of Admissions
ghan Nursing	4 sem. 1 s.s.	X	X	X	X				X		2600	75	100	30	80	Director of Admissions
ner e Nursing	6 qtr.			X		X			X		350	125	75	60	40	F. M. Williams Director of Admissions
Division	6 qtr.	X	X	X	X	X				X	1050	45	150		100	Chairman
ge e Nursing	6 qtr.	X	X	X	X	X	X			X	810	215	300	25	85	Timothy V. Boylan Director of Admissions & Records
d Nursing	6 qtr.	X		X	X	X				X	1350		150	40	50	Chairman
d e Nursing	6 qtr.			X	X	X				X	1350		150	40	25	Chairman
e Nursing	6 qtr.	X		X	X	X				X	1080		240	43	50	Director
e Nursing	6 qtr.					X			X		1100		100	60	45	Coordinator
e Nursing	6 qtr.		X	X		X						165	150-200		50	L. A. Marquette Admissions Officer
on e Nursing	6 qtr.		X	X		X				X	850	10	100	300	30	Larry Cannon Director, Admissions & Records

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Total Pr (in dol	
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees
OHIO—Continued													
University of Cincinnati, Raymond Walters Branch Cincinnati, Ohio 45236	Dorothy A. Oechsler Director Associate Degree Nursing Program	6 qtr.		X	X		X				X	1300	
Youngstown State University 410 Wick Ave. Youngstown, Ohio 44503	Gilda M. De Capita Chairman Department of Nursing	6 qtr.	X	X	X		X			X		1140	15
OKLAHOMA													
Bacone College Bacone, Okla. 74420	Sr. Mary C. Schaan Chairman Department of Nursing	4 sem. 1 s.s.	X		X	X				X		1200	45
Cameron State College 2801 C Ave. Lawton, Okla. 73501	Delores E. Kruger Chairman Department of Nursing	4 sem.			X	X	X			X		1100	
Murray State College Tishomingo, Okla. 73460	Chairman Department of Nursing	4 sem. 1 s.s.			X	X	X			X		566	42
Northern Oklahoma College 1220 E. Grand Tonkawa, Okla. 74653	Thomas Lee Harned Director Associate Degree Nursing Program	4 sem.			X	X	X			X		527	
Oklahoma State University Technical Institute 1900 N.W. 25th St. Oklahoma City, Okla. 73106	Head Department of Nurse Science	4 sem.	X		X		X				X	828	
OREGON													
Chemeketa Community College 4389 N.E. Satter Dr. Salem, Oreg. 97303	Mary Duby Coordinator Associate Degree Nursing Program	6 qtr.	X	X	X	X	X				X	1000	10
Lane Community College 4000 E. 30th Eugene, Oreg. 97405	Mary Fiorentino Director Associate Degree Nursing Program	6 qtr.	X	X	X	X	X				X	80	
Portland Community College 12000 S.W. 49th Ave. Portland, Oreg. 97219	Rose Christensen Chairman Nursing Department	6 qtr.	X	X	X	X	X			X		510	12
Southern Oregon College 1250 Siskiyou Blvd. Ashland, Oreg. 97520	Betty M. Haugen Chairman Department of Nursing	6 qtr. 1 s.s.	X	X	X	X	X			X		1050	20
PENNSYLVANIA													
Bucks County Community College Newton, Pa. 18940	Elizabeth V. Winpenny Chairman Associate Degree Nursing Program	4 sem.			X	X	X				X	175	35
Clarion State College, Venango Campus 1801 W. First St. Oil City, Pa. 16301	Kenneth E. Triplett Director Associate Degree Nursing Program	4 sem.	X		X	X	X		X				420
Community College of Allegheny County, Allegheny Campus 808 Ridge Ave. Pittsburgh, Pa. 15212	Barbara Asche Chairman Associate Degree Nursing Program	4 sem.	X		X	X	X				X	170	15
Community College of Philadelphia 34 S. 11th St. Philadelphia, Pa. 19146	Joelle G. Pyano Head Nursing Curriculum	4 sem.			X		X				X	400	24
Delaware County Community College Baltimore Pike & Thornton Rd. Media, Pa. 19063	Virginia J. Harris Chairman Associate Degree Nursing Program	4 sem.	X				X				X	202	

	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms		
	6 qtr.		X	X		X				X	1300		200	55	50	Director of Admissions
g	6 qtr.	X	X	X		X			X		1140	15	200	70	150	William Livosky Director of Admissions
	4 sem. 1 s.s.	X		X	X				X		1200	45	130	50	30	Chairman
	4 sem.			X	X	X			X		1100		250	70	45	Raymond E. Chapman Director of Admissions & Records
	4 sem. 1 s.s.			X	X	X			X		566	42	250	100	38	Chairman
g	4 sem.			X	X	X			X		527		200	50	50	Director
ence	4 sem.	X		X		X				X	828		250	75	36	Head
g	6 qtr.	X	X	X	X	X				X	1000	10	123	28	48	George Ruby
g	6 qtr.	X	X	X	X	X				X	80			55	60	Registrar
	6 qtr.	X	X	X	X	X			X		510	12	150	50	80	Allen Widestrom Registrar
	6 qtr. 1 s.s.	X	X	X	X	X			X		1050	20	125	51	44	Chairman
g	4 sem.			X	X	X				X	175	35	110	55	80	Joseph Heard Admissions Officer
g	4 sem.	X		X	X	X		X				420	250	42	30	Walter L. Hart Director of Admissions
g	4 sem.	X		X	X	X				X	170	15	100	21	90	Horace Belmear Admissions Director
	4 sem.			X		X				X	400	24	125	50	100	Office of Admissions
g	4 sem.	X				X				X	202		50	60	60	Thomas Needham Registrar

3385

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	Estimated Total (in Tuition	Fees
PENNSYLVANIA—Continued													
Gwynedd-Mercy College Gwynedd Valley, Pa. 19437	Sr. M. Barbara Chairman Associate Degree Nursing Program	4 sem.	X		X	X	X			X		1500	
Harrisburg Area Community College 3300 Cameron Street Rd. Harrisburg, Pa. 17110	Charmaine A. Bentz Director Nursing Program	4 sem.	X	X	X	X	X				X	165	
Montgomery County Community College 612 Fayette St. Conshohocken, Pa. 19428	Betty Jane Reisner Coordinator Associate Degree Nursing Program	4 sem.	X			X	X				X	350	6
Mount Aloysius Junior College William Penn Hwy. Cresson, Pa. 16630	Sr. M. Michaelann Sell Chairman Department of Nursing	4 sem.			X					X		600	
Northampton County Area Community College 3835 Green Pond Rd. Bethlehem, Pa. 18017	Marion L. Gorham Director Nursing Program	4 sem.	X	X	X	X	X				X	660	2
PUERTO RICO													
Puerto Rico Junior College P.O. Box AE Rio Piedras, P.R. 00928	Aida Maria Declet Director Associate Degree Nursing Program	4 sem. 1 s.s.								X		475	4
University of Puerto Rico Mayaguez, P.R. 00708	Josefina Torres Director Department of Nursing	4 sem. 2 s.s.	X		X		X			X		400	10
University of Puerto Rico, Arecibo Regional College G.P.O. Box 1806 Arecibo, P.R. 00612	Carmen Archilla de Garcia Chairman Associate Degree Nursing Program	4 sem.	X		X	X	X				X	207	15
University of Puerto Rico, Humacao Regional College Humacao, P.R. 00661	Cruz R. Matlock Director Associate Degree Nursing Program	4 sem.			X	X	X				X	260	10
RHODE ISLAND													
Rhode Island Junior College 199 Promenade St. Providence, R.I. 02908	Catherine McGoldrick Dean Division of Nursing	4 sem. 1 s.s.	X	X							X	450	4
SOUTH CAROLINA													
Baptist College at Charleston P.O. Box 10087 Charleston, S.C. 29411	Harriet Robinson Acting Director Associate Degree Nursing Program	4 sem. 1 s.s.		X	X		X			X		600	20
Clemson University, School of Nursing 717 Strode Twr. Clemson, S.C. 29631	Leon Roswal Director Associate Degree Nursing Program	4 sem.	X	X	X	X				X		300	91
Lander College Stanley Ave. Greenwood, S.C. 29646	Madge H. Longley Chairman Division of Nursing Science	4 sem. 2 s.s.		X	X					X		1400	
University of South Carolina, Coastal Carolina Regional Campus Conway, S.C. 29526	Doris M. Cole Coordinator Associate Degree Nursing Program	4 sem. 1 s.s.	X		X	X					X		55
University of South Carolina, College of General Studies Columbia, S.C. 29208	Donna Moss Coordinator Associate Degree Program in Technical Nursing	4 sem.	X	X	X	X	X			X		1040	
University of South Carolina, Francis Marion College Marion Hwy. Florence, S.C. 29501	Jane T. Spivey Chairman Associate Degree Nursing Program	4 sem. 1 s.s.			X	X	X				X*	200	

* Limited.

Nursing and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms		
Nursing	4 sem.	X		X	X	X			X		1500		50	50	96	Director of Admissions
ntz	4 sem.	X	X	X	X	X				X	165	10		27	100	Director of Admissions
er Nursing	4 sem.	X			X	X				X	350	60	100	75	30	Verl DeCamp Director of Admissions
n Sell ursing	4 sem.			X					X		600		150	50	44	Director of Admissions
m	4 sem.	X	X	X	X	X				X	660	20	200	40	44	Director of Admissions
t Nursing	4 sem. 1 s.s.								X		475	40	50	30	88	Director
ursing	4 sem. 2 s.s.	X		X		X			X		400	105	50	45	120	Director
de Garcia Nursing	4 sem.	X		X	X	X				X	207	150	150	52	80	Juana Mata de Nieves Registrar
Nursing	4 sem.			X	X	X				X	260	100	100	75	60	Maria C. Pena Admissions Officer
drick ng	4 sem. 1 s.s.	X	X							X	450	40	200	38	150	Dean Division of Nursing
Nursing	4 sem. 1 s.s.		X	X		X			X		600	200	80	71	35	Office of Admissions
Nursing	4 sem.	X	X	X	X				X		300	910	125	50	30	Office of Admissions & Registration
y ng Science	4 sem. 2 s.s.		X	X					X		1400		200	60	30	Joyce B. Rush Director of Admissions
Nursing	4 sem. 1 s.s.	X		X	X					X		550	100	50	25	Gene Anderson Admissions Officer
Program in sing	4 sem.	X	X	X	X	X			X		1040		115	54	100	Rollin E. Godfrey Dean of Admissions
Nursing	4 sem. 1 s.s.			X	X	X				X*	200		180	42	50	Marvin Lynch Director of Admissions

* Limited.

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Cost Total Program (in dollars): Tuition	(8) Fees	(8) Books
SOUTH CAROLINA—Continued														
University of South Carolina, Spartanburg Regional Campus, Spartanburg, S.C. 29303	Helen Biehl, Coordinator, Associate Degree Program in Technical Nursing	4 sem. 1 s.s.			X		X			X		580		200
SOUTH DAKOTA														
Presentation College, 1500 North Main, Aberdeen, S. Dak. 57401	Sr. M. Bonaventure Hoffman, Chairman, Associate Degree Nursing Program	4 sem. 1 s.s.			X	X				X		1150	200	125
University of South Dakota, Vermillion, S. Dak. 57069	Ben T. Suga, Director, School of Nursing	4 sem. 1 s.s.		X	X					X			100	150
TENNESSEE														
Austin Peay State University, College St., Clarksville, Tenn. 37040	Mary G. Windham, Director, Associate Degree Nursing Program	7 qtr.			X	X	X			X		450	560	51
Cleveland State Community College, Cleveland, Tenn. 37311	Alleyna M. Ellis, Head, Department of Nursing	7 qtr. 1 s.s.		X	X		X				X		350	175
Columbia State Community College, Columbia, Tenn. 38401	Dorothy J. Powell, Director, Department of Nursing	7 qtr.	X	X	X	X	X				X	385	59	350
East Tennessee State University, c/o Bristol Memorial Hospital, Bristol, Tenn. 37620	Eleanor H. Lowry, Chairman, Associate Degree Nursing Program	7 qtr.					X			X		595	13	50
Memphis State University, Memphis, Tenn. 38111	Lois Hollomon, Chairman, Department of Nursing	2 sem. 1 s.s.	X	X	X		X			X		690		200
Middle Tennessee State University, Murfreesboro, Tenn. 37130	Betty B. McComas, Chairman, Department of Nursing	4 sem. 1 s.s.		X	X		X			X		1200	56	250
Southern Missionary College, Collegedale, Tenn. 37315	Del LaVerne Watson, Chairman, Associate Degree Nursing Program	4 sem. 1 s.s.		X	X	X	X			X		3100	170	210
Tennessee State University, 3500 Centennial Blvd., Nashville, Tenn. 37203	Dorothy Coley Edmond, Director, Associate Degree Nursing Program	6 qtr. 4 s.s.			X	X	X			X		160	9	50
Union University, Jackson, Tenn. 38301	Isabel H. Neely, Chairman, Department of Nursing	4 sem. 2 4-wk. winter terms or 2 academic years	X	X	X	X	X			X		2500	200	200
University of Tennessee at Martin, Martin, Tenn. 38237	Judith H. Wakim, Director, Department of Nursing	7 qtr.	X		X		X			X			735	200
University of Tennessee at Nashville, 323 McLemore, Nashville, Tenn. 37203	Dorothy C. Laux, Chairman, Associate Degree Nursing Program	7 qtr.					X				X	735	150	200
TEXAS														
Alvin Junior College, Alvin, Tex. 77511	Florence J. Murphy, Director, Department of Nursing	4 sem. 1 s.s.	X	X	X	X	X				X			
Amarillo College, Box 447, Amarillo, Tex. 79105	Nancy Tingley, Director, Associate Degree Nursing Program	4 sem. 2 s.s.	X		X	X	X				X	366		15

(2)	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
d of Nursing am and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
Degree Program in al Nursing	4 sem. 1 s.s.			X		X			X		580		200	40	70	Paul Mack Director of Admissions
venture Hoffman Degree Nursing	4 sem. 1 s.s.			X	X				X		1150	200	125	40	75	Ronald Ochs Director of Admissions & Special Services
a Nursing	4 sem. 1 s.s.		X	X					X			100	150	45	50	Director
ndham Degree Nursing	7 qtr.			X	X	X			X		450	560	51	80	30	Glenn S. Gentry Dean of Admissions & Registrar
Ellis t of Nursing	7 qtr. 1 s.s.		X	X		X				X		350	175	40	35	Head
Powell t of Nursing	7 qtr.	X	X	X	X	X				X	385	59	350	65	60	Director
Lowry Degree Nursing	7 qtr.					X			X		595	13	50	62	100	Chairman
non t of Nursing	2 sem. 1 s.s.	X	X	X		X			X		690		200	100	120	Chairman
cComas t of Nursing	4 sem. 1 s.s.		X	X		X			X		1200	56	250	65	55	Chairman
e Watson Degree Nursing	4 sem. 1 s.s.		X	X	X	X			X		3100	170	210	35	80	A. Kutzner Director of Admissions & Records
ley Edmond Degree Nursing	6 qtr. 4 s.s.			X	X	X			X		160	9	50	28	100	Carl Crutchfield Dean, Admissions & Records
Neely t of Nursing	4 sem. 2 4-wk. winter terms or 2 academic years	X	X	X	X	X			X		2500	200	200	30	75	Milburn Blanton Director of Admissions
Wakim t of Nursing	7 qtr.	X		X		X			X			735	200	42	60	Henry Allison Director of Admissions
Laux Degree Nursing	7 qtr.					X				X	735	150	200	57	125	Melvin Welch
Murphy t of Nursing	4 sem. 1 s.s.	X	X	X	X	X				X					184	Director
gley Degree Nursing	4 sem. 2 s.s.	X		X	X	X				X	366		150	53	70	Director

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			Estima Tota (in	
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees
TEXAS—Continued													
Angelina College P.O. Box 1768 Lufkin, Tex. 76901	Opal A. Stewart Director Division of Nursing	4 sem. 2 s.s.	X	X	X		X				X	350	3
Angelo State University 2601 West Ave., N. San Angelo, Tex. 76901	Elizabeth C. Jones Director Associate Degree Nursing Program	4 sem. 2 s.s.	X	X	X	X	X				X	250	27
Central Texas College Hwy. 190, W. Killeen, Tex. 76541	Joann Schoen Director Associate Degree Nursing Program	4 sem. 2 s.s.	X	X	X		X			X		450	
Del Mar College Baldwin & Ayers Sts. Corpus Christi, Tex. 78404	Elizabeth G. Willis Chairman Department of Registered Nurse Education	4 sem. 2 s.s.	X	X	X	X	X			X		300	13
El Centro College Main & Lamar Sts. Dallas, Tex. 75202	Gail Watson Chairman Division of Associate Degree Nursing	4 sem. 2 s.s.			X	X	X				X	320	6
Galveston College 4015 Ave. Q Galveston, Tex. 77550	Ruth Bender Chairman Associate Degree Nursing Program	4 sem. 2 s.s.	X	X	X	X	X				X	400	32
Grayson County College P.O. Drawer 979 Denison, Tex. 75020	Mary Hardy Director Associate Degree Nursing Program	6 sem.			X		X			X		250	4
Kilgore College 1100 Broadway Kilgore, Tex. 75662	Rebecca Lohf Chairman Department of Nursing	4 sem. 2 s.s.	X	X	X	X	X			X		401	3
Laredo Junior College P.O. Box 738 Laredo, Tex. 78040	Eileen Cook Director Nursing Education	4 sem. 2 s.s.		X	X	X	X				X	600	7
McLennan Community College 1400 College Dr. Waco, Tex. 76708	Sara Moore Chairman Department of Nursing	4 sem. 2 s.s.	X	X	X	X	X				X	360	15
Midwestern University 3400 Taft Blvd. Wichita Falls, Tex. 76308	Samuel T. Hughes, Jr. Chairman Department of Nursing	4 sem. 2 s.s.			X	X	X			X		438	32
Odessa College P.O. Box 3752 Odessa, Tex. 79760	Lucile McCoy Director Associate Degree Nursing Program	4 sem. 3 s.s.	X	X	X	X	X			X		528	20
Pan American College Edinburg, Tex. 78539	Lillian W. Jones Head Associate Degree Nursing Program	4 sem. 2 s.s.	X	X	X		X			X	X	150	2
Paris Junior College Paris, Tex. 75460	Helen Whitworth Acting Director Associate Degree Nursing Program	4 sem. 2 s.s.	X		X		X			X		300	7
San Antonio College 1200 San Pedro San Antonio, Tex. 78212	Jean C. Lawrence Chairman Department of Nursing	4 sem. 4 s.s.	X		X	X	X			X		444	2
San Jacinto College 8060 Spencer Hwy. Pasadena, Tex. 77505	Elaine Cominsky Director Department of Nursing Education	4 sem. 4 s.s.	X	X	X		X				X	800	20
Tarrant County Junior College 5301 Campus Dr. Fort Worth, Tex. 76119	Ruth Burkhart Chairman Associate Degree Nursing Program	4 sem.			X		X				X		
Texarkana College 1024 Tucker St. Texarkana, Tex. 75501	Rachel Hartsock Director William Buchanan Depart-ment of Nursing	4 sem. 2 s.s.	X	X			X			X		100	1

3390

(2)	(3)	(4)		(5)		(6)		(7)			(8)				(9)	(10)
	Usual Length of Program	Advanced Placement Possible		Part-Time Study Possible		Evening Division Classes Possible		Living Arrangements			Estimated Costs for Total Program (in dollars)					
d of Nursing am and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
wart Nursing	4 sem. 2 s.s.	X	X	X		X				X	350	35	250	70	45	Director
Jones egree Nursing	4 sem. 2 s.s.	X	X	X	X	X				X	250	270	150	80	100	Director
en egree Nursing n	4 sem. 2 s.s.	X	X	X		X			X		450		350	100	80	John W. Moffitt Director of Student Affairs
Willis of Registered ucation	4 sem. 2 s.s.	X	X	X	X	X			X		300	125	150	67	75	Chairman
n Associate ursing	4 sem. 2 s.s.			X	X	X				X	320	60	250	40	150	John Williamson Registrar
er egree Nursing	4 sem. 2 s.s.	X	X	X	X	X				X	400	325	210	75	100	Registrar
y egree Nursing	6 sem.			X		X			X		250	40	200	85	60	Director
hf of Nursing	4 sem. 2 s.s.	X	X	X	X	X			X		401	35	270	60	36	Chairman
k ucation	4 sem. 2 s.s.		X	X	X	X				X	600	71	235	75	40	Director
of Nursing	4 sem. 2 s.s.	X	X	X	X	X				X	360	150	200	60	60	Chairman
ughes, Jr. of Nursing	4 sem. 2 s.s.			X	X	X			X		438	325	300	56	80	Registrar
oy egree Nursing	4 sem. 3 s.s.	X	X	X	X	X			X		528	200	90	50	50	Director
ones egree Nursing	4 sem. 2 s.s.	X	X	X		X			X	X	150	22	50	50	50	John W. Hook Registrar
worth ector egree Nursing	4 sem. 2 s.s.	X		X		X			X		300	75	100	100	39	Registrar
wrence of Nursing	4 sem. 4 s.s.	X		X	X	X			X		444	25	60	50	80	Chairman
nsky of Nursing n	4 sem. 4 s.s.	X	X	X		X				X	800	200	350	80	100	Director
hart egree Nursing	4 sem.			X		X				X				30	60	Chairman
rsock chanan Depart- Nursing	4 sem. 2 s.s.	X	X			X			X		100	10	45	45	60	Director

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program (Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions)	(4) Advanced Placement Possible: In general education	(4) Advanced Placement Possible: In nursing	(5) Part-Time Study Possible: In general education	(5) Part-Time Study Possible: In nursing	(6) Evening Division Classes Possible: In general education	(6) Evening Division Classes Possible: In nursing	(7) Living Arrangements: Dormitory residence required	(7) Living Arrangements: Available through college	(7) Living Arrangements: Individual arrangements only	(8) Estimated Costs Total Program (in dollars): Tuition	(8) Fees	(8) Books
UTAH														
Brigham Young University 399 12th Ave. Salt Lake City, Utah 84103	Marian Jensen Director Associate Degree Nursing Program	4 sem. 1 s.s.					X				X	300		115
Weber State College 3750 Harrison Blvd. Ogden, Utah 84403	Leola Davidson Chairman Associate Degree Nursing Program	7 qtr. 1 s.s. * For freshmen.	X	X	X		X		X*	X		80	45	265
VERMONT														
Castleton State College Castleton, Vt. 05735	Fanny A. Hager Director Associate Degree Nursing Program	4 sem. 1 s.s.	X		X					X		460	155	100
University of Vermont, Division of Health Sciences Waterman Bldg. Burlington, Vt. 05401	Virginia O. Allen Chairman Department of Technical Nursing	4 sem. 1 s.s.	X							X		2020	160	300
Vermont College Montpelier, Vt. 05602 (Women only)	Ruby C. Carr Chairman Associate Degree Nursing Program	4 sem. * Includes room and board.	X	X						X		3300*	65	75
VIRGIN ISLANDS														
College of the Virgin Islands St. Thomas, V.I. 00801	Laura Yergan Chairman Associate Degree Nursing Program	4 sem.	X				X			X		200	25	250
VIRGINIA														
Germanna Community College Fredericksburg, Va. 22401	Dale M. Featherston Head Associate Degree Nursing Program	7 qtr.	X		X		X				X	420	5	245
John Tyler Community College Chester, Va. 23831	Head Department of Nursing	6 qtr. 1 s.s.	X		X	X	X				X	315		
Marymount College of Virginia 2807 N. Glebe Rd. Arlington, Va. 22207	Nancy M. Goodrich Chairman Associate Degree Nursing Program	4 sem.	X	X						X		1650	150	120
Norfolk State College 2401 Corprew Ave. Norfolk, Va. 23504	Goldie Q. Bradley Chairman Division of Nursing Education	4 sem. 1 s.s.					X				X	1172		
Northern Virginia Community College 8333 Little River Tnpk. Annandale, Va. 22003	Marietta Cohen Head Associate Degree Nursing Program	7 qtr. 1 s.s.	X	X	X	X	X				X	270	25	150
Patrick Henry Community College P.O. Drawer 5311 Martinsville, Va. 24112	Dorsye E. Russell Chairman Associate Degree Nursing Program	6 qtr. 1 s.s.			X	X						.....750....		
Shenandoah College Winchester, Va. 22601	Chairman Nursing Department	4 sem.		X	X					X		700		85
Thomas Nelson Community College Drawer K, Riverdale Sta. Hampton, Va. 23366	Shirley Lee Chairman Department of Nursing	6 qtr. 1 s.s.	X	X	X		X				X	420	13	300
Tidewater Community College, Frederick Campus Portsmouth, Va. 23703	Philip DeLorey Chairman Associate Degree Nursing Program	7 qtr.	X	X	X	X	X	X			X	420		
Wytheville Community College Wytheville, Va. 24382	Louise B. Compton Head Associate Degree Nursing Program	7 qtr.			X		X				X	420		

(2)	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
d of Nursing am and Title	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
nsen Degree Nursing	4 sem. 1 s.s.					X				X	300		115	40	85	Director
rdson Degree Nursing	7 qtr. 1 s.s. * For freshmen.	X	X	X		X		X*	X		80	45	265	65	71	Emil Hansen Director of Admissions
Hager Degree Nursing	4 sem. 1 s.s.	X		X					X		460	155	100	45	35	Dean of Admissions
Allen t of Technical	4 sem. 1 s.s.	X							X		2020	160	300	70	125	Harold C. Collins Director of Admissions
arr Degree Nursing	4 sem. * Includes room and board.	X	X						X		3300*	65	75	35	39	Robert C. Donnelly, Jr. Director of Admissions
gan Degree Nursing	4 sem.	X				X			X		200	25	250	60	35	Mario Watlington Registrar & Admissions Officer
atherston Degree Nursing	7 qtr.	X		X		X				X	420	5	245	20	25	Patricia Herban Coordinator of Admissions
t of Nursing	6 qtr. 1 s.s.	X		X	X	X				X	315			51	40	Office of Admissions
Goodrich Degree Nursing	4 sem.	X	X						X		1650	150	120	50	50	Dean of Admissions
Bradley Nursing n	4 sem. 1 s.s.					X				X	1172				100	James S. Burton Director of Admissions
Cohen Degree Nursing	7 qtr. 1 s.s.	X	X	X	X	X				X	270	25	150	20	77	Edwin Walker Coordinator of Admissions & Records
Russell Degree Nursing	6 qtr. 1 s.s.			X	X						.....750.....				20	Chairman
epartment	4 sem.		X	X					X		700		85	40	36	Alan Peer Director of Admissions
t of Nursing	6 qtr. 1 s.s.	X	X	X		X				X	420	13	300	63	40	Joseph Angiello Coordinator of Admissions & Records
rey Degree Nursing	7 qtr.	X	X	X	X	X	X			X	420				30	J. E. Blair Director of Admissions
Compton Degree Nursing	7 qtr.			X		X				X	420			47	30	Bruce Porter Coordinator of Admissions & Records

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			Estimat Tota (in	
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees
WASHINGTON													
Bellevue Community College 3000 145th Pl., S.E. Bellevue, Wash. 98007	Mary Ann Douglas Chairman Nursing Education	6 qtr.	X		X		X	X			X	498	
Clarke College 1800 E. McLoughlin Blvd. Vancouver, Wash. 98663	Jean E. Hamilton Director Department of Nursing Education	7 qtr.		X	X	X	X				X	575	
Columbia Basin College 2600 N. Chase Pasco, Wash. 99301	Marjorie O'Connell Coordinator Associate Degree Nursing Program	6 qtr. 1 s.s.	X		X		X				X	540	
Everett Community College 801 Wetmore Everett, Wash. 98201	Jeanne M. Irving Chairman Division of Nursing	6 qtr.		X	X	X	X			X		420	
Highline Community College Midway, Wash. 98031	Doris Wolter Chairman Health Occupations	6 qtr.			X	X	X				X	70	
Lower Columbia Community College 1608 Maple St. Longview, Wash. 98632	Evelyn Boyd Coordinator Health Services Education	6 qtr. 1 s.s.			X	X						83	
Olympic College 16th & Chester Bremerton, Wash. 98310	Anne W. Rohweder Coordinator Associate Degree Nursing Program	6 qtr. 1 s.s.	X	X	X		X			X		290	29
Seattle Central Community College 1718 Broadway Seattle, Wash. 98122	Sharon J. Stewart Director Associate Degree Nursing Program	6 qtr.		X	X	X	X	X			X	420	
Shoreline Community College 16101 Gleenwood Ave., N. Seattle, Wash. 98133	Frances H. Zaleski Chairman Associate Degree Nursing Program	6 qtr.	X		X		X				X	420	
Spokane Community College E. 3403 Mission Ave. Spokane, Wash. 99202	Carol J. Walters Director Associate Degree Nursing Program	6 qtr.	X	X	X	X	X					420	
Walla Walla Community College 340 S. Park St. Walla Walla, Wash. 99362	E. Lucille Kelly Director Department of Nursing Education	7 qtr. 1 s.s.			X		X			X		70	
Yakima Valley College 16th & Nob Hill Blvd. Yakima, Wash. 98902	Laurice K. Durrant Director Allied Health Programs	7 qtr.	X	X	X		X			X		595	
WEST VIRGINIA													
Bluefield State College Bluefield, W. Va. 24701	Mary F. Linkenhoker Director Department of Nursing	4 sem. 1 s.s.			X	X	X				X	575	
Fairmont State College Fairmont, W. Va. 26554	Martha Miller Director Department of Nursing	4 sem. 1 s.s.								X		100	3
Marshall University Huntington, W. Va. 25701	Sarah Lee Patram Chairman Department of Nursing Education	4 sem. * For freshmen.	X	X	X	X	X		X*	X		100	4
Morris Harvey College 2300 MacCorkle Ave., S.E. Charleston, W. Va. 25304	Dorothy L. Brooks Head Department of Nursing	4 sem. 1 s.s.			X	X	X			X		1650	20
Parkersburg Community College Rte. 5, Box 167-A Parkersburg, W. Va. 26101	Joyce L. Randall Chairman Department of Nursing Education	4 sem. 1 s.s.	X	X	X		X				X	693	
Salem College Clarksburg, W. Va. 26301	Susan C. Novak Chairman Department of Nursing								Write to Chairman for inf				

Nursing and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9) Maximum Number of Freshman Admissions	(10) For Application Form and/or Catalog, Write to:
	Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms		
las on	6 qtr.	X		X		X	X			X	498	55	175	50	60	Frank Paustain Registrar
n Nursing	7 qtr.		X	X	X	X				X	575	23	300	85	66	Director
ell e Nursing	6 qtr. 1 s.s.	X		X		X				X	540	75	400	40	50	Coordinator
g ing	6 qtr.		X	X	X	X			X		420		220	16	120	Chairman
ions	6 qtr.			X	X	X				X	70		175	28	60	Edward Command Registrar & Admissions Officer
Education	6 qtr. 1 s.s.			X	X						83	5	60	35	35	Admissions
der e Nursing	6 qtr. 1 s.s.	X	X	X		X			X		290	290	200	39	54	Registrar's Office
t e Nursing	6 qtr.		X	X	X	X	X			X	420	13	210	40	30	Patrick H. Martin Coordinator of Admissions
ski e Nursing	6 qtr.	X		X		X				X	420		150	25	100	Chairman
e Nursing	6 qtr.	X	X	X	X	X					420	23	150	40	60	Director of Admissions
Nursing	7 qtr. 1 s.s.			X		X			X		70	20	70	30	35	Charles Cottingham Registrar
ant ograms	7 qtr.	X	X	X		X			X		595	65	140	25	65	Paul Aspevig Registrar
hoker Nursing	4 sem. 1 s.s.			X	X	X				X	575	25	150	50	45	Lillian Shewbridge Director of Admissions
Nursing	4 sem. 1 s.s.								X		100	377	200	50	40	Otis Melam Director of Admissions & Registrar
m Nursing	4 sem. * For freshmen.	X	X	X	X	X		X*	X		100	438	260	54	40	James Harless Director of Admissions
ks Nursing	4 sem. 1 s.s.			X	X	X			X		1650	200	200	60	80	James T. Preston Director of Admissions
l Nursing	4 sem. 1 s.s.	X	X	X		X				X	693	70	200	34	60	Chairman
Nursing								Write to Chairman for information.								

(1) College and Address	(2) Head of Nursing Program and Title	(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)			
		Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrangements only	Tuition	Fees	Books	Uniforms
WEST VIRGINIA—Continued															
Salem College Salem, W. Va. 26426	Ralph Floria Acting Chairman		Write to Mr. Dale Dickens, Admissions Department, for Information.												
West Liberty State College Wheeling, W. Va. 26074	Garnette Thorne Director School of Nursing Education	4 sem. 1 s.s.	X				X			X					
West Virginia Institute of Technology Montgomery, W. Va. 25136	Rena Pitotti Chairman Department of Nursing	4 sem.			X		X			X		487		150	35
WISCONSIN															
Milwaukee Area Technical College 1015 N. Sixth St. Milwaukee, Wis. 53203	Mary Vick Dean Associate Degree Nursing Program	4 sem. 1 s.s.	X		X		X				X	112	69	300	41
North Central Technical Institute 1000 Schofield Ave. Wausau, Wis. 54401	Mildred Bennett Chairman Associate Degree Nursing Program	4 sem. 1 s.s.		X	X	X	X				X		200	180	80
WYOMING															
Casper College 125 College Dr. Casper, Wyo. 82601	Edna C. Pryich Acting Director Associate Degree Nursing Program	5 sem.			X	X	X			X		.....	..675	.....	
Sheridan Junior College Sheridan, Wyo. 82801	Barbara Sene Director Associate Degree Nursing Program	4 sem. 1 s.s.			X	X	X			X		197	51	150	50

(3) Usual Length of Program	(4) Advanced Placement Possible		(5) Part-Time Study Possible		(6) Evening Division Classes Possible		(7) Living Arrangements			(8) Estimated Costs for Total Program (in dollars)				(9)	(10)
Abbreviations: sem.-semesters qtr.-quarters tri.-trimesters s.s.-summer sessions	In general education	In nursing	In general education	In nursing	In general education	In nursing	Dormitory residence required	Available through college	Individual arrange-ments only	Tuition	Fees	Books	Uniforms	Maximum Number of Freshman Admissions	For Application Form and/or Catalog, Write to:
	Write to Mr. Dale Dickens, Admissions Department, for Information.														Dale Dickens Admissions Department
4 sem. 1 s.s.	X				X			X						40	Nelson Cain Registrar
4 sem.			X		X			X		487		150	35	60	Director of Admissions
4 sem. 1 s.s.	X		X		X				X	112	69	300	41	187	Dorothy Hogan Guidance Counselor
4 sem. 1 s.s.		X	X	X	X				X		200	180	80	50	Admissions
5 sem.			X	X	X			X		.....675.....				40	Norman Ball Dean of Records & Admissions
4 sem. 1 s.s.			X	X	X			X		197	51	150	50	30	Bob Clapp Dean of Students

VT 014 266
PORTER, LYMAN W., AND OTHERS
CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD.

CALIFORNIA UNIV., IRVINE. GRADUATE SCHOOL OF ADMINISTRATION.
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IDENTIFIERS - *EXPECTANCY THEORIES

ABSTRACT - THIS STUDY INVESTIGATES THE DEVELOPMENT OF MOTIVATIONAL ATTITUDES FOR A SAMPLE OF APPROXIMATELY 40 NEWLY-HIRED ENGINEERS. THE STUDY UTILIZED AN EXPECTANCY THEORY APPROACH TO OBTAIN QUESTIONNAIRE DATA ON INDIVIDUALS' PERFORMANCE-REWARD EXPECTATIONS AND REWARD VALUES, BEGINNING ON THE FIRST DAY OF EMPLOYMENT AND CONTINUING AT MONTHLY OR LONGER INTERVALS THROUGH THE FIRST 12 MONTHS ON THE JOB. DATA WERE ALSO COLLECTED ON SUPERVISORS' RATINGS OF EMPLOYEES' JOB PERFORMANCE AT SEVERAL POINTS IN TIME. THE RESULTS OBTAINED FROM THE STUDY INDICATED THAT THE VALUES ATTACHED TO REWARDS BY INDIVIDUALS IN THIS SAMPLE REMAINED QUITE CONSTANT THROUGHOUT THE 12-MONTH PERIOD. THERE WAS A SIGNIFICANT DROP ACROSS TIME IN EMPLOYEES' BELIEFS THAT HIGH LEVELS OF PERFORMANCE WILL LEAD TO DESIRED REWARDS, AND THE DATA INDICATED SUCH A DECLINE SET IN RELATIVELY QUICKLY AND CONTINUED MORE OR LESS STEADILY THEREAFTER UNTIL LEVELING OFF TOWARD THE END OF THE FIRST YEAR. THE RELATIONSHIP OF THE VARIOUS ATTITUDE MEASURES TO PERFORMANCE REPRESENTED A COMPLEX PATTERN, BUT IT APPEARED THAT PERFORMANCE-REWARD EXPECTATIONS DID ACCOUNT FOR SOME OF THE VARIANCE IN RATINGS OF PERFORMANCE. (AUTHOR)

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13. ABSTRACT

This study investigates the course of development of motivational attitudes for a sample of approximately 40 newly-hired engineers. The study utilized an expectancy theory approach to obtain questionnaire data on individuals' performance-reward expectations and reward values, beginning on the first day of employment and continuing at monthly or longer intervals through the first 12 months on the job. Data were also collected on supervisors' ratings of employees' job performance at several points in time.

The results obtained from the study indicated that the values attached to rewards--their rated desirability--by individuals in this sample remained quite constant throughout the 12-month period. On the other hand, there was a significant drop across time in employees' beliefs that high levels of performance will lead to desired rewards. Furthermore, the data indicated such a decline set in relatively quickly--even by the end of the first month--and continued more or less steadily thereafter until leveling off toward the end of the first year. The relationship of the various attitude measures to performance represented a complex pattern, but it appeared that performance-reward expectations did account for some of the variance in ratings of performance.

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CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD

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Technical Report 4

INDIVIDUAL-ORGANIZATIONAL LINKAGES

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CONTINUOUS MONITORING OF EMPLOYEES' MOTIVATIONAL ATTITUDES DURING THE INITIAL EMPLOYMENT PERIOD

Lyman W. Porter

John Van Maanen

Frederick C. Yeager

and

William J. Crampon

In recent years, organizational psychologists have focused considerable attention on the bases and correlates of employee motivation. In particular, a major emphasis has been placed on expectancy theory approaches to understanding how motivational attitudes relate to performance (e.g., Galbraith and Cummings, 1967; Hackman and Porter, 1968; Lawler, 1968; Lawler and Porter, 1967; Porter and Lawler, 1968; and Vroom, 1964).

Most of the research stimulated by expectancy theory has been characterized by cross-sectional rather than longitudinal designs. That is, both expectancy attitude data and data on performance have been collected at one particular point in time and then correlated to obtain estimates of the relationship between the two classes of variables. An exception to this design is the study of Lawler (1968) in which both expectancies and performance were measured at two different times, a year apart. In any event, however, there has been virtually no research concerning the <u>development</u> of motivational attitudes on the part of employees during the early, presumably critical months of employment in a new organization (i.e., an organization that is new to the just-hired employee). Moreover, studies seldom have presented data concerning the course of development

of employees' expectations concerning whether rewards are based on effort and performance. What is needed, therefore, is information concerning the nature and level of performance-reward expectations that employees bring to a job situation, the changes that occur in these expectations during the early phases of employment, and relationships of these early motivational attitudes toward later job performance.

The present study was designed as an exploratory investigation to develop procedures that could be used in this type of research, as well as to provide some empirical data on the questions outlined above. The particular sample of respondents participating in this study--recently-hired engineers in a manufacturing organization--was chosen for the initial study because of the cooperation of the organization, its concern about the motivation of the employees to be studied, and the assumed cooperation and ability of the respondents to handle the types of questions contained on the attitude measuring instruments.

The chief focus of the present study is on the continuous monitoring of motivational attitudes beginning on the very first day of employment and continuing through the first twelve months on the job. A secondary purpose was to measure the predictive power of the motivational attitudes for forecasting later job performance.

Method

Sample

The data for this study were collected from a sample of 54 recently hired employees of a large manufacturing firm employing over 10,000 people. All individuals were hired for technical, engineering-type jobs and thus had previously undertaken relevant formal education. Seven of the 54 had

advanced degrees, the remainder held bachelor degrees. Thirty-eight had majored in engineering, and the other 16 in related technical areas. All were males, with a median age of 23, and for all but two of the individuals this was the first major full-time work experience following completion of college graduation.

Subject cooperation was secured by means of an introductory interview conducted with each newly-recruited technical employee that was hired during June and July of 1968. While the interviews were conducted by a member of the research staff, they were coordinated by the participating organization and were integrated into the series of steps comprising the pre-employment induction process. The interviewer, however, was introduced as a University employee and care was taken to make clear that the interviewer was not a part of the employing organization. All contacts were established after an individual had been hired but before he had officially begun work.

Utilizing a standardized format, the interviewer explained to the new hire that the study was being conducted independently of his organization and that all responses would be kept in the strictest confidence by the research staff. Emphasis was placed upon the voluntary nature of participation in the research project. Potential subjects were told that the nature of the research was simply to examine "how people feel about their jobs." Following an explanation of the longitudinal nature of the research design (i.e., that questionnaire packets--not otherwise specified--would be sent to them at several intervals over the next several months), each potential respondent was asked if he would be willing to participate. If the employee agreed to participate, he was given his first questionnaire

packet and instructed to complete the questionnaires and return them via mail to the research office at the University in a pre-addressed, stamped envelope. In all, 66 of the 74 individuals interviewed agreed to participate. Of these, 54 actually returned the first set of questionnaires.

The remaining administrations were conducted solely by mail. Each subject received his questionnaire packet at his home residence with instructions to complete the questionnaires and return the packet by mail to the University "as soon as possible." The packets generally were returned promptly. In the case of delayed responses, a member of the research staff contacted the subject by telephone and reminded him about the questionnaires.

In a longitudinal-type investigation such as this, it would be expected that some attrition in the number of respondents participating in the study would occur, and this did happen. One reason was due to employee terminations; after twelve months, 10 of the original 54 subjects had left the company. The other reason for attrition was due to failure to return questionnaire packets at a given administration; thus, the response rate (percent of those still with the company who returned their questionnaire packets) at different administrations varied from a high of 85% to a low of 77%.

Attitude Measures

Work attitude data were obtained by means of a two-part questionnaire designed to measure respondents' perceptions of the likelihood of effort or performance leading to each of 29 job related outcomes, and the values or attractiveness placed on these outcomes by the respondents. Seven of the 29 outcomes were assumed by the investigators to be outcomes that the

sample members would not like to receive (negative outcomes), and the remaining 22 outcomes were assumed to be ones that the sample members would like to receive (positive outcomes). This provided for a measurement of the likelihood of performance or effort leading to both positive and negative job-related outcomes.

The set of 29 outcomes was also constructed so that it would be representative of outcomes provided to the members of the sample by four major sources--the organization, the individual's immediate supervisor, the individual's fellow workers, and the individual himself. Eight of the 29 outcomes represented outcomes considered to be provided by the organization, seven represented outcomes provided by the supervisor, six were provided by the fellow workers, and the remaining eight were provided by the individual himself (intrinsic rewards). This a priori classification allowed for the analysis of the data in terms of attitudes associated with different sources of job-related outcomes. The instrument itself was patterned somewhat along the lines of the instrument used in the Hackman and Porter study (1968) and contained two parts:

Part I (Expectancy Beliefs). The first part of the questionnaire was designed to measure the respondent's beliefs (or expectancies) concerning the degree to which job performance was a means of achieving each of the 29 possible job-related outcomes. The questions in Part I were phrased in two different forms, half of the Ss receiving one version, and the remaining Ss the other version. This was done in order to compare possible differences between beliefs about effort versus beliefs about performance as means to the attainment of outcomes. One version asked the respondent about the relationship of "working especially hard"

(i.e., "effort") on his job and receiving each of the 29 possible outcomes. The other form asked about the relationship between "performing especially well" (i.e., "performance"), and receiving each of the outcomes. The list of outcomes was identical in both versions of the questionnaire.

For each of the 29 items, the Ss were asked to indicate on a seven-point scale the likelihood of one of the types of job behavior (working especially hard, or performing especially well) leading to an outcome. Examples of questions in Part I are as follows:

Form 1 (Effort)

If a person works especially hard on your job, he is more likely to receive compliments, recognition, and praise from his superior, than if he does not work especially hard.

Not at all true			Moderately true			Very true
1	2	3	4	5	6	7

Form 2 (Performance)

If a person performs especially well on your job, he is more likely to receive compliments, recognition, and praise from his superior, than if he does not perform especially well.

Not at all true			Moderately true			Very true
1	2	3	4	5	6	7

The scoring of the expectancy belief portion of the questionnaire was based on a scale ranging from Ø ("Not at all true") to 6 ("Very true") instead of the 1 to 7 scale used in the instrument itself. This converted scoring scale was used in order to provide a more appropriate interpretation of a "Not at all true" response that would be consistent with expectancy theory.

Part II (Value of Outcomes). The second part of the questionnaire was identical for both versions, and dealt with the values the individual respondents placed on each of 29 job-related outcomes.

Respondents were asked to rate each of the 29 consequences on a seven-point Likert-type scale ranging from "dislike very much" to "like very much." An example of a question from Part II of the questionnaire is:

Receiving compliments, recognition, and praise from your superior.

Dislike very much			Neither dislike nor like			Like very much
-3	-2	-1	0	1	2	3

This part of the questionnaire was scored in the same form as the scale on the questionnaire ranging from -3 ("Dislike very much") to +3 ("Like very much").

Motivational Force. In accordance with the general notion of expectancy theory, it is possible to obtain a summary estimate of motivational force by combining multiplicatively beliefs (expectancies) and values (valences) across the total number of outcomes. Thus:

$$F = \frac{\sum_{i=i}^{m} E_i \times V_i}{m}$$

where F = Average motivational force

E_i = Expectancies that effect or performance leads to the ith outcome

V_i = Value of the ith outcome

m = Total number of outcomes

For the questionnaire used in this study, an overall measure of motivational force was calculated by summing the belief strength times the value of the

corresponding outcome across the 29 outcomes and dividing by 29. The possible range of the motivational force score was from 18 (a response of "Very true" on all 29 questions in Part I and a response of "Like very much" on all 29 questions in Part II) to -18 (a response of "Very true" on all 29 questions in Part I and a response of "Dislike very much" on all 29 questions in Part II). This mean value is interpreted to indicate the degree to which an individual wants to work hard or perform well.

Data Analysis. In order to analyze respondents' beliefs about performance or effort leading to outcomes that were positively valued separately from those leading to negatively valued outcomes, the questions in Part I were divided into two groups based on the average sample response to the respective questions in Part II. This procedure indicated that twenty-two of the items related to expectancies about performance or effort leading to outcomes that the sample positively valued (an average sample response greater than zero on the respective questions in Part II); the remaining seven items related to expectancies about performance or effort leading to outcomes that the sample negatively valued (an average sample response of less than zero on the corresponding questions in Part II). This breakdown was consistent with the intended design of the instrument. The seven negative outcomes were the same in both the *a priori* and the empirical classification systems. This classification allows for the analysis of changes in expectancies about positive outcomes versus those for negative outcomes, and the relationship between these two sets of variables and other variables.

Analogous procedures were carried out with respect to outcomes. The responses dealing with the value or attractiveness of outcomes were divided

into two groups based on whether respondents saw them relatively highly related to performance or relatively unrelated to performance. This analysis indicated that 18 of the 29 outcomes on Part II related to outcomes that the sample had relatively high expectancies about performance or effort leading to their attainment (an average sample response of three or greater on the respective questions in Part I); the remaining eleven questions related to outcomes that the respondents had relatively low expectancies about performance or effort leading to their attainment (an average sample response of less than three on the corresponding questions in Part I).

The analysis of the motivational force scores involved the calculation of the average motivational force across all 29 items, and the calculation of separate force scores for each of the four "sources" of outcomes: organization, supervisor, fellow workers, and self.

Measures of Effort and Performance

Measures of the respondent's effort and performance were obtained by asking each respondent's immediate supervisor to rate him on each of the two aspects of work behavior. The rating format utilized an eight-point scale in a format similar to regular supervisory assessments ordinarily used by the company. The two rating questions were formulated as follows (and preceded by appropriate instructions):

1. The individual's OVERALL PERFORMANCE:

Performance does not meet minimum requirements	Performance needs some improvement	Performance meets expectations	Performance exceeds expectations	Performance outstanding
☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

2. The AMOUNT OF EFFORT the individual has put forth, regardless of how good his performance has been. In other words, how hard has the individual tried to perform well in his job?

Effort does not meet minimum requirements	Effort needs some improvement	Effort meets expectations	Effort exceeds expectations	Effort outstanding
/_/	/_/ /_/	/_/ /_/	/_/ /_/	/_/

Repeated Measurements

As indicated previously, a key feature of this study was the fact that attitudes were continuously monitored during the respondents' first year on the job in order to assess changes over this time period. Thus, members of the sample filled out questionnaires at eight different times during the first year: the first questionnaire was administered on the day the individual arrived to begin work with the company--in almost all cases, it was the day preceding his first full work day on the job--and the six subsequent questionnaires were completed at the end of each of the first six months on the job; the final questionnaire was administered at the end of the first year.

Effort and performance ratings were obtained twice, once at the end of the respondent's first four months on the job and then again at the end of his first year.

Results

Comparison of "Effort" and "Performance" Beliefs

As previously mentioned, one-half (randomly assigned) of the respondents received a form of the questionnaire in which Part I belief items concerned the likelihood of high levels of effort leading to outcomes,

while the other half of the respondents answered items concerning the likelihood of high levels of performance leading to the outcomes. Despite what might be predicted from a theoretical position (Porter and Lawler, 1968) that assumes outcomes to be more closely related to performance than to effort, a comparison of the results with the two forms of Part I indicated that Ss believed that effort and performance were about equally closely connected to rewards. Differences between mean expectancy scores for the two forms were not significant (as measured by t-tests) for any time period. Furthermore, correlations between expectancies and ratings of performance showed no significant differences between the two forms of Part I in their ability to predict subsequent performance. Since the number of respondents in each subgroup receiving one of the versions of Part I were relatively small, and since neither mean difference nor differences in correlations with performance ratings were found between the two forms, the two Part I subgroups will be combined for purposes of further data analyses to be reported in this article. Thus, Part I means will be reported as if there were a single version of the "belief" items, and the term "performance expectancies" will refer to both effort and performance beliefs.

Belief and Value Changes Across Time

This section of the results is divided into two major sub-parts: the first deals with the means for the various attitude measures--beliefs about positive and negative outcomes, outcome values relating to high and low expectancies, and total motivational force. The second sub-part looks at the changes in motivational force in terms of the four sources of outcomes--immediate supervisor, organization, fellow workers, and self. (Appendix I provides a summary of the data presented in this section.)

Means for the Attitude Measures. The belief scores for each time period represent the mean response given to the 22 questions relating to positive outcomes and the seven questions relating to negative outcomes. The two measures thus indicate the average level of expectancy that performance leads to the various positive outcomes (i.e., rewards), and the average level of expectancy that performance leads to the various negative outcomes. Figure 1 illustrates a significant decrease ($t = 2.95$, $p < .05$) in the mean belief scores relating to positive outcomes from 3.93 for the first day on the job to 3.44 at the end of the first year. This decrease implies that over time the members of the sample decreased their beliefs that high performance on the job would lead to desirable outcomes.

Insert Figure 1 About Here

Figure 1 also illustrates a significant increase in the mean belief scores relating to negative outcomes from 1.70 on the first day of work to 2.17 at the end of the first year. This increase implies that over time the members of the sample increased their beliefs that good performance on the job would lead to undesirable outcomes.

It is important to note that the mean belief scores relating to positive outcomes were significantly higher than the mean belief scores relating to negative outcomes at all time periods. This implies that throughout the first year of work the members of the sample continually saw a higher likelihood of performance leading to desirable outcomes than of performance leading to undesirable outcomes.

The mean values placed on outcomes relating to high and low expectancies are illustrated in Figure 2. As can be seen there is virtually no change

in the mean values placed on rewards associated with high expectancies between the first day on the job and the end of the first year.

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Insert Figure 2 About Here

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The mean values placed on outcomes associated with low expectancies showed an increase during the first month and then leveled out for the remaining portion of the first year of work. These results for values of outcomes imply that the attractiveness of both expected and less expected outcomes remained relatively constant over time.

As previously described, through combining respondents' beliefs that their performance will lead to the various outcomes and the value placed on these outcomes, we can obtain a measurement of motivational force. A high score is assumed to indicate a strong desire on the part of the

- - - - - - - - - - - - - - -

Insert Figure 3 About Here

- - - - - - - - - - - - - - -

individual to perform well so that valued outcomes can be obtained. As can be seen in Figure 3, the motivational force value for the sample decreased significantly from 5.65 for the first day to 4.60 at the end of the first year. This was due primarily to the change in the strength of beliefs that job performance or effort would lead to outcomes rather than a change in the desirability of the outcomes.

By Sources of Outcomes. By examining motivational force in terms of the four sources of outcomes--organization, immediate supervisor, fellow workers, and self--it is possible to isolate some of the factors that lead to the changes discussed above.

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Insert Figure 4 About Here

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The motivational force scores relating to self reactions and reactions from the organization produced the highest force scores at any given point in time. Motivational force scores for these two sources, plus reactions from the immediate supervisor, followed courses of rather steady decline from the first day through twelve months. In fact, the declines for self and supervisory reactions showed a significant decrease during the year. The fellow worker reactions resulted in the lowest motivational force scores and demonstrated a relatively slight decline across time.

Relationships Between Attitudes Measures and Supervisors' Ratings

The relationship between the three attitude measures--beliefs, values, and motivational force--and the performance and effort ratings made by supervisors were ascertained by the use of product moment correlation coefficients.

The three attitude measures and their sub parts failed to correlate significantly with ratings of either effort or performance made at the end of four months. This was true regardless of when the attitudes were assessed (from the first day through the end of the first year). In considering these results, it must be noted that a number of supervisors reported feeling that four months did not provide a very adequate basis for measuring either performance or effort. Given this probable unreliability of the criterion, therefore, the lack of significant correlations of the attitude measures with the ratings made at this early point in the first year of a person's employment are probably not too surprising and thus do not provide a meaningful test of expectancy theory.

Effort ratings made at the end of one year continued not to be predicted in a significant manner by prior or concurrent attitude measures. While beliefs relating to positive outcomes did correlate positively with the one-year effort ratings, the relationships were not especially strong (e.g., r = .22 for the end of the fourth month). The correlations of motivational force scores with the year-end effort ratings were never higher than .25 at any time period.

Performance ratings obtained at the end of the first year were much better predicted than the effort ratings, by the prior attitude measures (particularly the belief scores relating to positive outcomes). Table 1 shows the correlations for each of the attitude measures with the one-year performance measures at each of the eight times attitude data were collected (first day through six months and again at the end of 12 months). A rather surprisingly high (relatively speaking) and significant correlation of .31 was obtained between performance-reward beliefs relating to positive outcomes expressed the very <u>first day</u> on the job (and immediately prior to actual

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Insert Table 1 About Here

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start of work the following day) and supervisors' ratings of performance one year later. The strength of this relationship increased through the end of the second month of work and then decreased rather consistently during the next ten months. By the end of one year, the correlation had dropped to .05.

The beliefs relating to negatively valued outcomes showed, as would be expected, a consistently negative correlation with the one-year

performance ratings. This finding indicates that an individual that saw a relatively high probability of performance leading to negative valued outcomes was likely to be a poorer performer on his job.

The values attached to outcomes correlated near zero at any time with the one-year performance rating (Table 1). Also, consequently, the motivational force scores combining values and beliefs predicted year-end performance less well than did beliefs alone. The highest correlation between "force" and later performance was .31 for the attitudes measured at the end of two months of employment.

Again, as was similar for the four-month results, ratings of effort made at the end of one year were less strongly related to earlier motivational force attitudes than were the comparable performance ratings mentioned above. The most likely reason why neither the four-month nor the one-year effort ratings related very strongly to the motivational attitudes is because of the great difficulty supervisors reported they encountered in attempting to assess subordinates' effort as compared to performance. This is probably particularly true in the case of the raters in the present study because their subordinates were working on engineering-design-type problems where visible signs of effort are not always available.

Discussion

The results of this initial exploratory investigation into continuous monitoring of motivational attitudes can be discussed around two major themes: the stability or changes of the attitudes during the first twelve months on the job, and the ability of the attitudes to predict subsequent job performance.

Stability and Changes in Attitudes Across Time

With regard to the question of possible changes in motivational attitudes across time during early months in a new job situation, two findings stand out for the particular sample of employees: first, the values that these newly-hired engineers attached to various outcomes that were potentially available in the situation remained remarkably constant across the twelve-month measurement period. Such stability, of course, is not surprising and is in fact to be expected in most employment situations. This is because it can be assumed that the values that employees attach to outcomes are ordinarily well formed outside of and prior to the entering of a particular work situation. This is not to say that such values could not be altered under unusual circumstances, but rather that under fairly normal employment conditions (as prevailed in this organization during this time period), values attached to outcomes would be relatively unaffected by the day-to-day happenings in an organization.

The second finding of interest with respect to possible attitude changes across time is the significant drop in the employees' beliefs that high levels of performance will lead to desired rewares and the significant increase in beliefs that good performance will lead to negative outcomes. The data indicate that these changes set in almost immediately (since the beliefs sampled at the end of the first month already showed a respective drop or increase from the first day) and continued steadily thereafter through the first six months. By the end of the first year, the evidence indicates that the changes in beliefs about performance leading to outcomes had leveled off from the initial "optimistic" performance-reward beliefs. Of course, it is not possible to determine from the present

study whether these changes are "normal," or if they set in more or less rapidly than would be the case for other groups of employees in the same organization or in other organizations. Later studies that gather this type of data across organizations will be needed to answer this comparative question. What is relevant, though, in the interpretation of the present set of results, is the fact that the company for which the respondents worked did not have any special orientation or training program for newly hired employees of this type. The organization simply put each of them in a particular job that might or might not, by chance, have involved especially challenging assignments, a good supervisor and so forth. Thus, the company's relative lack of attention to providing supportive and stimulating experiences during the early phases of employment for these highly educated new hires may have contributed to the general overall decline in motivational-type beliefs. At least, future studies that gather data from organizations utilizing special training programs for newly-hired college-level employees should provide interesting data to contrast with findings from the present study in this regard.

Relationships of Attitudes to Performance

The results pertaining to the relationships between the motivational attitudes and measures of effort and performance present a rather complex mosaic. Nevertheless, several facts are apparent: (1) supervisors' ratings of performance were more closely related than were their ratings of effort to respondents' attitudes; (2) performance and effort ratings made at twelve months were more closely related to respondents' attitudes than were similar ratings made after only four months; (3) measures of employees' beliefs correlated more highly with subsequent performance ratings

than did the values attached to outcomes or the multiplicative combination of beliefs and values (i.e., force); and (4) beliefs measured during the earlier months predicted performance at the end of one year better than did beliefs measured closer in time to the end of one year.

In attempting to interpret these findings it seems clear that the beliefs or expectancies that the employees held about whether high levels of performance would lead to greater levels of desired outcomes were the key motivational variables relating to job performance. The data thus provide some support for an expectancy-type of model (e.g., Porter and Lawler, 1968; Vroom, 1964), in that expectancies obtained at one point in time were found to correlate significantly with performance measured at a later point in time. As Lawler (1968) has pointed out, however, we are still a long way from knowing much about the optimum time interval for using expectancies to predict subsequent performance. In the present study, the best predictions were obtained some nine or ten months in advance of the measurement of performance--when that performance was evaluated at the end of the first year of employment. (If we were attempting to predict performance for employees who had been on the job for five years, say, different time intervals might have proved to be better for predictive purposes.) Expectancies measured concurrently at the time performance is measured do not appear to be strongly related to performance in the present investigation. These overall results concerning the belief measures indicate modest support for a theoretical position that hypothesizes that expectancies are an important causal factor in determining later job performance.

Expectancy theory in its most elegant form, however, did not prove as effective in predicting job performance. That is, when the beliefs

were multiplied by values attached to outcomes to obtain a measure of "motivational force," the correlations with performance were lower than for the beliefs alone. As was previously pointed out, this was due to the fact that outcome values correlated near zero with performance. In other words, when values were added into the motivational force equation they lowered rather than raised the predictive power of the attitude measurements. There could, of course, be many reasons why the values attached to outcomes were not related in any way to performance. It is probably not fruitful at the present time to speculate on these reasons, but the results indicate that we should at least be cautious in positing a multiplicative "beliefs times value" formulation of the strength of employees' motivation to perform. Other similar "continuous monitoring" types of studies utilizing expectancy types of attitude measurements will be needed before we know whether some of the current motivational theories will need to be revised in some of their details.

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TABLE 1

Correlation of Attitudes Measures with One-Year Performance Ratings

	Time Periods							
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_{12}
Beliefs								
Positive Outcomes	.31*	.33*	.41*	.28	.20	.16	.20	.05
Negative Outcomes	-.08	-.29	-.29	-.37*	-.24	-.18	-.19	-.21
Value of Outcomes								
High Expectancies	.02	-.01	.16	.11	-.03	.08	-.02	.17
Low Expectancies	.08	.22	.06	-.02	.05	.17	.00	.08
Motivational Force	.14	.19	.31*	.19	.09	.11	.08	.13
Sample Size	42	39	40	39	37	36	38	34

*$p < 0.05$

FIGURE 1

Changes in Performance-Outcomes Expectancy Scores

During First Year of Employment

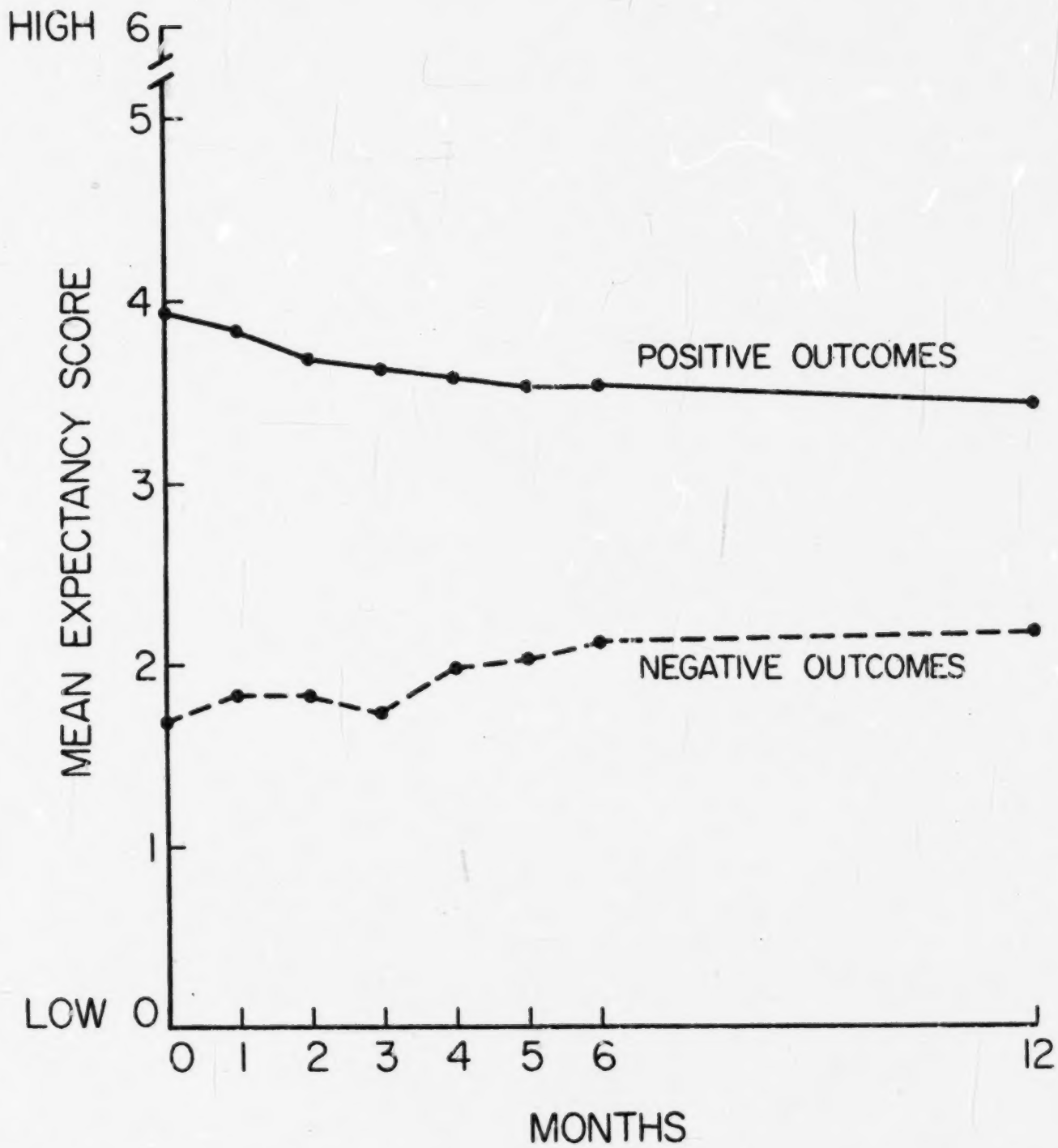

HIGH
6
5
4
3
2
1
LOW
0
MEAN EXPECTANCY SCORE
POSITIVE OUTCOMES
NEGATIVE OUTCOMES
0
1
2
3
4
5
6
12
MONTHS

FIGURE 2

Changes in Value of Outcomes

During First Year of Employment

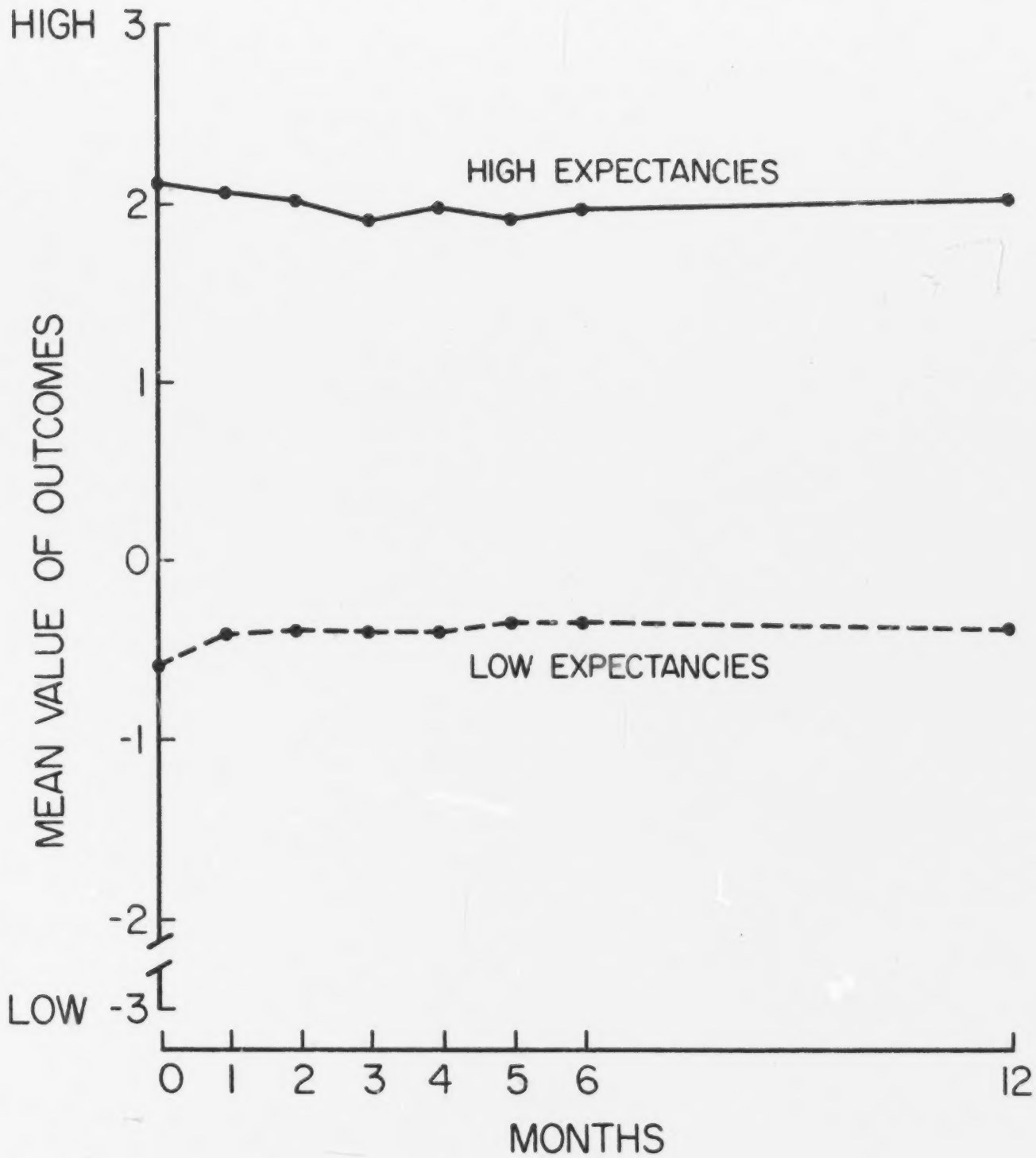

HIGH 3
2
1
0
-1
-2
LOW -3
MEAN VALUE OF OUTCOMES
HIGH EXPECTANCIES
LOW EXPECTANCIES
0 1 2 3 4 5 6 12
MONTHS

FIGURE 3

Changes in Motivational Force Scores

During First Year of Employment

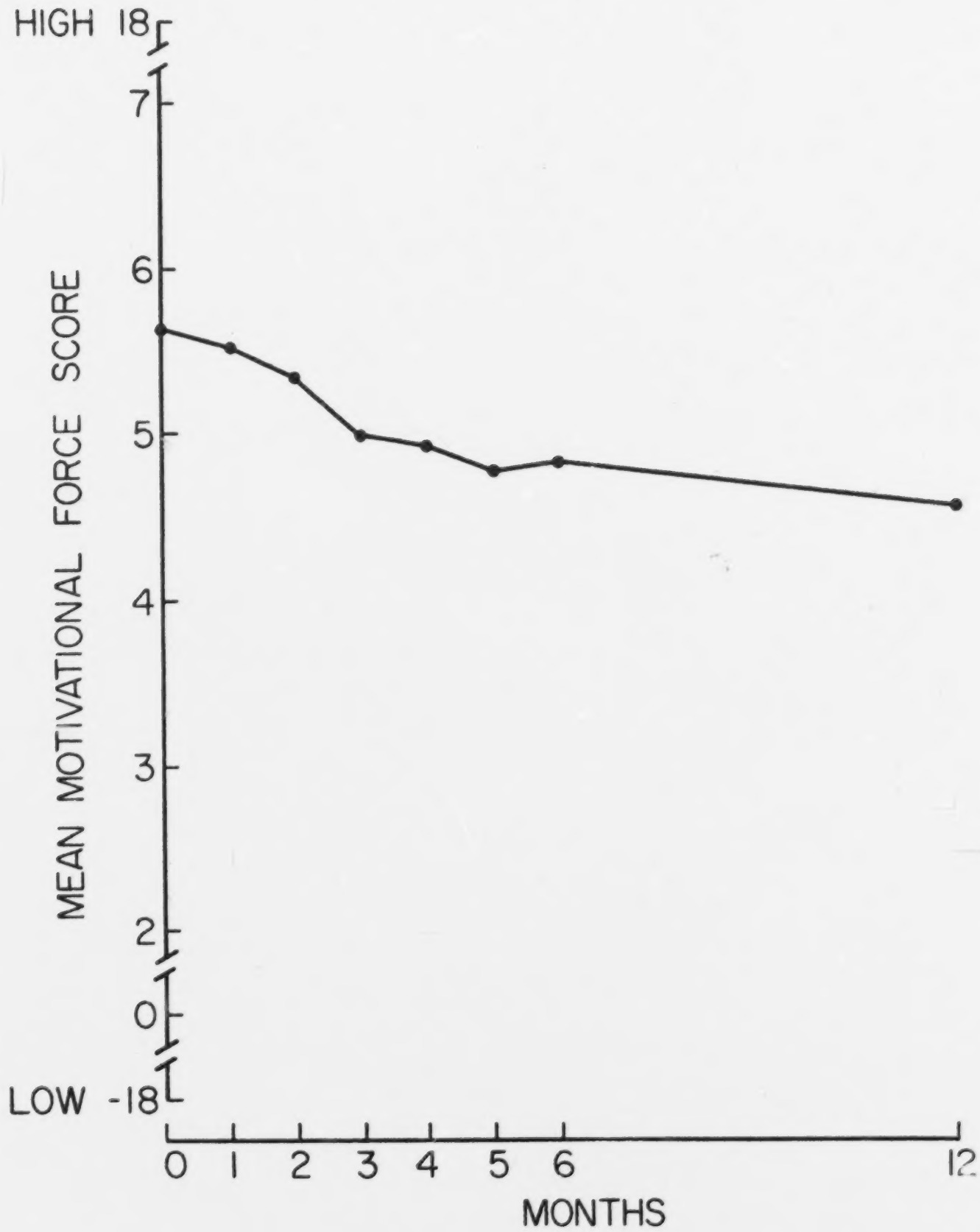
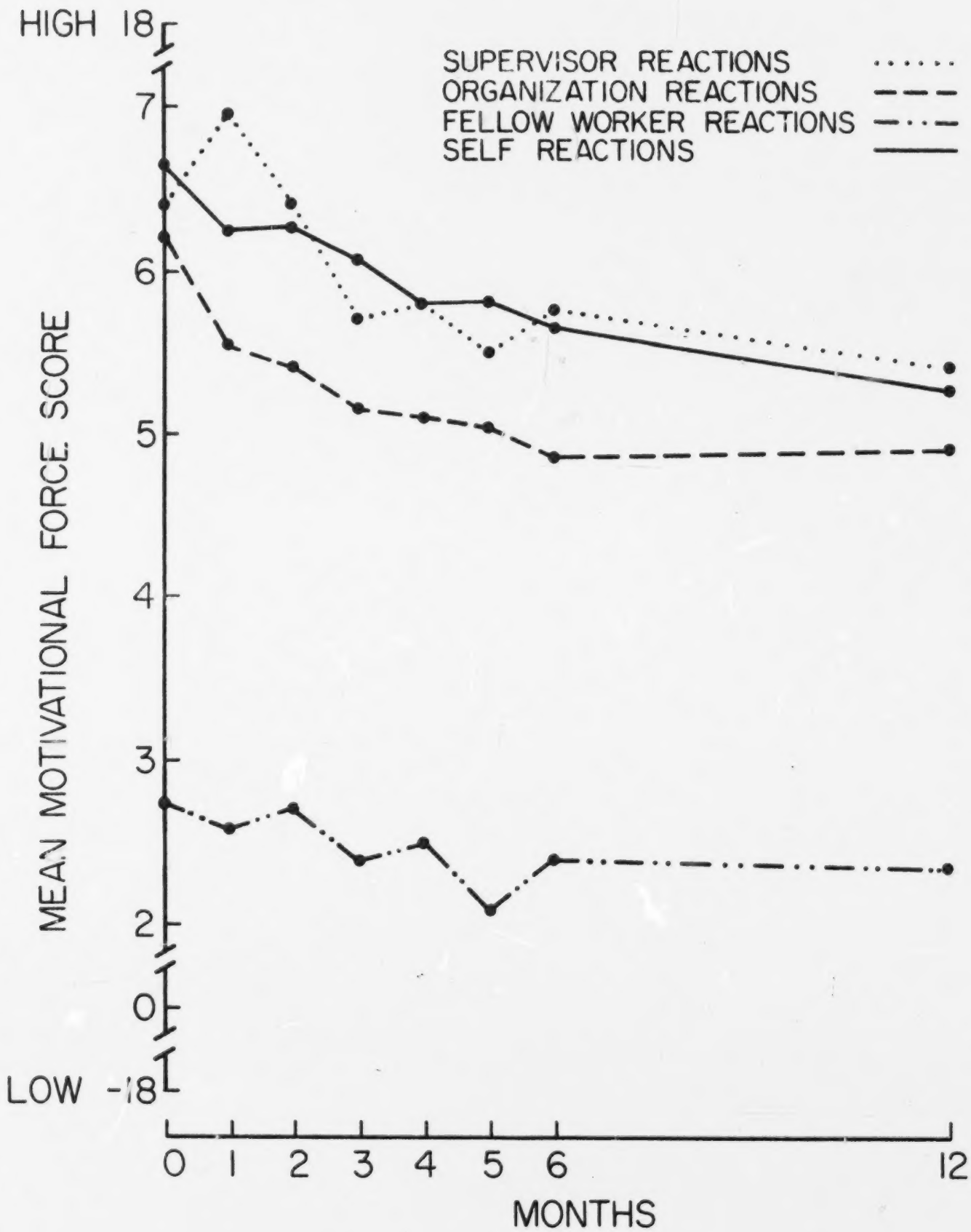

HIGH 18
7
6
5
4
3
2
0
LOW -18
MEAN MOTIVATIONAL FORCE SCORE
0
1
2
3
4
5
6
12
MONTHS

FIGURE 4

Changes in Motivational Force Scores

Categorized by Sources of Outcomes


HIGH 18
7
6
5
4
3
2
0
LOW -18
MEAN MOTIVATIONAL FORCE SCORE
SUPERVISOR REACTIONS
ORGANIZATION REACTIONS
FELLOW WORKER REACTIONS
SELF REACTIONS
0 1 2 3 4 5 6 12
MONTHS

APPENDIX I

Summary Statistical Data

	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_{12}
Sample Size	54	44	44	41	39	40	41	34
Expectancy Beliefs								
Positive Outcomes								
Mean*	3.93	3.85	3.72	3.64	3.60	3.57	3.55	3.44
Standard Deviation	0.69	0.60	0.68	0.68	0.73	0.71	0.73	0.84
Negative Outcomes								
Mean*	1.70	1.87	1.87	1.77	1.98	2.06	2.15	2.17
Standard Deviation	0.75	0.83	0.72	0.71	0.83	0.83	0.82	0.77
Value of Outcomes								
High Expectancy								
Mean	2.09	2.07	2.01	1.91	1.94	1.90	1.94	2.00
Standard Deviation	0.48	0.53	0.56	0.57	0.57	0.66	0.65	0.54
Low Expectancy								
Mean*	-0.59	-0.40	-0.41	-0.39	-0.39	-0.35	-0.37	-0.39
Standard Deviation	0.35	0.43	0.46	0.37	0.47	0.42	0.44	0.48
Motivational Force								
All Questions								
Mean*	5.65	5.53	5.34	4.98	4.93	4.78	4.83	4.60
Standard Deviation	2.08	2.16	2.24	2.19	2.35	2.53	2.53	2.32
Motivational Force (By Sources)								
Supervisor Reaction								
Mean*	6.18	5.62	5.38	5.15	5.11	5.06	4.87	4.91
Standard Deviation	2.88	3.03	3.42	3.56	3.50	3.39	3.35	2.80

APPENDIX I (continued)

	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_{12}
Organizational Reactions								
Mean	6.36	6.93	6.37	5.70	5.78	5.51	5.76	5.36
Standard Deviations	2.96	2.80	3.03	2.84	3.17	3.08	3.28	3.38
Co-Worker Reactions								
Mean	2.74	2.61	2.70	2.42	2.48	2.10	2.42	2.34
Standard Deviation	2.23	2.22	2.28	1.74	2.22	2.16	2.40	2.52
Self-Reactions								
Mean*	6.64	6.24	6.26	6.03	5.78	5.80	5.67	5.25
Standard Deviation	2.64	2.55	2.62	2.78	2.87	3.14	2.98	2.71

*Change between T_0 and T_{12} is significant at $p < 0.05$

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3439

VT 014 318
REED, GEORGE M., JR. AND OTHERS
AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR.
SOUTH CAROLINA VOCATIONAL EDUCATION RESEARCH COORDINATING UNIT, CLEMSON.
SOUTH CAROLINA STATE DEPT. OF EDUCATION, COLUMBIA. OFFICE OF VOCATIONAL EDUCATION.
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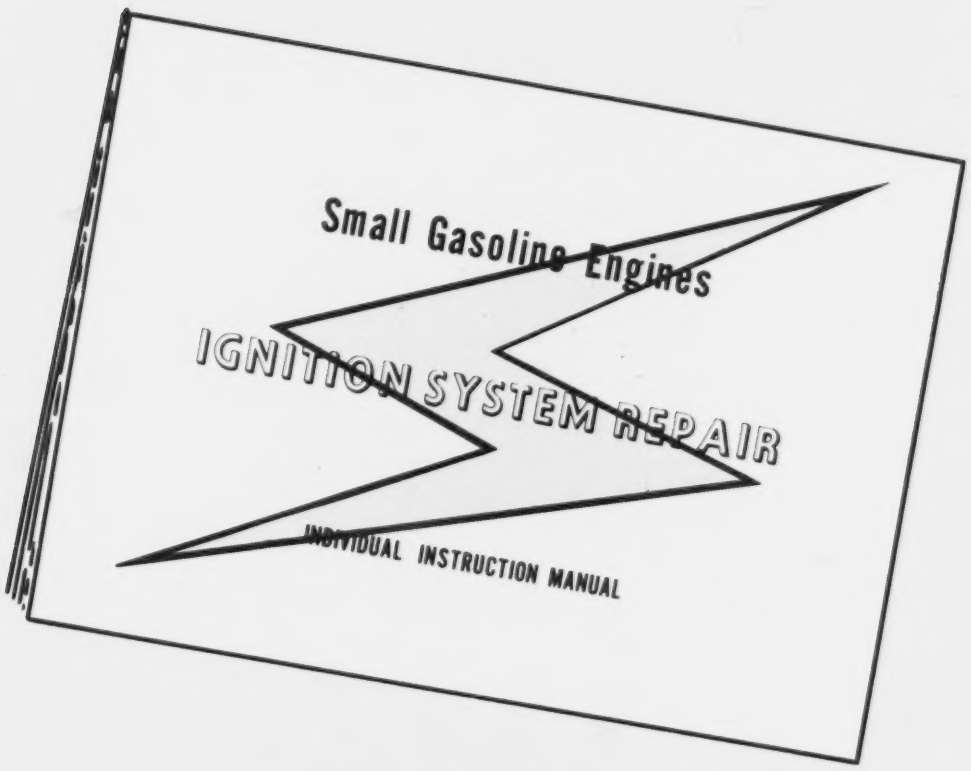
DESCRIPTORS - *VOCATIONAL AGRICULTURE; AGRICULTURAL EDUCATION; *PROGRAMED INSTRUCTION; *CURRICULUM EVALUATION; *INDIVIDUALIZED INSTRUCTION; POWER MECHANICS; ENGINES; ELECTRICAL SYSTEMS; EXPERIMENTAL PROGRAMS; *TEACHER ATTITUDES; TRADE AND INDUSTRIAL EDUCATION

ABSTRACT - THE PURPOSE OF THIS PROJECT WAS TO MEASURE THE EFFECTIVENESS OF THE PROGRAMED INSTRUCTIONAL UNIT, "SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR" (VT 014 347, IN AIM VOL. 5, NO. 2) AS A TEACHING METHOD IN HIGH SCHOOL VOCATIONAL AGRICULTURE PROGRAMS. SPECIFIC OBJECTIVES WERE TO: (1) COMPARE THE EFFECTIVENESS OF THE PROGRAMED BOOKLET AS A TEACHING METHOD WITH THE EFFECTIVENESS OF TRADITIONAL TEACHING METHODS AND COMPARE THE EFFECTIVENESS FOR STUDENTS OF THREE DIFFERENT LEVELS OF MECHANICAL APTITUDE AS MEASURED BY STUDENT ACHIEVEMENT ON A MANIPULATIVE TEST AND ON AN OBJECTIVE TEST, AND (2) DETERMINE TEACHER REACTIONS TO THE USE OF THE BOOKLET. SOME CONCLUSIONS WERE THAT: (1) THE EFFECTIVENESS OF THE PROGRAMED INSTRUCTION METHOD WAS GREATER, IN GENERAL, THAN THAT OF TRADITIONAL INSTRUCTION METHODS, AND (2) THE PROGRAMED INSTRUCTION METHOD WAS EQUALLY EFFECTIVE FOR STUDENTS OF THE THREE DIFFERENT LEVELS OF MECHANICAL APTITUDE. SOME COMMENTS BY TEACHERS WERE THAT THE BOOKLET SHOULD BE REVISED TO ELIMINATE A FEW MINOR ERRORS, THAT A LOWER AND MORE APPROPRIATE READING LEVEL SHOULD BE CONSIDERED, AND THAT THE BOOKLET SHOULD BE AVAILABLE TO ALL STUDENTS AND TEACHERS THROUGHOUT THE STATE WHO STUDY SMALL ENGINES. (GEB)

VT 014 318

An Evaluation of Programmed Instructional Materials in Teaching Small Gasoline Engine Ignition System Repair



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AN EVALUATION OF PROGRAMMED INSTRUCTIONAL MATERIALS IN TEACHING SMALL GASOLINE ENGINE IGNITION SYSTEM REPAIR

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TABLE OF CONTENTS

PAGE

INTRODUCTION 1

DESIGN AND CONDUCT OF THE STUDY. 3

Design of the Study 3

Description of Subjects 6

Testing Procedures. 6

ANALYSIS AND INTERPRETATION OF DATA. 9

Results of Test Score Analysis. 9

A Teacher Evaluation Synopsis 10

CONCLUSIONS AND RECOMMENDATIONS. 13

APPENDICES 15

INTRODUCTION

The Vocational Education Media Center at Clemson University has recently developed its first programmed instructional unit. This unit is in the form of a programmed booklet entitled Small Gasoline Engine Ignition System Repair. It was designed to be a self-standing, auto-tutorial, linear programmed booklet for individual student use in the shop. Due to the expense involved in preparing these materials, it seemed feasible to determine what advantages, if any, this type of instruction had when compared to traditional methods for teaching mechanical subjects.

The purpose of this project was to measure the effectiveness of the instruction booklet on small gasoline engine ignition system repair as a teaching method in high school Vocational Agriculture programs.

Specifically, the objectives of the study were to:

1. Compare the effectiveness of this programmed booklet as a teaching method with the effectiveness of traditional teaching methods as measured by student achievement on a manipulative test and on an objective test.
2. Determine the effectiveness of this programmed booklet as a teaching method for students of three different levels of mechanical aptitude as measured by student achievement on a manipulative test and on an objective test.
3. Determine teacher reactions to the use of the programmed booklet as an instruction method in high school agricultural mechanics programs.

Activities described herein made possible the accumulation of data reflecting the characteristics of this instructional method in different situations. In addition, some conclusions and recommendations concerning the booklet's effectiveness were recorded.

DESIGN AND CONDUCT OF THE STUDY

At the Agriculture Teachers' Fall Group Conferences in 1969, the possibility of teachers in District I, (Abbeville, Anderson, Greenville, Greenwood, Laurens, McCormick, Oconee and Pickens Counties, South Carolina), participating in this project was discussed. On a voluntary basis, thirty-one teachers indicated their desire to take part.

Two meetings were held in February, 1970, one at McDuffie High School and another at Hillcrest High School. The purpose of these gatherings was to familiarize teachers with procedures and materials to be used, to distribute objectives for the unit on Small Gas Engine Ignition Repair, to collect information about teachers, students, and facilities, and to determine which teachers were still willing and able to participate. A brief explanation of the programmed instruction manual, its development, and the purpose of this evaluation project was presented. Two methods of instruction, (the programmed booklet method and the traditional method), were discussed with the participating teachers. Copies of objectives for the unit were distributed to all teachers, and nine one-hour class periods or an equivalent time was set as a time limit for both methods. Instructions pertaining to the overall procedure were given so that teachers could proceed with either method as soon as they were assigned to a method group. There was a combined total of nineteen teachers present at the two meetings. Attendance was considered evidence of willing cooperation.

Design of the Study

In the design of this study, attempts were made to control for apparent differences in the participating schools. Two specific items of difference

for which controls were employed were the adequacy of shop facilities and the race of teachers involved. Steps were taken to balance the distribution of these two factors into two matched groups.

Information gathered from teachers at the February meetings provided a way to divide the schools into those with adequate facilities and those with questionable facilities. Information sheets from teachers who represented schools having the prescribed small engine tools and equipment were placed in a stack labeled Adequate. Information sheets from teachers who represented schools that had only a portion of the tools and equipment prescribed were placed in a stack labeled Questionable. These two stacks were in turn divided according to teacher race. From the resulting four stacks, halves of each were taken to form two groups of matched information sheets which represented two groups of schools matched according to adequacy of facilities and teacher race. Schools represented by one of these groups were selected randomly to use the programmed instruction method and were designated the experimental group. Schools represented by the other group were told to use traditional methods of instruction and were designated the control group. To maintain an equal number of schools in each group one school had to be left out. This school was used later as a location for field testing one of the objective tests.

Several changes occurred during the instructional period which affected the comparability of the matched groups. Two teachers dropped out of the project. Some essential equipment was stolen from one school while another received new equipment. The final situation had the following appearance:

METHOD GROUP	TEACHER	FACILITY GROUP	NO. SCHOOLS
Control	White	Adequate	2
Control	White	Questionable	3
Control	Negro	Adequate	2
Control	Negro	Questionable	1
Experimental	White	Adequate	5
Experimental	White	Questionable	0
Experimental	Negro	Adequate	2
Experimental	Negro	Questionable	1

After schools were assigned to the control or the experimental group, a letter was sent to each teacher indicating which method he should employ. The materials needed for the instruction were also sent.

Control group teachers received the following materials: (See Appendix A)

(1) Introduction to the unit

(2) Objectives (distributed at meetings)

(3) Lists of tools needed (exerpt from programmed instruction booklet), and

(4) Pages 2, 3, 4, and 20 from the programmed booklet concerning parts identification.

Experimental group teachers received the following materials: (See Appendix A)

(1) Teacher introduction sheet

(2) One programmed instruction booklet per pupil, and

(3) One worksheet (part of booklet) per booklet

Teachers were allowed to select a time for teaching the unit to fit their individual schedules. Indications of approximate dates of instruction were given by each teacher on the teacher information sheets. Letters notifying teachers of their assignment to the control or experimental group and the necessary materials were mailed to teachers preceding their planned instruction dates.

Description of Subjects

Subjects for this study were high school students in South Carolina Supervisory District I who were enrolled in vocational agriculture classes. Both black and white as well as female and male students were involved. They were in grades ranging from nine through twelve. In all, achievements of 342 students were measured. Those using traditional methods numbered 133 as compared to 209 using the programmed instruction booklet.

Testing Procedures

Three types of tests were administered to the students who participated in this study. A mechanical aptitude test was administered to all students during the instructional period. After the completion of the instructional period at each school both a manipulative test and a written objective test were administered. (Appendix B)

The need for consideration of differences in students' mechanical aptitudes was apparent. To provide a medium for this consideration the Mechanical Reasoning portion of the Differential Aptitude Test Battery, Form A (The Psychological Corporation), was administered by the teachers to each student in the project. The Form A raw scores obtained were converted to Form L raw scores, making them comparable to Form L norms and providing for each student a national percentile rank in mechanical reasoning.

Based on their percentile ranks, four students were chosen from each school to take the manipulative test. All students were divided into three groups, "x", "y", and "z". Group "x" was composed of students ranking 34 or less, group "y" of students with ranks of 35-59, and group "z" of students with a rank of 60 or above. (Highest) When possible, representatives from each of these groups were chosen for the manipulative test.

Manipulative tests were administered as soon as possible after the completion of the unit of instruction at each respective agriculture shop. Although no time limit was involved, the test generally required about twenty minutes per student. The test operation was performed in relative privacy with only the one student being tested, the tester, and sometimes the teacher present.

Two standard Briggs and Stratton vertical shaft engines mounted on lawn mowers were used for the test. The two engines were used alternately to insure a minimum of damage and wear to both. The shrouds were removed prior to testing. Starter clutches were "hand tight". Contact points in the engines were new and other sets of identical new points were available for comparison. All tools necessary for the procedures required were provided along with some other miscellaneous tools.

The test consisted of the following:

(1) removal of starter clutch, flywheel, dust cover, and contact point assembly

(2) inspection and judgement of contact points

(3) replacement and setting of contact point assembly

(4) replacement of dust cover, flywheel, and starter clutch

(5) all intermediate procedures involved

In the evaluation of each student's performance, emphasis was placed on proper use of tools, order of procedure, relative speed and the student's judgement of the contact points. Originally, the test had a possible score of one hundred points. Due to inconsistency in equipment four points were discarded leaving a total of 96. (Appendix B)

A forty-one question multiple choice objective test was evaluated after being administered at Palmetto High School for a field test. It was later decided that no changes should be made in the test as it was originally written. Following the administration of the manipulative tests these objective tests were presented to each teacher in the project for testing of all participating students. This test was based on specific objectives toward which teachers in both the control and experimental group had been teaching. (Appendix B)

ANALYSIS AND INTERPRETATION OF DATA

Information gathered during this study was primarily in three forms: (1) information about schools and teachers gathered by teacher information sheets, (2) information about the abilities and achievements of students involved as measured by the three tests employed, and (3) ideas and opinions of teachers using the programmed materials as collected through teacher questionnaires. These sets of information were considered and interpreted as follows in an attempt to accomplish the objectives set forth at the beginning of the study.

Results of Test Score Analysis

Scores obtained from the three tests used and other variables already applicable to each situation provided data which were subjected to a least squares analysis using the Clemson University computer facilities (BMDX64-General Linear Hypothesis). With regards to the test scores of students using the two methods of instruction the following results were obtained:

1. Students using the programmed instruction booklet obtained scores on the <u>manipulative test</u> which were not significantly different from the scores obtained by students using traditional methods of instruction, when manipulative test scores were adjusted to a common D.A.T. (Differential Aptitude test) score ($P>.05$).
2. Students using the programmed instruction booklet obtained scores on the <u>objective test</u> which were higher than the scores obtained by students using traditional methods of instruction, when objective test scores were adjusted to a common D.A.T. (Differential Aptitude test) score ($P<.01$).

A second analysis was made using the D.A.T. scores in a different way. The three groups referred to earlier as groups "x," "y," and "z" were coded groups 1, 2, and 3, respectively, and used as an additional variable. This analysis provided the following results pertaining to scores made by students of different mechanical aptitude levels mentioned in objective II:

1. No significant difference was found to exist in <u>manipulative test</u> scores between groups of students with three different levels of scores on the Differential Aptitude($P>.05$).
2. No significant difference was found to exist in <u>objective test</u> scores between groups of students with three different levels of scores on the Differential Aptitude Test ($P>.05$).

(See Appendix D for tables on data.)

A Teacher Evaluation Synopsis

Teachers who used the programmed instruction booklet were asked to contribute to its evaluation by answering a questionnaire. These questions were intended to get as many thoughts from the teachers as possible. Seven of the eight teachers responded to the survey. Although their interpretations of the questions and the forms of their answers varied, the results were categorized and are represented by the following statements. Answers unaccounted for were irrelevant.

<u>Pertaining to the students</u>:

1. Generally, students of all intelligence levels accepted this booklet as an instructional method.
2. All but one of the teachers responding indicated that slower students benefited more than brighter students using the booklet.

3. All teachers indicated that slower students learned faster with this method than they would have with traditional classroom instruction. One teacher stipulated that the booklet needed to be supplemented with individual instruction if the slower students were to learn any faster.

Pertaining to the teacher:

1. When asked if the booklet saved the teacher time and generally helped with the job of teaching all teachers gave a positive reply. Some ways in which the booklet helped the teacher included:
   a. better student comprehension due to pictures,
   b. frees teacher to work with slower students, and
   c. provides information and organization for the teacher.
2. Six teachers answered positively when asked if the booklet enhanced the development of skills. One teacher gave a negative reply.
3. The booklet was popular with all of the teachers who used it. They all expressed a desire to have more materials of this type.

Faults and suggested improvements:

1. Two possible faults of this instructional method were pointed out. These were:
   a. Teachers may use this as an opportunity to neglect their duties.
   b. Learning is too dependent on student motivation.
2. Some teachers suggested improvements that could be made in producing more materials of this type.

a. A more detailed explanation of the functions of parts mentioned could be included.

b. A more substantial binding could be used.

CONCLUSIONS AND RECOMMENDATIONS

From experiences during the testing period it became evident that the manipulative test was inadequately designed to reveal distinguishing differences in student achievement. The objective test findings were used to draw the following conclusions, which were neither contradicted nor supported by the manipulative test results.

For Objective I:

Since students who used the programmed instruction booklet experienced significantly greater achievement, as measured by the objective tests, than students who used traditional methods, it is concluded that the effectiveness of the programmed instruction method was greater, in general, than that of traditional instruction methods in these situations.

For Objective II:

Since no significant differences were found in achievement on objective tests between students of three different mechanical aptitude levels, it is concluded that the programmed instruction method was equally effective for students of these three different levels of mechanical aptitude.

For Objective III:

Results stated in the teacher evaluation synopsis were as conclusive in nature as that portion of this study was designed to reach. No further conclusions have been drawn to fulfill Objective III.

The writer feels that observations made throughout this study as well as findings recorded in this paper point to the following recommendations:

1. The booklet should be revised to eliminate a few minor errors.
2. The booklet should be revised to a lower and more appropriate reading level.
3. For classes of brighter students, many steps could be eliminated from the programmed booklet procedures.
4. In using programmed instructional materials such as this booklet, special consideration should be given to the availability of tools and equipment necessary for proper use of the teaching material.
5. An appropriate manipulative test should be developed which would provide discrimination among levels of skills possessed by students.
6. The booklet should be made available for use by all students and teachers who study small engines throughout the state. An additional evaluation using an improved manipulative test and a larger number of students should be conducted to further reveal the effectiveness of this booklet.

Appendix A

Instructional Materials

Materials Received by Control

Group Teachers

Small Engines Repair - Ignition System Repair

Preceding the instruction on ignition system repair all students should have been taught a unit on the basic fundamentals of small gasoline engines, the proper use of hand tools and shop safety.

It is recommended that each student have a small gasoline engine to perform the necessary jobs to complete the work on ignition system repair.

A series of sheets on needed tools and parts identification are included for your information. Each student should have a set of tools numbered 1-9 and 11-13. The student should be instructed in the correct names and usage of the tools. Only 1 set of tools numbered 10 and 14-17 are needed for each 10 students.

The following references may be used if desired:

(a) Briggs and Stratton - Repair Instructions
(b) Briggs and Stratton - General Theories of Operation
(c) Small Engine Repair Manual - Technical Publications, Inc., Kansas City, Mo.
(d) Small Engines-Care-Operation-Maintenance and Repair, Vol. I & II, AAAE & VA, Athens, Ga.

IGNITION SYSTEM REPAIR

Major Objective:

To train the student to properly inspect, repair and replace parts in the ignition system of a single cylinder gasoline engine so the engine will function properly after he has disassembled, inspected, adjusted and reassembled all necessary components. This should be accomplished on an engine which will not run previously due to improper ignition point operation or ignition system malfunction.

Contributory Objectives:

1. To identify and list the parts of the small gasoline engine pictured on the following pages. The student must identify and list the 15 indicated parts.

2. To properly remove and replace the spark plug lead wire and spark plug without damaging the lead wire or spark plug using the correct tools indicated on the attached page.

3. To properly clean the spark plug and reset the spark plug gap to to .025" or the setting specified in the owner's manual using the tools provided.

4. To remove, service, and replace the carburetor air cleaner as specified in the owner's manual.

5. To properly remove and replace the shroud and recoil starter from the engine, with the tools provided, without damaging either the shroud or the engine.

6. To properly remove and replace the air screen with the tools provided without damaging the screen or misplacing the screws.

7. To properly remove and replace the flywheel clutch, washer, flywheel (either aluminum or cast iron) and flywheel key with the proper special tools without damaging any of the components.

8. To examine and determine by visual inspection the condition of the flywheel key and to replace the flywheel key when such inspection reveals it to be wholly or partially sheared. To know the effect of a sheared flywheel key.

9. To properly remove and replace the dust cover over the ignition points with the tools provided without damaging the dust cover or the holding screws.

10. To identify and list the parts of the ignition system pictured on the attached page. The student must identify and list correctly the five indicated parts.

11. To properly remove and replace the complete contact point assembly with the tools provided without damaging any of the component parts.

12. To examine and determine by visual inspection the condition of the contact points and to determine the need for replacement of the contact points where such visual inspection indicates excessive burning or pitting of the contact points.

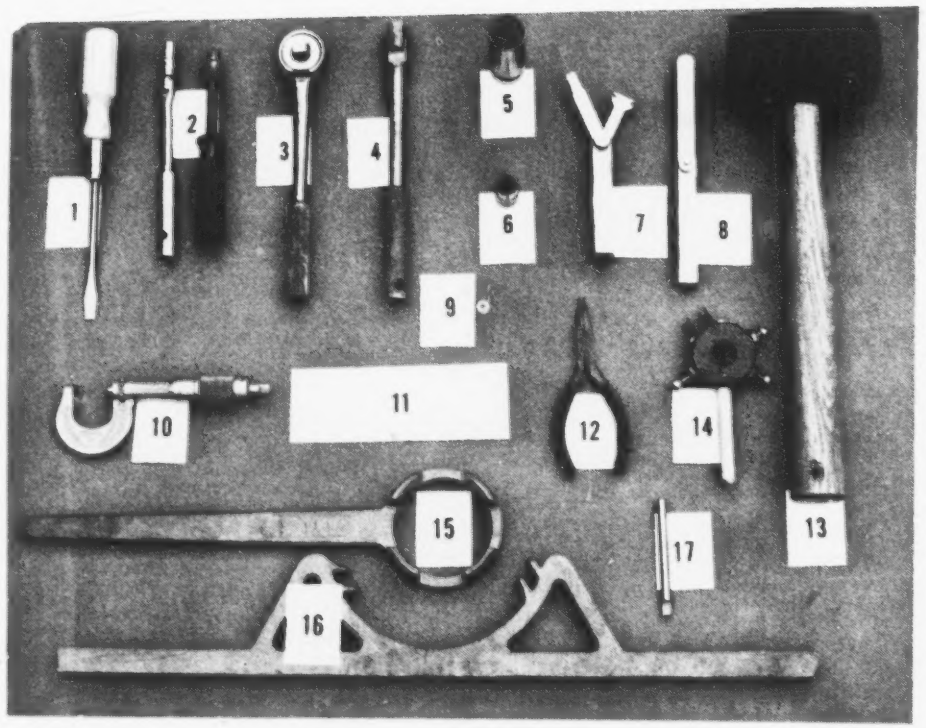
13. To properly adjust the contact point gap to .020" using the flat feeler guage and other needed tools.

14. To properly check and adjust, if needed, the armature air gap at approximately .010" using a file card and other needed tools.

15. To check the ingition spark using the Briggs and Stratton #19051 spark tester. The tester must be set up according to Briggs and Stratton specifications.

16. To properly secure a small gasoline engine to a work table, to start the small gasoline engine and have it function properly.

3463



TOOLS NEEDED TO PERFORM THIS JOB

1. 6" COMMON SCREW DRIVER
2. 1/4" NUT DRIVER OR 1/4" SOCKET WRENCH WITH 1/4" DRIVE HANDLE
3. 3/8" DRIVE RATCHET WRENCH
4. 3/8" FLEX HANDLE
5. 3/8" DRIVE, 13/16" DEEP SOCKET
6. 3/8" DRIVE, 7/16" REGULAR SOCKET
7. WIRE SPARK PLUG GAUGE
8. FEELER GAUGE
9. CONTACT POINT SPRING DEPRESSOR TOOL
10. 0-1" OUTSIDE MICROMETER
11. FILE CARD, APPROXIMATELY .010" THICK
12. NEEDLE NOSE PLIERS
13. SOFT FACED MALLET
14. #19051 BRIGGS & STRATTON SPARK TESTER
15. #19114 BRIGGS & STRATTON STARTER CLUTCH WRENCH
16. #19167 BRIGGS & STRATTON FLYWHEEL HOLDER
17. #19055 BRIGGS & STRATTON PLUNGER HOLE GAUGE

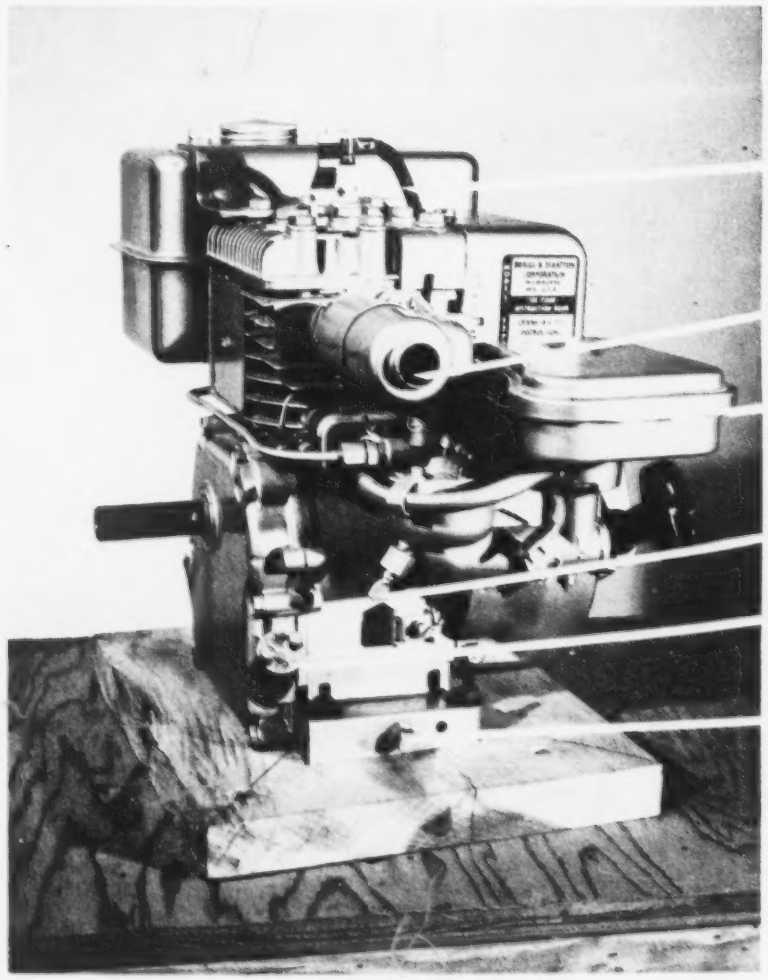
LOCATE A SMALL CAN OR OTHER CONTAINER TO HOLD PARTS REMOVED FROM THE ENGINE.

AFTER ALL TOOLS HAVE BEEN ASSEMBLED AND IDENTIFIED PROCEED TO STEP 1A, PAGE 2.

3464

STEP 1A - PARTS IDENTIFICATION

1. TURN YOUR ENGINE TO THE POSITION OF THE ENGINE IN THE PICTURE AT THE LEFT AND LOCATE THE FOLLOWING PARTS ON YOUR ENGINE.



SPARK PLUG LEAD

MUFFLER

CARBURETOR AIR FILTER

HIGH SPEED CARBURETOR ADJUSTMENT

OIL FILLER PLUG

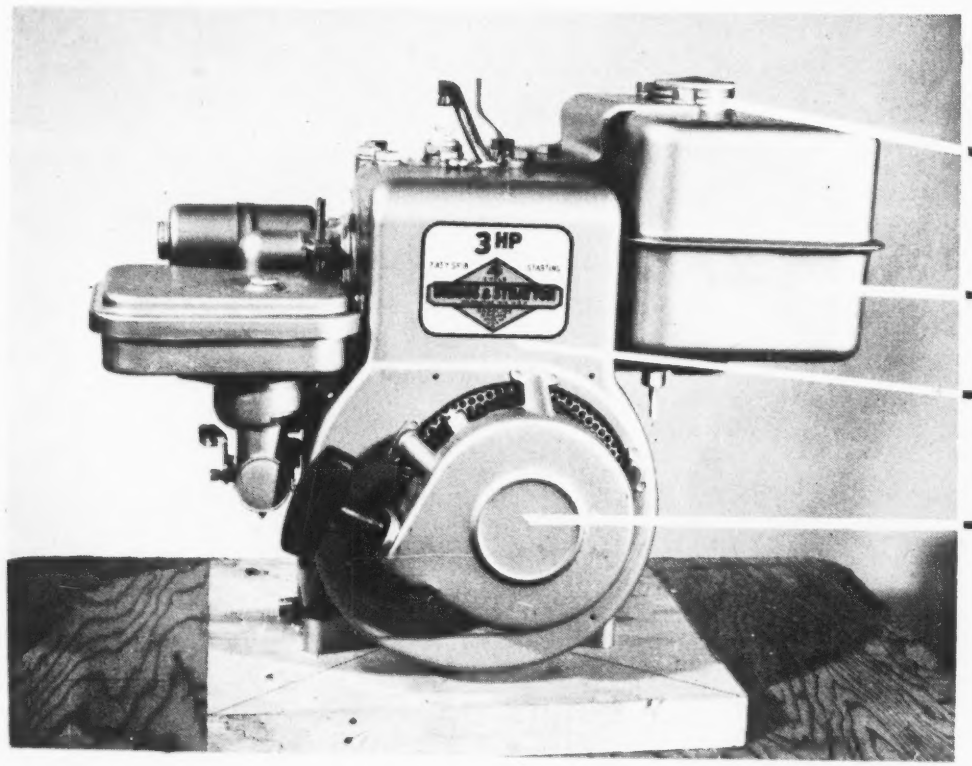
OIL DRAIN PLUG

2. AFTER LOCATING THE PARTS ON YOUR ENGINE PROCEED TO STEP 1B, PAGE 3.

3465

STEP 1B - PARTS IDENTIFICATION - CONTINUED

1. TURN YOUR ENGINE TO THE POSITION OF THE ENGINE IN THE PICTURE AT THE LEFT AND LOCATE THE FOLLOWING PARTS ON YOUR ENGINE.



FUEL TANK CAP

FUEL TANK

SHROUD

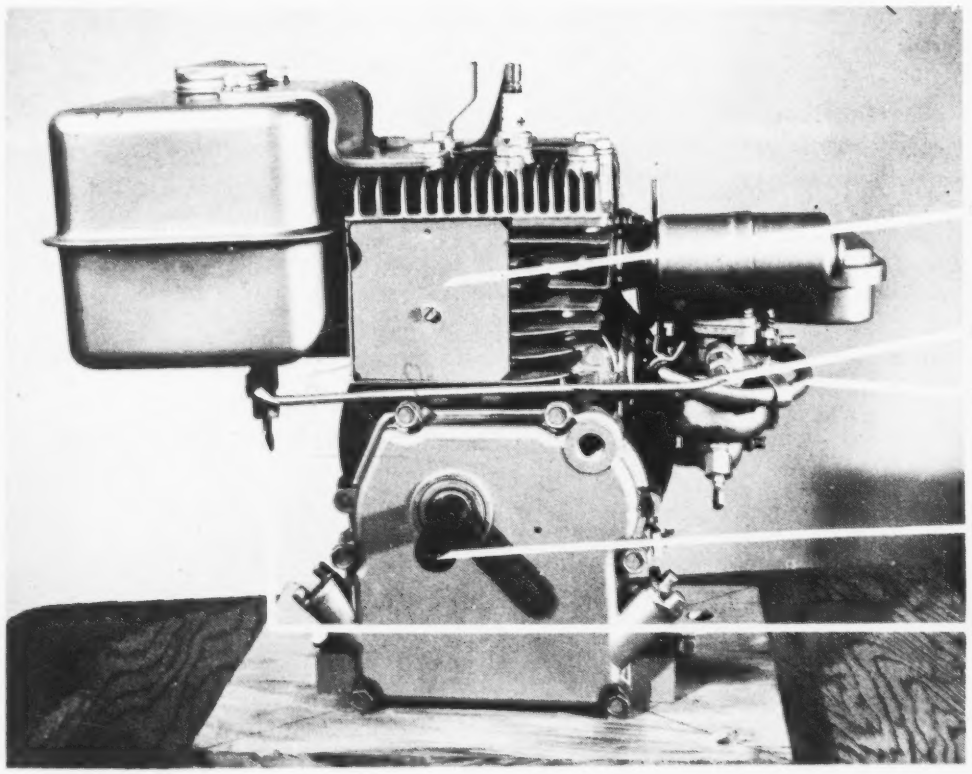
RECOIL STARTER

2. AFTER LOCATING THE PARTS ON YOUR ENGINE, PROCEED TO STEP 1C, PAGE 4.

22
34466

STEP 1C - PARTS IDENTIFICATION - CONTINUED

1. TURN YOUR ENGINE TO THE POSITION OF THE ENGINE IN THE PICTURE AT THE LEFT AND LOCATE THE FOLLOWING PARTS ON YOUR ENGINE.



BAFFLE

FUEL LINE

CRANKCASE BREATHER

OUTPUT LINE SHAFT

FUEL SHUTOFF

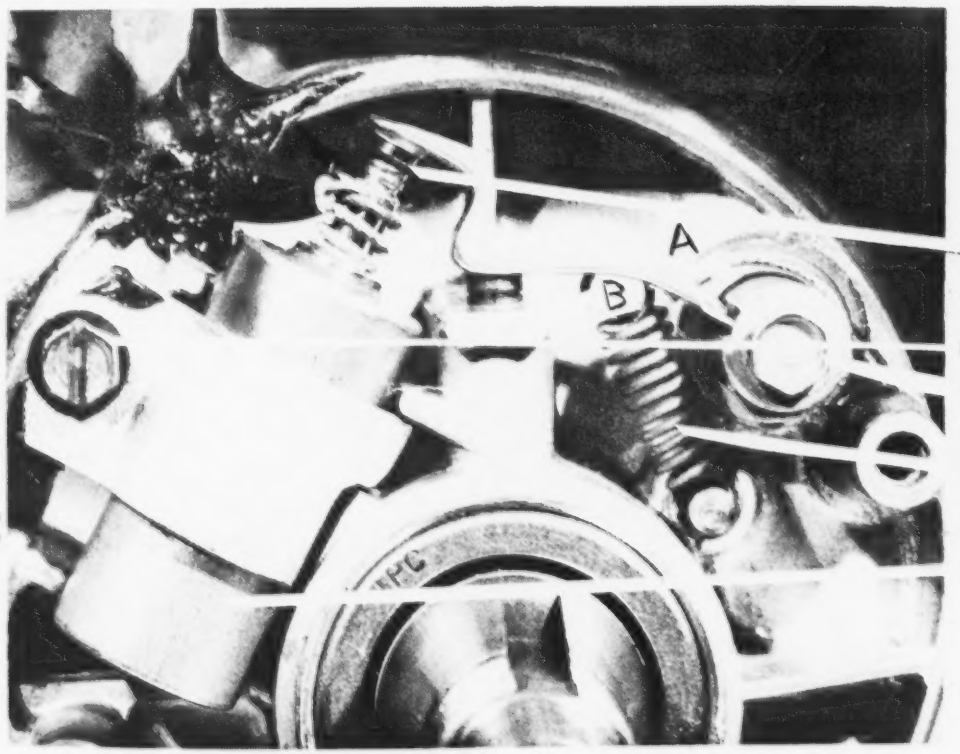
2. AFTER LOCATING THE PARTS ON YOUR ENGINE PROCEED TO STEP 1D, PAGE 5.

3467

STEP 16 - IGNITION SYSTEM PARTS IDENTIFICATION

1. TURN YOUR ENGINE SO THAT YOU CAN OBSERVE ALL THE PARTS OF THE IGNITION SYSTEM.

2. LOCATE AND IDENTIFY THE FOLLOWING PARTS ON YOUR ENGINE.



CONTACT BREAKER POINTS

CONDENSER MOUNTING SCREW

GROUND CONTACT MOUNTING SCREW

GROUND CONTACT HOLDING SPRING

CONDENSER

3. NOTE THE FOLLOWING:
   (A) POSITION OF BRADED GROUND WIRE
   (B) THE WAY THE GROUND CONTACT HOLDING SPRING IS FASTENED.

4. AFTER LOCATING THE PARTS OF THE IGNITION SYSTEM ON YOUR ENGINE PROCEED TO STEP 17, PAGE 21.

Materials Received by Experimental

Group Teachers

Ignition System Repair - Small Engines

Teacher Introduction:

The student instructional manual is for individual student use after the introductory units on small gasoline engines have been presented. Preceding the use of this manual the student should have received instruction in:

(1) The basic principles of operation of small gasoline engines.

(2) Proper use of hand tools.

(3) Shop safety.

Each student should have an instructional manual, a small gasoline engine similar to that pictured on pages 4, 5 and 6 of the instructional manual, tools numbered 1-9 and 11-13 from list on page 3 of the instructional manual. Only one set of tools 10 and 14-17 are needed for each 10 students. The students should each have sufficient work space so as not to be crowded. About 4 students to each 4' x 8' work table would be adequate.

The unit is designed for individual student usage with a minimum of teacher involvement. The unit will also allow each student to progress at his own speed.

The teacher, while this unit is being used, can circulate among the students and be available for consultation with individual students as the need arises.

Supplementary reference materials might include:

(1) Briggs and Stratton - Repair Instructions

(2) Briggs and Stratton - General Theories of Operation

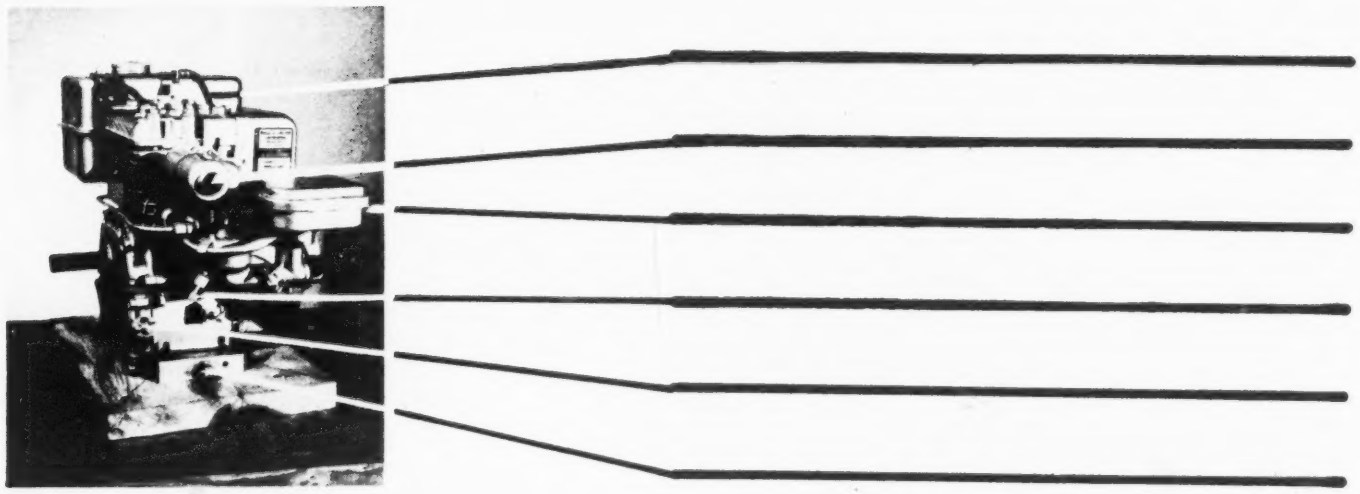
(3) Small Engines - Care - Operation - Maintenance and Repair, AAAE & VA

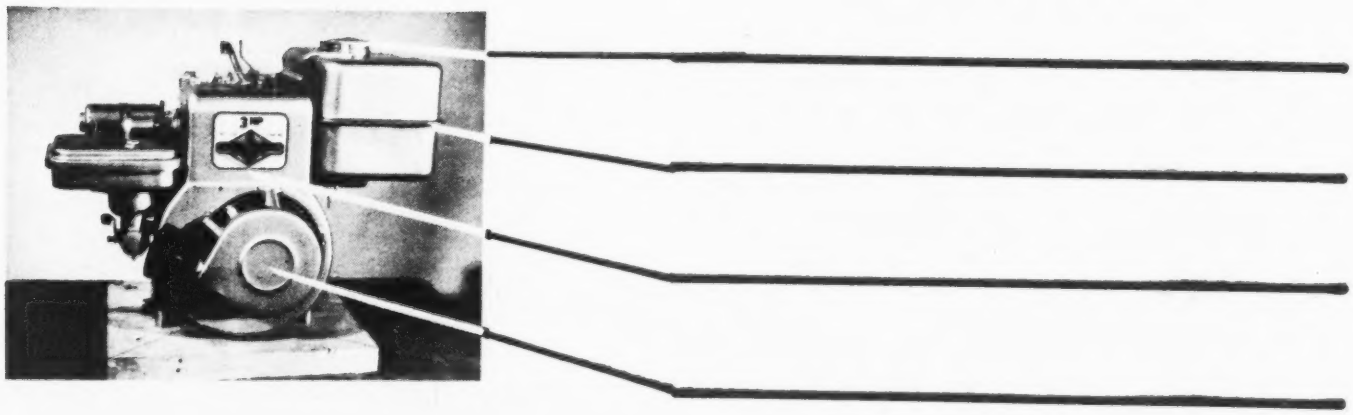
(4) Small Gasoline Engine Service Manual

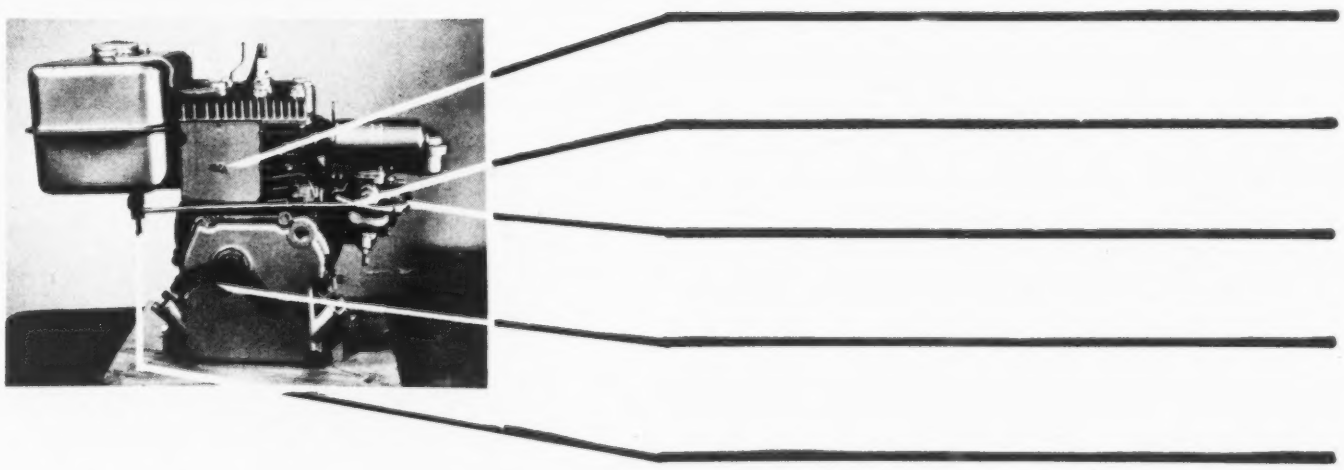
IGNITION SYSTEM REPAIR

STUDENT WORKSHEET #1

ENGINE PARTS IDENTIFICATION



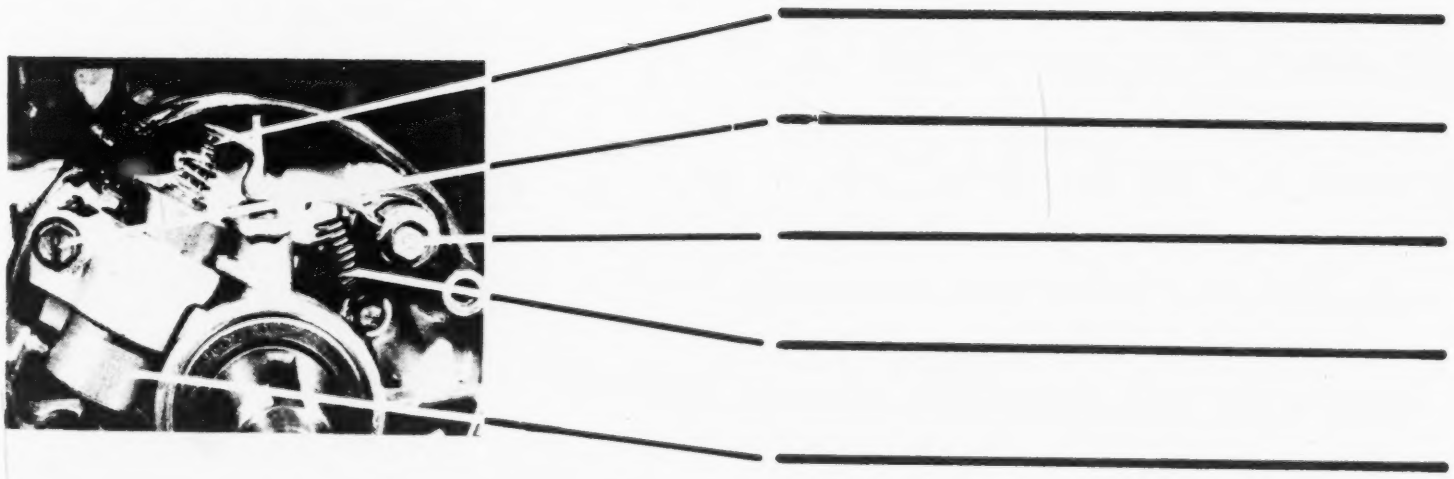




IGNITION SYSTEM REPAIR

STUDENT WORKSHEET #2

IGNITION PARTS IDENTIFICATION



Appendix B

Testing Materials

Not Included:

Mechanical Reasoning portion of the

Differential Aptitude Test Battery

Form A, Separate Booklet Edition

The Psychological Corporation,

New York, New York

IGNITION SYSTEM REPAIR

Test Questions

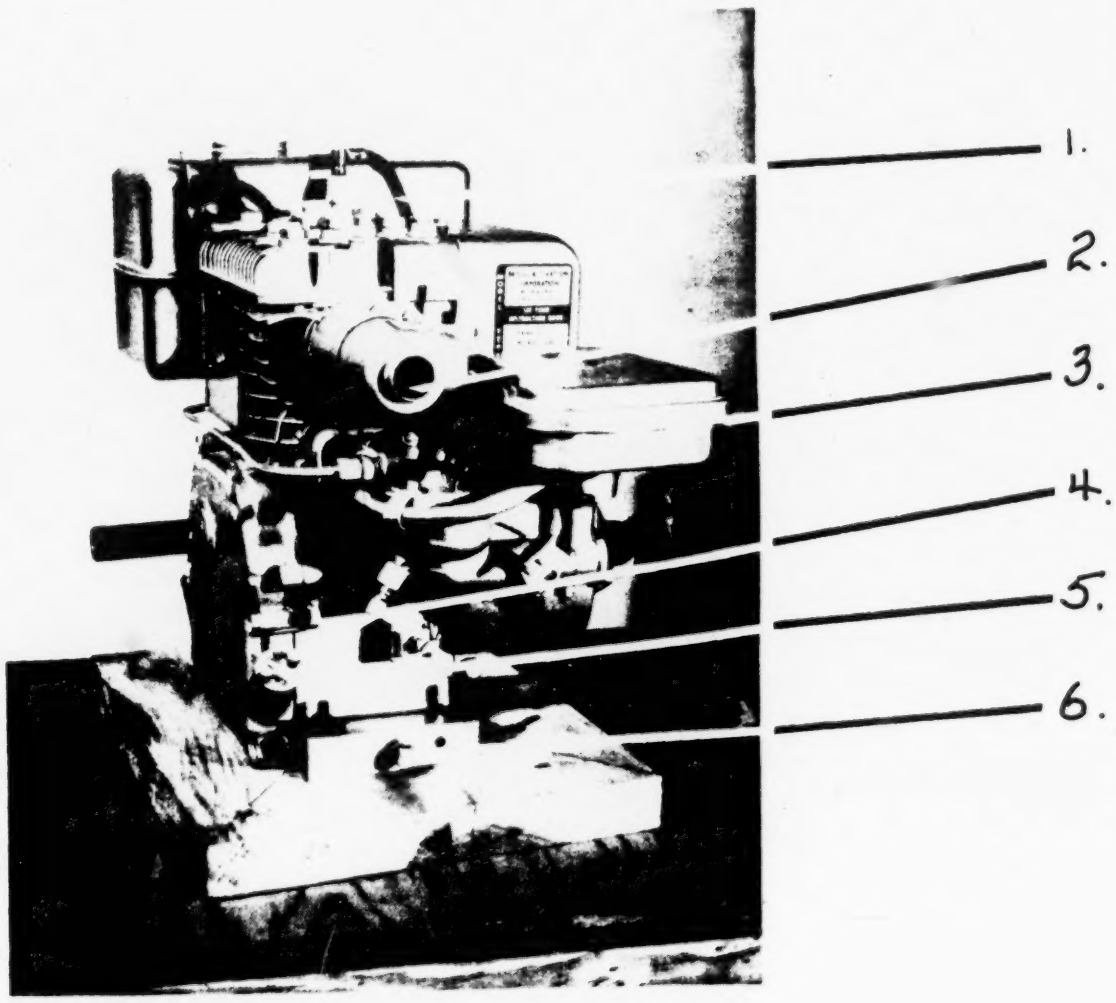


FIGURE 1

Questions 1-6 refer to Figure 1 above.

1. In Figure 1 part number 1 is
   a) spark plug
   b) primary lead
   c) spark plug lead
   d) lead in wire

2. In Figure 1 part number 2 is
   a) gas tank
   b) spark plug
   c) output shaft
   d) muffler

3. In Figure 1 part number 3 is
   a) gas tank
   b) carburetor air filter
   c) carburetor
   d) oil sump

4. In Figure 1 part number 4 is
   a) high speed carburetor adjustment
   b) low speed carburetor adjustment
   c) carburetor air filter holding screw
   d) gasoline shut off valve

5. In Figure 1 part number 5 is
   a) a mounting bolt
   b) oil filler plug
   c) oil drain plug
   d) inspection hole cover

6. In Figure 1 part number 6 is
   a) inspection hole cover
   b) oil drain plug
   c) mounting bolt
   d) oil filler plug

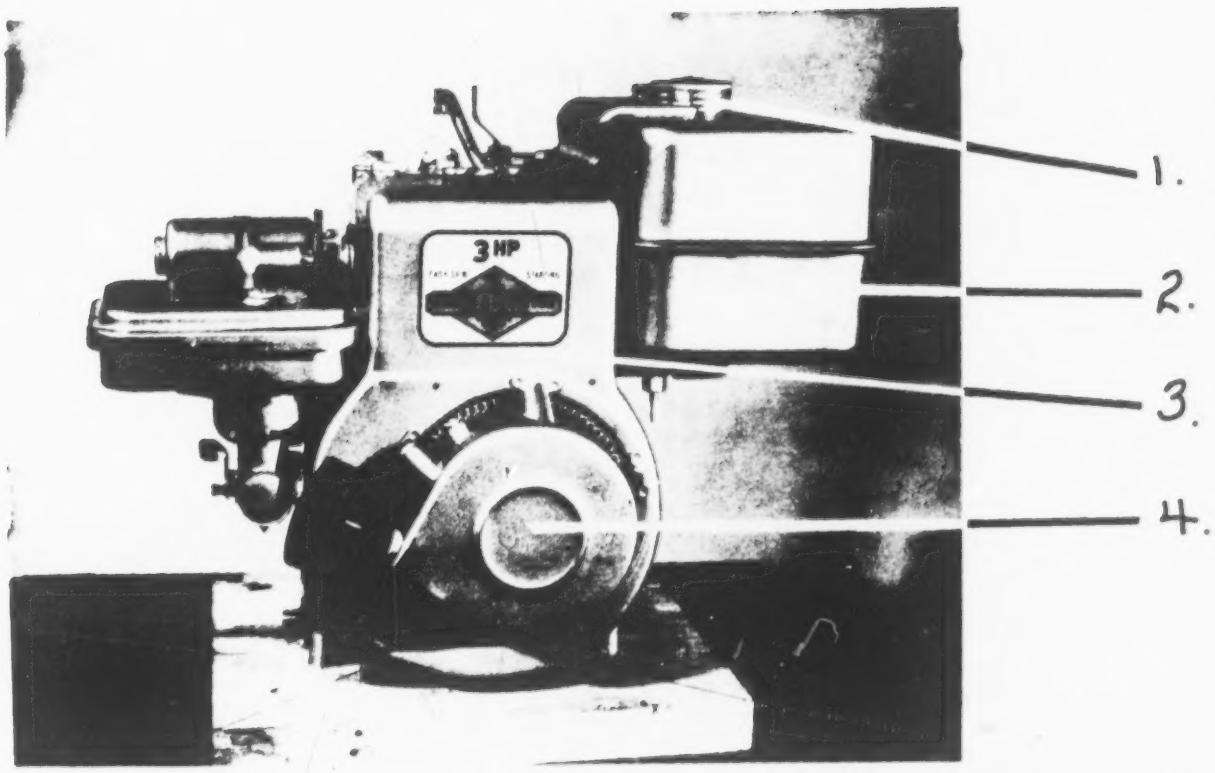


FIGURE 2

Questions 7-10 refer to Figure 2 above.

7. In Figure 2 part number 1 is
   a) fuel tank cap
   b) spark plug cover
   c) shroud inspection cover
   d) ignition system cover

8. In Figure 2 part number 2 is
   a) shroud
   b) fuel tank
   c) air cleaner cover
   d) baffle

9. In Figure 2 part number 3 is
   a) fuel tank
   b) baffle
   c) air cleaner cover
   d) shroud

10. In Figure 2 part number 4 is
   a) shroud
   b) recoil starter
   c) fuel tank
   d) air cleaner cover

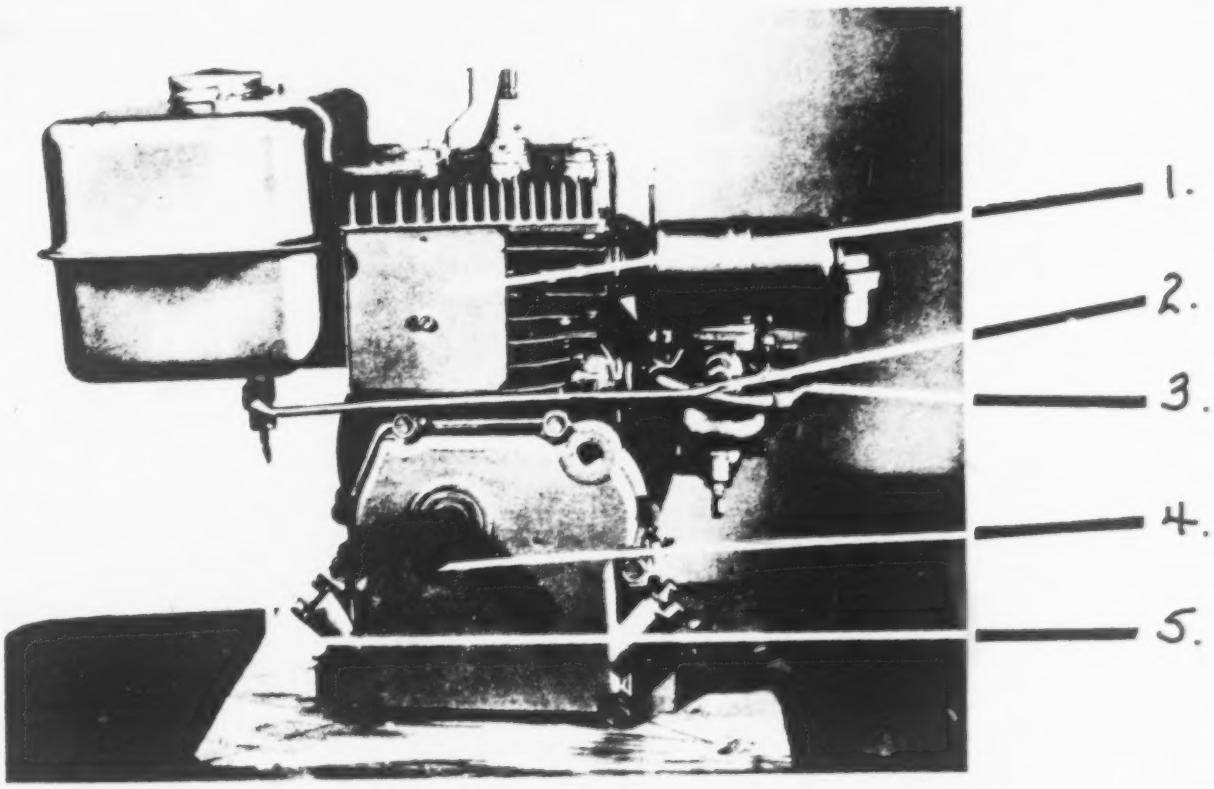


FIGURE 3

Questions 11-15 refer to Figure 3 above.

11. In Figure 3 part number 1 is
    a) muffler
    b) baffle
    c) crankcase cover
    d) shroud

12. In Figure 3 part number 2 is
    a) fuel line
    b) crankcase breather
    c) secondary lead
    d) primary lead

13. In Figure 3 part number 3 is
    a) fuel line
    b) primary lead
    c) secondary lead
    d) crankcase breather

14. In Figure 3 part number 4 is
    a) carrying handle
    b) output line shaft
    c) starter shaft
    d) input line shaft

15. In Figure 3 part number 5 is
    a) fuel tank mounting screw
    b) carburetor idle adjustment
    c) fuel shut off
    d) high speed adjusting screw

16. To remove the spark plug lead wire grasp the
    a) wire with the fingers and pull
    b) connector with the fingers and remove
    c) wire with a pair of pliers and remove
    d) any of the above as there is no correct way

17. The correct way to remove a spark plug is with a
    a) correct size regular socket wrench and ratchet handle
    b) adjustable wrench
    c) correct size deep socket wrench and ratchet handle
    d) none of the above

18. The proper gauge to use when adjusting a spark plug is
    a) wire spark plug guage
    b) flat feeler gauge
    c) thin dime
    d) file card

19. The carburetor air cleaner should be serviced according to the directions in
    a) your instruction book
    b) the owner's manual
    c) your text book
    d) none of the above

20. When removing the shroud, it is usually held in place by
    a) 1 bolt
    b) 2 bolts
    c) 3 bolts
    d) 4 bolts

21. When removing the screen which of the following tools can be used?
    a) hammer and chisel
    b) regular screw driver and 1/4" nut driver
    c) phillips screwdriver and 3/8" nut driver
    d) regular screwdriver and hacksaw

22. When removing the aluminum flywheel you would use the flywheel holder and a
    a) hammer
    b) #19051 spark tester
    c) starter clutch wrench
    d) 3/8" x 1/2" box and wrench

23. The cup shaped washer is placed with the cup
    a) away from the flywheel
    b) toward the flywheel
    c) either a or b above, it does not matter
    d) none of the above

24. When removing an aluminum flywheel you should use
    a) 3 jaw puller
    b) a pry bar and machinest hammer
    c) a soft faced mallet and pry bar
    d) special aluminum flywheel puller

25. A sheared flywheel key will
    a) cause the engine to be out of time
    b) let the flywheel fall off
    c) let the flywheel spin so the engine won't start
    d) all of the above

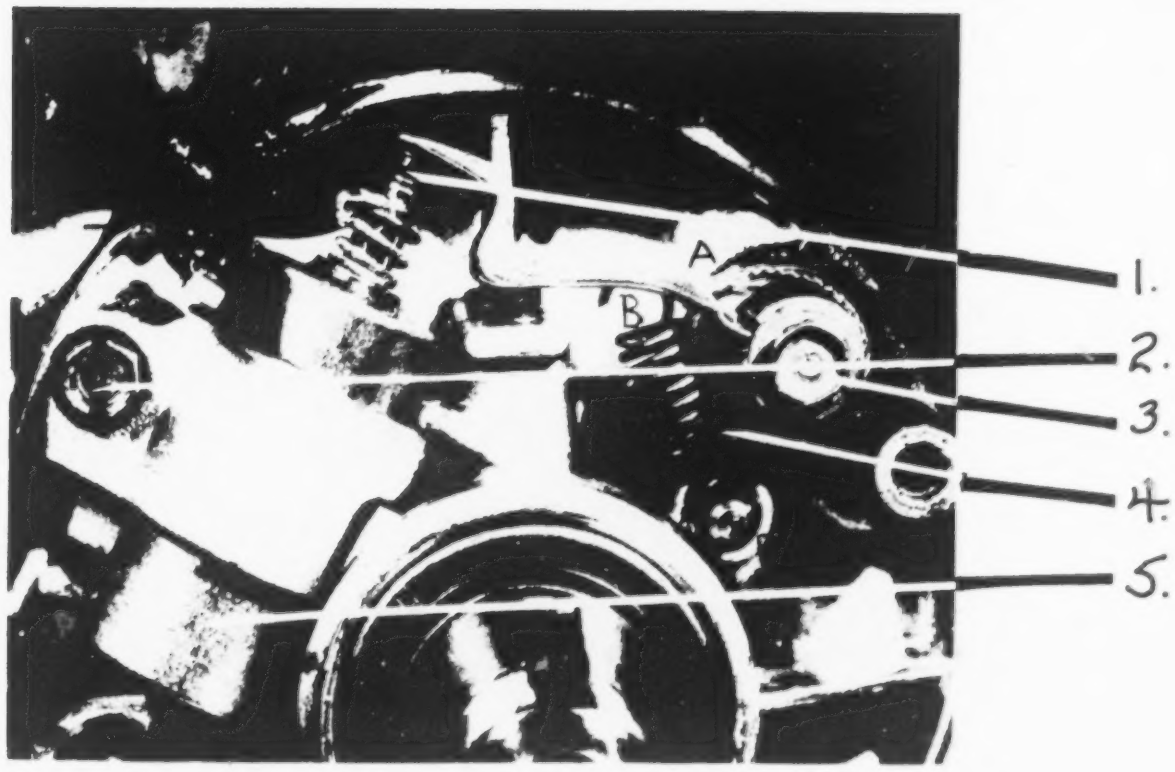


FIGURE 4

Questions 26-30 refer to Figure 4 above.

26. In Figure 4 part number 1 is
    a) ignition point plunger
    b) braded ground wire
    c) primary lead wire
    d) contact breaker points

27. In Figure 4 part number 2 is
    a) wire sealing compound
    b) condenser mounting screw
    c) ignition point spring
    d) ground contact mounting screw

28. In Figure 4 part number 3 is
    a) ignition point screw
    b) condenser mounting screw
    c) braded wire screw
    d) ground contact mounting screw

29. In Figure 4 part number 4 is
    a) ground contact
    b) wire holding spring
    c) ground contact holding spring
    d) none of the above

30. In Figure 4 part number 5 is
    a) condenser
    b) evaporator
    c) extra point holder
    d) gas can

31. When removing the contact point assembly which of the following are removed first
    a) ground contact point assembly
    b) condenser and point assembly
    c) the sealer on the wire leads
    d) the contact point plunger

32. The length of the contact point plunger is measured using a
    a) try square
    b) outside micrometer
    c) inside micrometer
    d) 12" steel ruler graduated in 64ths of an inch

33. To remove the wires from the condenser point you would use
    a) phillips screw driver and needle nose pliers
    b) needle nose pliers and small adjustable wrench
    c) point spring depressor and needle nose pliers
    d) none of the above

34. When reinstalling the contact point plunger the end with the groove around it is installed at
    a) the top of the contact point plunger hole
    b) the bottom of the contact point plunger hole
    c) either a or b, it doesn't matter
    d) the contact point plunger has no groove

35. The contact point gap is set at .020" using the
    a) file card folded double
    b) flat feeler gauge
    c) wire gauge
    d) none of the above

36. The contact point gap should be adjusted by
    a) sliding the condenser
    b) bending the ground contact point arc
    c) filing off the contact point plunger
    d) all of the above

37. The armature air gap refers to the distance between
    a) the two arms of the armature
    b) the arms of the armature and the governor vane
    c) the arms of the armature and the flywheel
    d) none of the above

38. The armature air gap is set using
    a) the file card approximately .010" thick
    b) the .010" blade of the flat feeler gauge
    c) the .010" of the wire gauge
    d) a steel rule graduated in 64ths of an inch

39. To check the proper functioning of the ignition system in producing a spark we use
    a) our hand, hold the connector and turn the engine over
    b) the #19051 spark tester
    c) screw driver to short the plug out
    d) a timing light

40. When installing the shroud and recoil starter on the engine we must be certain that
    a) the starter is wound up tight
    b) the splines on the clutch and starter line up
    c) the fuel tank is removed
    d) the rope is pulled completely out of the starter

41. When operating a small gasoline on a work bench in the shop it should be
    a) held in a vise by the output shaft
    b) held down with the hands
    c) clamped securely to the bench
    d) allowed to vibrate freely on the table.

IGNITION SYSTEM REPAIR

Answers to test questions

1. C
2. D
3. B
4. A
5. B
6. B
7. A
8. B
9. D
10. B
11. B
12. A
13. D
14. B
15. C
16. B
17. C
18. A
19. B
20. C
21. B
22. C
23. B
24. D
25. A
26. D
27. B
28. D
29. C
30. A
31. A
32. B
33. C
34. A
35. B
36. A
37. C
38. A
39. B
40. B
41. C

ANSWER SHEET

Ignition System Repair

Choose the correct answer for each question in the test booklet. Mark an X over the letter on the answer sheet which is next to the correct answer in the test booklet. Do not mark the test booklet.

Example: This test is about

a) How to build an engine

Correct Answer → b) Ignition System Repair

c) Adjusting the Carburetor

d) Replacing the muffler

Mark B (A X C D) on the answer sheet.

1. A B C D	11. A B C D	21. A B C D	31. A B C D
2. A B C D	12. A B C D	22. A B C D	32. A B C D
3. A B C D	13. A B C D	23. A B C D	33. A B C D
4. A B C D	14. A B C D	24. A B C D	34. A B C D
5. A B C D	15. A B C D	25. A B C D	35. A B C D
6. A B C D	16. A B C D	26. A B C D	36. A B C D
7. A B C D	17. A B C D	27. A B C D	37. A B C D
8 A B C D	18. A B C D	28. A B C D	38. A B C D
9. A B C D	19. A B C D	29. A B C D	39. A B C D
10. A B C D	20. A B C D	30. A B C D	40. A B C D

41. A B C D

Manipulative Test

Directions for Test

Remove points.

Inspect them and replace them if you think they need replacing.

Set the points at .020.

Put the engine back together.

Do not worry about sealing the dust cover.

Do not tighten dust cover screws too tightly.

Do not use the wrench for tightening the starter clutch. Use only your hand.

Test the spark.

Manipulative Test Data Sheet

School_____ Method Group_____ Facility Group_____

JOB	GRADING			
Student Name	_____	_____	_____	_____
Disassembly: (15)				
Rem. STR Clutch, F.W., D.C.	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Rem. G.C. Mounting Screw	0 1 2	0 1 2	0 1 2	0 1 2
Point & Spring Rem.	0 1	0 1	0 1	0 1
Condenser M. Screw & Bracket	0 1	0 1	0 1	0 1
Rem. Lead Wire	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Orderly Placement of Parts	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Judgement	30	30	30	30
Reassembly (55)				
Reinstalling Lead Wires	0 1 2	0 1 2	0 1 2	0 1 2
Reinstalling Cond. & Bra_ket	0 1 2	0 1 2	0 1 2	0 1 2
(Loosely)	0 1 2	0 1 2	0 1 2	0 1 2
Point Installation (15)				
Post Alignment	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Screw Placement	0 1 2	0 1 2	0 1 2	0 1 2
Spring	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Arm	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Braided Wire Position	0 1	0 1	0 1	0 1
Relative Speed	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Setting Points (25)				
Adjusting to Open	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
Sliding Condenser	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
Use of Gauge	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Evident Final Tightening	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Check After Tightening	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4
General Speed & Ease	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
Dust Cover Replacement	0 1	0 1	0 1	0 1
Key Installation	0 1 2	0 1 2	0 1 2	0 1 2
Fly Wheel Installation	0 1 2	0 1 2	0 1 2	0 1 2
Washer	0 1	0 1	0 1	0 1
Use of Tester	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3

Appendix C

Miscellaneous Information Forms

CLEMSON UNIVERSITY
CLEMSON, SOUTH CAROLINA 29631

SCHOOL OF EDUCATION

RESEARCH COORDINATING UNIT
FOR VOCATIONAL EDUCATION

Dear Sir:

According to our random method of selection, your students have been assigned to the group which (will, will not) use the programmed instruction manual in our evaluation project.

Included are some materials, including objectives, for your information. Objective tests will be sent later for you to administer and return to us.

We will select a few students from each school for manipulative tests which I will administer. You have indicated that you will teach the unit on ignition system repair on approximately _____ _____ . I will attempt to come to your school within ten days after the instruction is completed to adminster manipulative tests. If the date indicated above is changed or if you can give me a more precise date of completion at a later time, please let me know so that I can rearrange my calendar. I will try, however, to contact you by phone to make final plans for this visit. If you have any questions please write or call.

We appreciate your cooperation with our efforts.

Respectfully,

George Reed, Jr.

George Reed, Jr.
Graduate Assistant
Research Coordinating Unit
100 Godfrey Hall
Clemson University
Clemson, South Carolina 29631
Phone: 654-2421 Ext. 391

Teacher Information Form

School Name _____

County _____

Your Name _____

Home Phone Number _____

Number of Students _____

When do you plan to teach this unit? _____

Grade of students receiving instruction _____

_____

_____

_____

Do you have appropriate gas engines? _____

_____

_____

Do you have recommended tools? _____

FOR: Teachers using the Small Gas Engine Ignition Repair Programmed Instruction Booklet in the evaluation project.

SUBJECT: Your Comments on the booklet.

Please answer the following questions as fully as possible.

YOUR NAME_____

(1) Do you feel that brighter or less bright students benefit more from this type of instruction?

(2) How did students of different intelligence levels react to this type of instruction?

(3) Do you feel that slower students learned faster or better than they would with regular classroom instruction?

(4) Did this booklet save you any time? How?

(5) In what other ways, if any, did this booklet help you with your job as a teacher?

(6) What general improvements do you think could be made in developing more instructional materials of this kind?

(7) Would you like to have access to more material of this type?

(8) What are the faults, in your opinion, of this type of instruction?

(9) Does this type of instruction enhance the development of skills? How?

Please send this back with objective test answer sheets.

Thank you.

Appendix D

Analysis of Variance Tables

Coding:

Variable	Code
Race	1 - Negro 2 - White
Method	1 - Traditional Instruction 2 - Programmed Instruction Booklet
Facilities	1 - Adequate Facilities 2 - Questionable Facilities
D.A.T. Group	1 - 34 or Less 2 - 35-59 3 - 60 or above

Manipulative Test Scores

Analysis of Variance Table

Source	Sum of Squares	D.F.	Mean Square	F
RACE	7.92742	1	7.92742	0.16955
TRT	46.87968	1	46.87967	1.00268
FAC	13.27311	1	13.27311	0.28389
ERROR	2805.26959	60	46.75449	

Race	Method	Facilities	Mean
1	1	1	82.16401
1	1	2	83.23911
1	2	1	84.03592
1	2	2	85.11103
2	1	1	82.89151
2	1	2	83.96662
2	2	1	84.76343
2	2	2	85.83853

Objective Test Scores

Analysis of Variance Table

Source	Sum of Squares	D.F.	Mean Square	F
RACE	982.57557	1	982.57544	25.41615**
TRT	439.03472	1	439.03467	11.35645**
FAC	225.31375	1	225.31375	5.82816*
ERROR	11481.87346	297	38.65948	

Race	Method	Facilities	Mean
1	1	1	24.94114
1	1	2	22.77971
1	2	1	27.61148
1	2	2	25.45005
2	1	1	28.65675
2	1	2	26.49532
2	2	1	31.32709
2	2	2	29.16566

* indicates significance at the .05 level.

** indicates significance at the .01 level.

Manipulative Test - Considering DAT as a Variable

Analysis of Variance Table

Source	Sum of Squares	D.F.	Mean Square	F
RACE	5.62227	1	5.62227	0.12621
TRT	21.54407	1	21.54407	0.48363
FAC	25.73781	1	25.73779	0.57778
DAT	188.00417	2	94.00208	2.11022
COV. 1	105.24292	1	105.24292	2.36256
ERROR	2539.13168	57	44.54616	

Race	Method	Facilities	DAT Group	Mean
1	1	1	1	84.24882
1	1	1	2	83.68798
1	1	1	3	77.66006
1	1	2	1	85.77994
1	1	2	2	85.21911
1	1	2	3	79.19119
1	2	1	1	85.53792
1	2	1	2	84.97709
1	2	1	3	78.94916
1	2	2	1	87.06905
1	2	2	2	86.50821
1	2	2	3	80.48029
2	1	1	1	84.87891
2	1	1	2	84.31807
2	1	1	3	78.29015
2	1	2	1	86.41004
2	1	2	2	85.84920
2	1	2	3	79.82128
2	2	1	1	86.16801
2	2	1	2	85.60718
2	2	1	3	79.57926
2	2	2	1	87.69914
2	2	2	2	87.13831
2	2	2	3	81.11038

Objective Test - Considering DAT as a Variable

Analysis of Variance Table

Source	Sum of Squares	D.F.	Mean Square	F
RACE	297.83346	1	297.83325	9.31078**
TRT	451.52989	1	451.52979	14.11560**
FAC	37.89011	1	37.89011	1.18451
DAT	188.01920	2	94.00960	2.93890
TRXDAT	68.95106	2	34.47552	1.07776
COV. 1	361.65405	1	361.65405	11.30593**
ERROR	8316.87929	260	31.98799	

Race	Method	Facilities	DAT Group	Mean
1	1	1	1	26.64531
1	1	1	2	26.02827
1	1	1	3	23.37756
1	1	2	1	25.68639
1	1	2	2	25.06934
1	1	2	3	22.41864
1	2	1	1	28.36394
1	2	1	2	30.32812
1	2	1	3	26.53411
1	2	2	1	27.40501
1	2	2	2	29.36920
1	2	2	3	25.57518
2	1	1	1	28.95546
2	1	1	2	28.33841
2	1	1	3	25.68771
2	1	2	1	27.99653
2	1	2	2	27.37948
2	1	2	3	24.72878
2	2	1	1	30.67408
2	2	1	2	32.63826
2	2	1	3	28.84425
2	2	2	1	29.71516
2	2	2	2	31.67934
2	2	2	3	27.88532

** significant at .01 level.

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MORGAN, ROBERT L.
THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS.

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ABSTRACT - TO DETERMINE THE EFFECT OF COLOR AND BLACK AND WHITE TEXTBOOK ILLUSTRATIONS ON IMMEDIATE AND DELAYED (SIX WEEKS) RECALL OF INFORMATION AND TO DETERMINE IF THERE IS AN INTERACTION BETWEEN COLOR AND ECONOMIC STATUS OR RACE OR ECONOMIC STATUS BY RACE ON RECALL, STUDENTS FROM 18 NORTH CAROLINA PUBLIC SCHOOLS WHO WERE ENROLLED IN NINTH GRADE AGRICULTURE WERE RANDOMLY SELECTED BY RACE AND ECONOMIC STATUS AND ASSIGNED TO BLACK AND WHITE OR COLOR TREATMENTS. STUDENTS RECEIVED TWO INSTRUCTIONAL UNITS, ONE ON TRACTOR MAINTENANCE AND THE OTHER ON MOWER REPAIR, WITH ORDER OF TEXTUAL AND COLOR PRESENTATION CONTROLLED. KNOWLEDGE AND COMPREHENSION ITEMS WERE DEVISED ON MATERIAL PRESENTED BOTH IN WRITTEN AND ILLUSTRATED FORM, AND STUDENTS WERE TESTED AT THE END OF EACH WEEK FOR SIX WEEKS AND AGAIN SIX WEEKS LATER. THE RESULTS INDICATED THAT COLOR DID NOT PRODUCE SIGNIFICANT EFFECTS WITH EITHER COMPREHENSION OR KNOWLEDGE TYPE ITEMS, AND THE VARIOUS INTERACTIONS WITH RACE AND ECONOMIC STATUS WITH COLOR PROVED TO BE GENERALLY INSIGNIFICANT. THE ECONOMIC STATUS BY RACE BY COLOR EFFECT GENERALLY INDICATED THAT HIGH ECONOMIC STATUS WHITES BENEFITED SOMEWHAT, BUT THE BENEFITS TO OTHER GROUPS VARIED GREATLY. IT WAS CONCLUDED THAT COLOR WAS GENERALLY A WEAK INSTRUCTIONAL VARIABLE AND THAT MORE RESEARCH IS NEEDED. (AUTHOR/SB)

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THE EFFECTS OF COLOR IN TEXTBOOK ILLUSTRATIONS ON THE RECALL AND RETENTION OF INFORMATION BY STUDENTS OF VARYING SOCIO-ECONOMIC STATUS

Robert L. Morgan
Center for Occupational Education

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PREFACE

There is an old saying that "its a poor workman who doesn't know his own tools." If there is a grain of truth in this bit of folk wisdom, it is apparent that educators are among the poorest of workmen. The tools of the educator over the last several centuries have been textbooks, yet so little empirical research on textbooks has been undertaken that no one in the field of education can state, except intuitively, the criteria for a good textbook. It is difficult to imagine this situation obtaining in other areas. For instance, any industrial firm would know the characteristics and capabilities of a machine they used to make their product. The manager of the firm would be able to supply information on the speed, efficiency and output of his machinery and be able to compare his machine to others in these terms and in terms of cost. This knowledge is indispensable to industry where competitive marketing necessitates such detailed knowledge for future financial planning.

With the costs of education constantly rising, the need for research into the educator's tools and their efficiency is becoming more obvious. We have taken textbooks for granted for too long a time, and with the development of Computer Assisted Instruction the paucity of our knowledge about textbooks will become even more apparent. How will we ever begin to compare the efficiency of CAI and other new forms of instruction, when we do not even know the characteristics of the books these new forms will be compared to?

The Center extends its appreciation to Dr. Robert Morgan for completing the report and to the following persons who provided assistance in the development of the research project and reviews of the results:

Dr. J. W. Cunningham, Associate Professor of Psychology
Dr. Donald W. Drewes, Professor of Psychology
Dr. Howard G. Miller, Professor and Head, Department of Psychology

all of North Carolina State University.

The assistance of the American Association for Agricultural Engineering and Vocation Agriculture is also gratefully acknowledged. Without the assistance of the Association in preparing the textbooks for use in the project, this project would not have been possible.

The Center also thanks Miss Susan Babcock for her assistance in preparing the graphics included in the report, and J. K. Dane for editorial assistance in the preparation of the final manuscript.

John K. Coster
Director

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ABSTRACT

A study was conducted in 18 North Carolina public schools. The schools were randomly selected from those schools offering ninth grade agriculture. Students were blocked on race and economic status. The purposes of the study were to: (1) ascertain if there was a differential effect between the effect of the use of color and black and white illustrations in textbooks on two factors; the recall of information immediately after the completion of an instructional unit, and the recall of the learned material six weeks later, and (2) ascertain if economic status, race or an interaction of race by economic status interacts with the color variable to produce a differential effect in terms of the immediate and delayed recall of information presented in an instructional unit.

Two heavily color-illustrated textbooks were selected and black and white versions were produced. Students were randomly selected from each school by race by economic status cell and randomly assigned to black and white or color treatments. The order of presentation of the two texts was controlled for. Items were devised on the material presented both in written and illustrated form, and both knowledge and comprehension items were developed.

The results indicated that color did not produce significant effects with either comprehension of knowledge type items, for either of the two subject matter areas. The various interactions with race and economic status with color proved to be generally insignificant. The economic status by race by color effect generally indicated that high economic status whites benefited somewhat, but the benefits to other groups varied greatly.

It was concluded that color was generally a weak instructional variable and that more research is needed on the proposed problems.

TABLE OF CONTENTS

	PAGE
PREFACE	ii
INTRODUCTION	1
The Problem	4
Background and Significance of the Problem	6
Theoretical Framework	11
Objectives	21
METHODOLOGY	22
Population and Sample	22
The Experimental Design	22
Classification Factors	30
Treatment Factor	31
Dependent Variables	33
Hypotheses to be Tested	34
Experimental Procedures	35
RESULTS	37
CONCLUSIONS AND RECOMMENDATIONS	44
BIBLIOGRAPHY	48
APPENDICES	54
Appendix A. Dependent Variables, Inferential Statistics and Descriptive Statistics	55
Appendix B. Steps in the Preparation of a Publication by the American Association for Agricultural Engineering and Vocational Agriculture	112

3502

INTRODUCTION

For as long as man has been writing, he has been illustrating his words with pictures. As long as 2000 years ago, the people of the Indus Valley were writing a pictographic script which was often accompanied by stylized pictures, generally of animals (Chard, 1969). Unfortunately, since no one has been able to decipher the script, we have no way to tell what relationship the pictures bore to the text. The early history of the use of illustrations, however, indicates that they were viewed as a form of art, rather than as a practical device for the communication of ideas. Many manuscripts of the early middle ages were beautifully decorated by illuminators who often drew fantastic creatures along the margins of the text.

The first known use of illustrations as aids to the learning process began approximately five centuries ago in geography, travel, and nature books. Explanatory illustrations, which were first employed about 1460, were used to clarify the textual material and to make it more vivid. With the advent of this combination of text and illustrations as an explanatory aid, the illustrated textbook came into existence. The inclusion of illustrations represented a departure from the earlier practice of "illustration for art's sake," because of the key role played by the illustration in conveying information (English, 1961).

Howard (1947) stated:

> Early popular books included many illustrations and many kinds of illustrations. Der Edelstein, 1461, was a collection of fables with 101 woodcuts. A few years later, Aesop appeared with 200 pictures. In 1478, Ptolemy's Cosmographia had maps. The same year, Braydenbach's Pilgrimage, a famous travel book, included many pictures to illustrate foreign lands. In 1488, John Widman printed the Algorithmus Linealia showing illustrations of commercial customs and exchange, geometric diagrams, various tables, and examples of arithmetic operations. Three years later, Pictagoris Arithmetrice Introductor was published in Florence, Italy, which included 39 illustrated problems. About the same time, Summa was printed as the first work to illustrate finger symbolism of numbers, with 36 positions of the fingers and hands shown. The first printed Euclid had 420 diagrams in the margins. Music books of the times included both music scores and pictures. Even Latin grammars were illustrated and in 1545, Henry VIII authorized the Primer with religious pictures Hence, Comenius' Orbis Pictus which appeared later, was not the first illustrated school book, as is sometimes supposed (p. 28)

Mahoney, Latimer, and Folmsbee (1947), in Illustrations in Children's Books, gave an interesting account of the historical developments in illustrations in the United States:

> The earliest reader to use illustrations is considered to

be Webster's The Little Reader's Assistant, 1790, and those illustrations were used in Samuel Cooper's History of North America, 1873.

The first textbook that was printed throughout in blue ink was the Chirstmas Primer, 1839. Some writers acknowledge that this is the first use of colored print in textbooks. At this time the English color printer, Edmund Evans, and the author, Walter Crane, were responsible for a movement to produce better color illustrations (p. 27).

The functional purpose of clarifying and supplementing texts with illustrations seemed to change around 1850 (Howard, 1947), apparently because of a change in the printing techniques employed. The woodcutters of this time tended to convey little of the original meaning of the illustration on successive cuts of the same illustration.

As improvements in the printing process and reproduction were developed, the artistic skills were moved to the fore, and the relationship of the illustration to the test slipped to an incidental position.

Observations by teachers that children were paying little or no attention to the illustration during study periods led to a growing conviction that they were of no value in texts. At this time (approximately 1880) the purpose being served by illustrations was simply that of artistic decorations (Howard, 1947, p. 28).

However, there proved to be a resurgence in the instructional use of illustrations in textbooks. In 1933 Gunderson (1933) analyzed ten primary readers with respect to the illustrative materials that were used and found that about one quarter of the page space was devoted to such materials. Later, Kennedy (1945) analyzed the illustrations used in ten first grade readers and found that 90 percent of the pages in all books contained illustrations. Kennedy further indicated that one-half of the space in the selected readers was illustrated. Kambly (1943) analyzed illustrations used in science textbooks and found that the average illustrated space of fifteen science books was approximately 22 percent.

The manner of selecting illustrations for textbooks has undergone a great change in the last thirty years. "Two representative publishers" admitted to Kambly in 1939 that they had no criteria for selecting illustrations other than the intuitive judgments of the authors or editors (Kambly, 1943). More recently Lloyd W. King observed that modern textbook publishers now select pictures with the criteria that the illustrations must be an integral part of the text itself and, additionally, that these illustrations may be used as teaching devices (King, 1945).

Other investigators also found support for the proposition that illustrations were no longer being used simply as decorative devices. They stated:

> No longer are illustrations hurriedly collected, indiscriminately selected, and dumped in for ornamental purposes . . . in fact the illustrations for a good modern textbook are integral parts of it (English, 1961, p. 9).

The present author recently sent letters to twenty of the largest textbook publishers requesting information concerning the criterial for illustration selection for textbooks. The eight publishers who replied all stated that they had no objective criteria. Most of the publishers agreed that illustration selection was based on author's and editors' whims, as well as the probably marketability of the texts. One publisher, W. W. Norton and Company, claimed that the question of selection is not a legitimate scientific question, rather it is an artistic one.

Thus, while illustrations now seem to be more carefully considered than they have been in the past, there is still ample support for Kambly's contention that there is no empirical basis for the selection of illustrations for inclusion in textbooks. In fact, Kambly's remarks may be taken one step further. There seems to be little empirical justification for the use of illustrations in textbooks at all, and particularly, the use of colored illustrations as valuable pedagogical adjuncts to textual material is unsupportable on the basis of available research.

The Problem

This study is directed towards the broad problem of producing instructional materials which can be demonstrated to increase the efficiency of learning and comprehension. More specifically, the primary purpose of the present study was to ascertain if there was a differential effect between the effect of the use of color and black and white illustrations in textbooks on two factors: the recall of information immediately after the completion of an instructional unit, and the recall of the learned material six weeks later.[1]

The second purpose of the present study was to ascertain if economic status, race, or an interaction of race by economic status interacts with the color variable to produce a differential effect in terms of the immediate and delayed recall of information presented in an instructional unit.[2] That is, does color produce differential learning effects on persons of different economic status? If differences do exist in the effect of color on persons of different economic status, this might explain why the hypothesized differences due to color have not been empirically found. For instance, it might be possible that color could increase learning in lower economic status students, while decreasing or not effecting it in the middle or upper economic status students.

If this interaction between color and economic status or race, or economic status by race is shown not to exist, it would indicate that the color effect is independent of the economic status or race of the student. The heuristic reasons for this investigation are obvious, since the above interaction has not been directly investigated. The practical use of this information would depend on the results. Consider the case in which there is a significant difference in learning due to color: (1) a significant interaction between the color variable, and the concommitant variables might indicate how "best" to use color illustrations in textbooks, and (2) an insignificant interaction would indicate that the color effects on learning are independent regardless of economic status or race. Next, consider the case where color is found to have an insignificant effect on learning: (1) if a significant

---

[1] Henceforth, illustrations refer to man-made visual representations, and pictures refer to machine-made (photographed) visual representations. Visuals refer to the class containing these two subsets.

[2] For the present study, race is defined as the response to the question, "What race are you?" That is, genetic factors are ignored, and race is considered a social phenomena. The economic status variable is defined as a variable with two states, middle and low. Low status is defined as receiving at least one free lunch at school in the past three years. Middle status applies to those that have not received lunches.

interaction occurs, one would detect a color effect that differs among persons in terms of their economic status (this effect might not have been noted if the students had not been classified on race and economic status); and (2) an insignificant interaction might provide no new information but would reinforce the view that color has no effect on learning regardless of economic status.

Background and Significance of the Problem

Often, in the literature of the social sciences, we find a situation where the belief of the layman, even the experienced layman, is at variance with the results of research. The question of the effects of the use of colored textual materials in the learning process is one of these situations. There are widely held opinions in the literature on audio-visual aids and other educational sources that color has been considered an important variable in the effective use of textual materials. However, the research literature that is available does not support this observation. Yet in the face of this contradiction, millions of dollars are spent yearly to produce books filled with colored illustrations and printed with highly sophisticated and expensive techniques.

Although the figures are now sadly out of date, the following quotation should provide some idea of the economic magnitude of the problem:

> Based on reports covering 93 percent of the texbook business, a reliable estimate of the total value of the sales in 1957 was $277,000,000. The corresponding figure for 1946 was $107,250,000 . . . The causes of this large increase were many . . . during recent years a complete revolution in illustration and design has overwhelmed the textbook publisher . . . Full color and offset printing are in demand in most elementary books, and in some high school books . . . there is a crying need for research concerning the use of color in textbooks (Buckingham, 1960, pp. 1521-1522).

However, the issue to be examined is not simply an economic one. A question of greater importance is the pedagogical value of the use of color in textbooks. Hopefully, the present study will provide a contribution to our basic store of knowledge about the effects of color on learning.

The "crying need for research" noted by Buckingham in 1960 was still a crying need a full decade later. After an extensive review of the literature, only two studies of the effects of colored visuals on learning from textbooks could be found. The first of the two studies was conducted by Ibisen (1952). The subjects for his experiment, one hundred and fourteen second grade students from Bloomington, Indiana, were randomly assigned to one of three treatment conditions. The first group received three texts with no illustrations; the second group received the same three texts with black and white illustrations; and the third group received these three texts with colored illustrations. The study was conducted under laboratory conditions; that is, students were individually subjected to the treatment. Each student received the three texts according to the treatment condition to which he had been assigned.

After reading the text, or the text and illustrations, the subjects were asked to recall certain particulars about the story. The experimenter kept a shorthand record of all recorded responses that the child gave regarding what he had read. Every sentence from the story was scored as a

correct response, and a system was devised for dealing with the responses in the illustrative materials that were not present in the text alone.

Ibison (1952) tested the null hypothesis "there are no differential effects in recall of textual materials and illustrations associated with the presence of either colored or uncolored illustrations (except such effects as may be due to chance variations)" (p. 15). He stated that the colored versions of two stories yielded significantly superior results with respect to the number of scored responses, resembling statements in the text, and relating to the text and illustrations. In the case of the third story, no significant difference was found between any of the editions (colored or black and white illustrations). In addition, he also found that color editions yielded more favorable types of affective responses than black and white editions, and in fact, were preferred by over 45 percent of the students, substantiating research from related areas indicating that children prefer color (Bamberger, 1922; Miller, 1936; Rudisill, 1952; Keehn, 1955 to name only a few).

For the present discussion, the most important finding of the Ibison study was that "the editions with color and black and white illustrations produced almost exactly the same number of recalled illustrations," (Ibison, 1954, p. 110). On a more subjective level, he reported results on the interest level of children in the stories without regard to illustrations. Ibison stated, "illustrations may be necessarily inversely needed in proportion to the intrinsic interest of the story," (p. 111). He concluded that illustrations seemed to have the greatest value in the least popular story while in the most interesting story, illustrations seem to have no effect or possibly even a distractive effect.

A later study, performed by English (1961), was an attempt to evaluate and compare learning achievements of second and fifth grade pupils, in order to ascertain whether there was a significant difference in learning when selected units of science and arithmetic subject matter used colored rather than black and white illustrative materials. This study was conducted to examine Ibison's conclusion that colored illustrations do not make a contribution to the learning process. English (1961) criticized Ibison's work on two points; (1) it was "extremely clinical," that is, subjective techniques were employed; and (2) the research was conducted in a laboratory setting outside the classroom environment.

English (1961) attempted to answer the following questions:

1. Are there statistically significant differences in acquisition of knowledge by second and fifth grade children as they study selected units of science and arithmetic subject matter through the use of color as opposed to black and white textual materials?

2. As children mature, their perceptive abilities and needs may change; are there any noticeable changes in the effectiveness of colored instructional materials on the acquisition of knowledge by children in the fifth grade when compared to that of children in the second grade?

3. Are there subjective opinions held by those individuals in the experiment (both students and teachers) with regard to the effectiveness of colored materials, and if such subjective opinions do exist, are they supported by the statistical evidence obtained?

English (1961) drew the following three major conclusions as a result of his analysis of the data:

1. If the color influences the acquisition of learning of grade school children at all, the effective use is that which employs large blocks of color to arrest attention(as was found in the fifth grade materials in arithmetic selected for the experiment) with important information being over-printed on these blocks of color.

2. If there is any significant advantage for the acquisition of learning when color is employed in groups of objects to show a number concept in second grade arithmetic; when color is used to achieve realism in science illustrations; and when color is employed in diagrammatic usage such as charts, graphs, and cartooning in both second and fifth grade science, this experiment cannot discern it.

3. Of all of the many variables which were presented, or were introduced in classrooms involved in this experiment, the interaction of teachers and instructional units in the role of effectiveness of teachers themselves constitute a significant phenomenon.

There seems to be a singular lack of results providing positive evidence for the effects of color in textbooks on the learning process. Yet, the fact remains, many textbook companies are advertising the number of colored illustrations as a major sales point of their texts. Many teachers believe, in fact, that color does tend to aid learning, yet research provides no evidence of such a relationship. However, using two widely different techniques, the same conclusions were reached; that is, color was not proved to have a positive effect on the learning process.

Although there are apparently only two extant studies on the use of colored visuals in textbooks, there are a number of studies of color and its effect on learning in other media. Since these studies are only suggestive and not conclusive when applied to textbooks, they will be mentioned only briefly.

McLean (1930) conducted one of the first studies dealing with the effects of color and black and white illustrations on "learning." He presented color and black and white pictures in order to ascertain the difference with respect to learning and preference. He found that "the colored flat pictures produced a greater range in accuracy of reporting with 57 percent of the 152 subjects," (p. 199). The subjects in McLean's experiment were high school age boys. He used six autochromes from magazines and some colored and black and white postcards. He discovered that in nine out of twenty items tested, color was superior; in five items black and white was superior; and in the remaining six there was little difference. The total superiority of colored pictures was thirty points

on McLean's scale, which proved insignificant when divided among 67 students.

Research has also been conducted on black and white versus color films. Out of three studies examined, two (Gibson, 1947 and May and Lumsdaine, 1958) support the contention that learning is not affected by the use of color. The third study (Vander Meer, 1952) had somewhat different results and the implications are interesting to contemplate. Vander Meer (1952) conducted two experiments on the effects of color on learning by way of films. One study merely confirmed the results of previous studies in demonstrating no differential effect on learning attributable to the use of color. However, this experiment was concerned solely with the immediate recall of facts presented in the films. In a separate experiment testing both immediate and delayed recall, Vander Meer found evidence to indicate that the use of color may have increased delayed recall of facts. From a selection of five films presented in both color and black and white versions to samples of students, a test of delayed recall given six weeks after the showing of the films revealed that there was a difference in the delayed recall of facts of two of the color films significant at the .01 level. A third color film showed a difference in recall significant at the .05 level. Though not conclusive, these findings do indicate the possibility that delayed recall may be increased by the use of color. From a pedagogical point of view this would be a most important consideration.

As implied earlier, there have been a large number of studies showing that children prefer colored to black and white illustrations and films. However, in an academic situation the question is not necessarily one of preference, but rather of learning efficiency and unit cost. Students are required to read textbooks so the question of preference becomes secondary to that of pedagogical efficiency, and entirely irrelevant to a study of color in textbooks.

One other study needs to be mentioned in outlining the significance of the problem approached in this study. In a series of experiments, Dwyer (1967 a, 1967 b, 1968 a, 1968 b, 1968 c, and 1968 d) attempted to determine the effects of realism in illustrations on learning. Although the color problem was not approached specifically, some of Dwyer's findings related to the question of the instructional value of color. In summarizing his research on visuals, Dwyer stated:

> For specific types of students, the addition of color in specific types of visual illustrations is an important instructional variable in increasing achievement of specific educational objectives (Dwyer, 1969, p. 16).

Dwyer's findings thus reopen the entire case for research into the effects of color on learning. Many of his illustrations were presented in textbook-like programmed booklets, which has interesting implications for the present project. Most importantly, his studies indicate the possibility that earlier studies of the effects of color may not have presented the appropriate materials in a manner which would allow for the

detection of a color variable. In short, Dwyer has demonstrated the possibility that certain types of color illustrations may have an effect and it is in the hope of confirming or denying this possibility that the present study is being conducted.

Theoretical Framework

Before attending to the development of the theoretical framework for the present study, a distinction must be drawn between the use of illustrations as "adjuncts" to textbooks and their use when integrated into the text. This distinction is fundamental to the present study. Samuels (1970) reviewed the body of research material on the use of illustrations as adjuncts to textbooks. He considered an illustration of an adjunct when the "text (could) be comprehended or the objects of the lesson fulfilled when the pictures (were) removed (p. 397)." For purposes of this study, an illustration is considered "integrated" when the text or lesson cannot be understood except by reference to the illustration.

Samuels (1970) review covered two important aspects of the use of visuals as adjuncts to textbooks; their effects on learning to read and their effects on comprehension. After a detailed and comprehensive review, he drew the following conclusions:

> 1. The bulk of research findings on the effect of pictures on the acquisition of a sight vocabulary was that pictures interfere with learning to read.
>
> 2. There was almost unanimous agreement that pictures, when used as adjuncts to printed texts, do not facilitate comprehension... (p. 405).

These conclusions are important not only for the present study, but they are also relevant to a condemnation of present publishing practice with regard to the "artistic" use of illustrations. At present, the use of visuals as adjuncts to textual material is nearly universal in textbook publishing, particularly in elementary through secondary grades material. The only notable exception to this common practice is the Bloomfield and Barnhart (1963) readers which have been used to teach reading without pictures. Samuels (1970) noted in passing that teachers usually accept the fact that a text contains illustrations without being overly concerned about their effects on learning.

In view of Samuels' (1970) excellent treatment of this literature, it would not appear profitable for the present study to undertake an examination of the effects of color versus black and white illustrations used as adjuncts to texts. After all, if illustrations used in this way are demonstrably worthless, the comparison of color and black and white would be meaningless. Thus, the present study undertakes to examine illustrations <u>only</u> when they are integrated with the textual material. Here, obviously, we are on firmer ground. If the text cannot be fully comprehended without the illustrations, there is an obvious learning effect from the pictures and we may reasonably undertake the problem of whether or not a differential color effect exists.

Let us now refer to the previous studies on colored visuals and their corresponding theoretical frameworks. McLean (1930) based his

study on the theory that since colored illustrations were preferred to black and white illustrations, more time would be spent viewing the colored illustrations; therefore, more learning would occur. The study produced no significant color effect. Ibison (1952) used as his theoretical base the premise that color would have an attention-getting effect. This attention-getting effect would motivate the child to become more interested in the text, thereby increasing learning via increased attention. No color effect was noted. English (1961) based his study on the proposal that color would add two elements to the instructional situation. He selected textual materials for science classes in terms of the "realism" of the illustration and, for the math class, in terms of the attention-getting properties of the illustrations. Neither type of illustration produced a significant effect in terms of learning. Gibson (1947) selected his films in terms of realistic uses of color. He reported no color effect, as did May and Lumsdaine (1958), using a similar theoretical framework. Vander Meer (1952) based his research on a three factor color theory: (1) color may be an important cue for learning what the film is intending to teach, if color aids in identification (e.g., birds, snakes, or flags); (2) color may be used for emphasis, to make objects stand out; and (3) color may simply be pleasing to the learner. He reported color effects in delayed recall of information presented in three of the films in one of his two experiments. Only one of the ten films produced an immediate recall effect. However, he concluded that while color produced significant statistical effects, and color may aid learning to a degree, it is not a crucial cue indispensable for learning. What then can color contribute to learning, if the proposed realism, motivational, and attention-getting effects have not produced significant differences in learning?

Dwyer (1968a, 1968b, 1968c, and 1968d) studied the effects of realism in visuals. He based his studies on an unresolved issue in the construction of instructional visuals: should illustrations be made as realistic as possible? Morris' (1946) iconicity theory, Carpenter's (1953) sign similarity theory and Dale's (1948) cone of experience theory, would each predict that the closer a visual approaches its manifestation in the real world, the more learning would take place.

Other theorists, notably French (1954), Miller (1957), Rappaport (1957) and Travers et al. (1946) contended that the effectiveness of learning may be promoted up to a point by additional cues, but past that point additional cues may overload an individual's information processing capacity (channel capacity), hence hindering rather than aiding learning. Broadbent (1965) supports this "channel capacity" notion and proposes a physiological filter in the nervous system to prevent over loading the system.

The results of Dwyer's (1967b, 1968a, 1968b, 1968c, and 1968d) experiments support the "channel capacity" theorists, rather than the "realism" theorists, thus adding weight to the contention that realism does not aid learning in and of itself.

Dwyer (1968a, 1968b, 1968c, and 1968d) applied the same treatment

to ninth, tenth, eleventh, and twelfth grade students, and reported that there was a color effect in the ninth and twelfth grades and no effect in the tenth and eleventh grades, averaged over various types of illustrations. However, this author believes that an alternate interpretation of Dwyer's results should be examined. While it is not possible to establish statistically that an interaction exists between illustration type and the color variable because Dwyer's raw data are not available, examination of his available data (on the total criterion tests) indicates that such an interaction probably does exist. In the case of the line drawings, color had a consistent interfering effect. For the model picture and realistic photographs no such trends could be discerned. In the case of shaded-detailed drawings, however, color had a consistent facilitory effect.

It is necessary to examine both his illustrations and his criterion tests in order that a comprehensive explanation of his results may be developed, since his investigation was not directed toward the color problem per se. By necessity then, the conclusions are subjective and ex post facto, but it is believed that the inconsistencies in Dwyer's results warrant such an examination.

The total criterion score, as conceived by Dwyer, consisted of the sum of the scores on four subtests. Due to the increased number of items, this test is more reliable than the individual subtests. However, in order to explain the results found in the total criterion test, it is necessary to examine each of the subtests. The results of the analysis of the drawing test scores indicated that black and white line drawings were the "best" type of illustrations. The results of the model test scores indicated that color shaded detailed drawings and the color model photographs were the "best" illustrations from Dwyer's heart model test. The terminology test score results indicated that illustrations do not aid learning of the type measured by this test. On the comprehension test, the color shaded detailed drawings were by far the best type of illustration.

As one can readily see, the most effective type of illustration was determined by the learning objective of the various tests. If one wants a student to draw and label a given object, a black and white line drawing should be used to supplement textual material. It is proposed that this facilitation is due to the fact that most students produce line drawings, when asked to draw something. To simply learn the meaning of terms, a text alone is sufficient. To learn the relationship between parts (comprehension), color shaded detailed drawings are "best." To identify structures in a model both color shaded detailed and color model photographs are good. For learning all of these test objectives, color shaded detailed drawings are the "best," and was the only type of illustration that consistently yielded a color effect.

The black and white drawings were consistently better than the color line drawings, and color shaded detailed drawings were consistently better than black and white shaded detailed drawings. Examination of the illustrations and the concomitant test items revealed that

for the line drawing, structural components were not delineated in terms of the concepts to be learned. That is, color was not used to isolate structural components; rather, it was distributed in a seemingly random fashion. Hence, due to the irrelevant additional stimuli in the color line drawings, discrimination of the parts of interest was made more difficult. In the line drawing there was seemingly no effort made to interrelate various structural components that were being treated by the text. In addition, structural parts performing the same function were linked to each other by the use of color.

Having surveyed these studies, it is obvious that with different theoretical frameworks and methodologies there has been a distinct shortage of empirical support for the theories that have been forwarded. Even Vander Meer (1952) whose study provided some empirical support for the notion that color aids learning, notes that his results have little practical utility. In fact, of all studies surveyed, it is the work of Dwyer, who was not studying color per se, which is most suggestive for the development of a theory of the manner in which color might be employed to aid learning.

Dwyer's studies suggest a number of hypotheses relevant to the use of color, illustrations in general, and their relationships to the learning process.

First, his work suggests that illustrations may, in some circumstances, interfere with the learning process. This might occur in cases where the illustrations were added without regard for their pedagogical value, simply to add "interest" or "variety." In these cases, they may be viewed as irrelevant stimuli, or noise. In connection with this, it is also possible for color itself to interfere as an irrelevant stimulus, when it is used randomly and without purpose.

Second, it appears that the effectiveness of illustrations is related to specific instructional objectives. For example, in Dwyer's (1968a, 1968b, 1968c, and 1968d) studies text alone was enough to present meanings of various terms, while the identification of structional components required at least a line drawing, and functional relationships required at least color shaded detailed drawings. This example is suggestive of two other conclusions. First, the type of illustration may interact with color with varying effectiveness; and second, color should be used to isolate structional and functional components. Therefore, for presenting relationships between parts and the pairing of names with structional components, it is proposed that color can have an effect on the learning process.

Using the implications from Dwyer's work[3] as a base, and taking into consideration the findings of previous studies, the following postulates may be made with regard to the use of color in textual materials:

1. Color should not be used to add realism to illustrations, to increase motivation due to increased pleasure in viewing colored visuals or as an attention-getting device.

2. Color should be used to delineate the various structural components in an illustration, and to delineate the various functional components in an illustration.

It is to the second postulate that the remainder of this section will be addressed. From this postulate and studies on verbal learning, a heuristic theory of the effects of color will be developed for illustrations that supplement instructional materials. It should be noted, at this point, that this theory is not being formulated as a hypothesis for empirical testing, but rather as a general framework within which to conduct empirical research on the general question of the effects of color.

It is proposed that if color is an important variable in illustrative materials, it is in providing additional "coding information." English (1961) claimed that there was no increased amount of information in his colored illustrations. The author wishes to distinguish between "coding information" and the "objective information" which English (1961) discussed. While the same "objective information" exists in both black and white and colored illustrations, the "coding information" differs due to the structure of the English language, since we do have names for colores and no such names for shades of gray. That is, in specific types of illustrations color can be used in order to isolate components in a way that black and white cannot. For example, color would tend to unify a component into a discrete "whole," while a component shaded in gray may be viewed as a "whole" or simply part of a "greater whole." Color then would provide the learner with an increased number of coding possibilities, assuming that the color coding is related to the concepts to

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[3] It has recently come to the author's attention that Dwyer's (1968a, 1968b, 1968c, 1968d, and 1969) studies were based on results reported in A Study of the Relative Effectiveness of Varied Illustrations. Upon careful examination of the sampling plan of this series of studies, a question was raised about the sampling techniques employed. Dwyer (personal communication from Francis M. Dwyer, Jr., The Pennsylvania State University) stated that classes were selected from two schools to participate in the study, and that his nine treatments were randomly assigned to the classes in the two schools. The statistics which he employed to analyze the results treated the students rather than the classes as the experimental unit, and the schools were completely confounded with the treatment.

3517

be learned. On the other hand, if the color is not related to any structural or functional component of the illustration, then a negative effect may be noted due to the hypothesis that individuals would tend to be distracted from the concept to be learned.

There is some support for the idea that the use of color can help the viewer recognize discrete units. Hebb (1949) makes the point that the "primitive unity" of a figure is its simplest aspect. By "primitive unity" he means that a bounded area will be seen as a unit standing out from the background. The concept of "primitive unity" is similar to Rubins' (1915) concept of "figure and ground." The primary phenomenal difference between figure and ground lies in the fact that figure has form while the ground does not. This phenomenological occurrence can be produced either by color or by shades of gray, in which all components of a given color or shade of gray become the figure and the background and all other components are seen as ground. For the purposes of this study, it is predicted that color will serve as a more effective method of producing recognition of units as discrete wholes. In large measure this presumption is based on the fact that colors themselves have discrete names, whereas shades of gray can only be referred to relatively. In fact, Wertheimer (1923) demonstrated the perceptual grouping principle of "similarity," where colored dots of the same color tend to be seen as a group. It is assumed that both shades of gray and color may be used as grouping devices by lending "sameness" to structural or functional components. This predicted "sameness" is either facilitory or interfering, depending on its relevance to the concept to be taught. As before, it is assumed that color will convey the idea of unity more effectively.

If color does have the effect of producing an idea of "discrete unity," it should have an effect on learning. Since the subject will be better able to apprehend the "primitive unity" of the structure on figure he is to learn, he will be more capable of pairing this unity with a name. It could be argued that the pairing of structures with the name is analogous to paired-associate learning since paired-associate learning is concerned with learning pairs of entities and their linkages.

Weiss and Margolius (1954) conducted a study in which color served as a context stimuli. The results indicated that colored cards used to present stimulus terms produced a significant increase in the number of paired-associates recalled. While the authors offered no explanation, Saltz (1963) interpreted the results of this study in terms of a stimulus differentiation hypothesis which he had proposed. This hypothesis was developed from an examination of the empirical results of a number of studies which indicated that the differentiation between stimulus terms and the differentiation between the response terms was a key factor in learning. Specifically, the less the similarity in stimulus terms or response terms the greater the differentiation and the greater the probability that the S-terms will elicit the appropriate response terms. In Saltz's (1963) study, color was found to be a significant factor in learning when used to differentiate either stimulus or response terms.

Underwood (1963), on the other hand, argues that subjects select the simplest aspects of a complex stimulus to respond to, and he proposes that subjects select that part of the complex stimulus that is just "sufficient" to produce the correct responses. Birnbaum (1966) suggested that a mediational hypothesis might explain Saltz's (1963) results. The mediational hypothesis suggests that the stimulus word is associated with the color and then the color is associated with the response term. Hence, either the color or the word should produce more appropriate responses than chance. Her results tend to support this proposition. All three of these theoretical propositions have been supported in later studies. No matter which explanation one accepts for the results of these paired-associate studies, it is evident that color can be used to increase learning.

In considering Dwyer's work (1967b), it appears that any of these three theories could be used to explain Dwyer's results. However, used in conjunction, these theories do indicate that a complex stimulus, color, should be used to: (1) isolate critical cues; (2) differentiate these critical cues; and (3) where possible, the choice of color cues should be used consistently for both isolation and differentiation.

A concrete example may serve to point out how these principles may be applied to the construction of visuals. Given one illustration representing a car's engine, one would first attempt to isolate the logical structural elements. If only one element from this rather complex stimulus were being discussed, and only one illustration were being used, color could be used to simply separate the part under discussion from the rest of the stimulus in the illustration. This process is analogous to cue selection. If several parts of an illustration were being discussed, different colors could be used to isolate the structural parts and separate them from one another. Only when two illustrations are employed does the mediational hypothesis become important. When two illustrations are depicting similar structural parts the same color should be used in each illustration to delineate those structural parts where possible.

Up to this point we have discussed how color might be used to reduce the complexity of a complex whole. However, in most complex wholes certain parts are functionally related. Hence, the distinction is made between functional and structural color coding. The structural coding simply would delineate structural parts that are of special interest in a given passage, which is named in the text or diagram. The task of the student is to match the structural components with the correct name. This is also true for functional components, but functional coding would also unite a series of structural components involved in the same function. It is the student's task to remember these structural parts as a unit. These two tasks have analogous counterparts in verbal learning. The matching of the structural or functional component with its name is similar to paired-associate learning which has already been discussed. The grouping together of similar components is similar to clustering.

Color could be used to provide the linkages between these parts and hence, restore "primitive unity" to these parts so that they may be perceived as a whole. As such, the principles that have been stated for the reduction of complexity may also be used to unite parts. Returning to the example of the car engine, one might separate the unburned gas flow process. The gas in the fuel pump, gas line, carburetor, and intake manifold could be represented in red, for instance. The fact that each of these parts is connected by the red might aid the student in remembering these concepts as a group rather than as individual components. Bousfield (1953), supporting this proposition, stated that words (concepts) which are related to one another may facilitate one another in recall not directly but by superordinate concept (color). For example, if diamond, ruby, and saphire were in a list of twenty words and one were asked to recall this list, the three words would be remembered as a group because they are jewels. It is also proposed that the color red may serve the same perceptual function as "jewel" does conceptually, and do this better than a shade of gray.

Once again returning to Dwyer's (1967b) work where illustrations were directly corresponding to the textual materials, one may note a differential color effect on various types of test items across illustration types. The shaded-detailed drawings and the color-model photographs best exemplify the use of color to delineate structural elements. The identification and knowledge tests for students under these two treatments always resulted in higher scores for students who received color than for students who received the black and white shaded-detailed drawings and model photographs. For the comprehension tests, the color shaded-detailed drawing treatment always resulted in higher scores than any other treatment. The shaded-detailed drawings were the only illustrations in which color was used to unite the various elements in the illustrations.

If colo functions in the manner which has been suggested, then it may be viewed as functional in facilitating the recall of information. However, this covers only a portion of the problem stated in the introduction. The problem statement indicated that attention must also be paid to questions of the relationship of race and socio-economic status to color, and the long and short-term effects of color. Theoretical and empirical support must be demonstrated for the investigation of these effects.

Glasman (1968) found that a large status-race difference (confounded) existed in the clustering of items in a free recall situation when scores were covaried for I. Q. While no difference was found in paired-associate learning, lower class black students did not cluster, leading to a significantly smaller number of recalled words, when compared with whites who did cluster. All children knew the categories, but lower class black students did not use them. Jensen (1969) attributed this failure to a genetic learning disability. This author contends that the failure to cluster was due to the lack of clustering practice in past learning experiences. It is proposed that weak cues for clustering are ignored by deprived students, but that stronger cues

would have produced an insignificant difference between class-race. Although there appears to be no empirical support for this contention, there is a body of theoretical data which seems suggestive. Both Bernstein (1961) and Jensen (1969) have discussed what they refer to as "restricted" and "elaborated" codes. These codes are actually languages or, more correctly, verbal ability. These authors contend that persons in different socio-economic strata acquire different codes with the middle class acquiring an elaborated code and the lower class acquiring a restricted code. The importance of the restricted code in terms of the present study is that Bernstein and Jensen both imply that the acquisition of this code tends to limit an individual's ability to deal in abstraction. Since the clustering process is one that would seem to require some level of abstraction it is reasonable to suggest that persons of lower socio-economic status may not pick up weak clustering cues, though they may react to strong ones. Color is considered to be a strong clustering cue while the shades of gray are considered to be a weak cue. If this assessment is correct, there should be differential effects produced through the use of black and white or color illustrations according to the socio-economic status of the individual being tested. The possible effects can be divided into two classes; those on knowledge, and those on comprehension. Here, "knowledge" refers to specific recall of phenomena presented and "comprehension" refers to the ability to translate, interpret, and extrapolate concepts which have been presented. These categories are drawn directly from Bloom (1956). Since functionally similar components of structures may be represented by identical colors in a learning situation, the clustering effect of color may operate to facilitate the comprehension of functional similarities. Thus, by implication from Glasman's (1968) study and the theory proposed here, middle class students should score higher on comprehension tests covering material presented in conjunction with black and white illustrations than lower socio-economic class students. According to the assumptions regarding colors' strong clustering effect, there should be no significant differences between the scores on comprehension tests between individuals of different social classes when material is presented in color. On the other hand, since Glasman (1968) found no differences in the results of paired-associate learning tests--a knowledge test in Bloom's (1956) classification--there should be no difference between the test scores of students of differing socio-economic classes when only knowledge items are considered.

Since Glasman's (1968) study confounded the differences between race and social status, the material just presented also forms the argument for examining the effects of color according to race. The implications drawn from the Glasman (1968) study ought to hold as well. It should be added here that from a theoretical perspective, it is apparent that the socio-psychological explanation of the effects of color proposed in this section is antithetical to the genetic explanation forwarded by Jensen (1969). The value of providing some empirical test having implications for these two theories is readily apparent.

Studies involving color as a treatment have traditionally examined both immediate and delayed recall. Although the framework pro-

posed in this section to this point has made no mention of delayed recall, it is obvious that this should be a variable of interest. From a pragmatic point of view, it is of less importance that color produce an effect on learning than that the effect be lasting. If the color effect is transient, there can be no justification for the use of color in instructional materials.

The delayed recall effects of color have been examined from two perspectives. First, attempts have been made to determine if there are any differences in delayed recall test scores by treatment. Second, consideration has been given to whether or not there are differences in delayed recall when what was learned initially is held constant.

Both Dwyer (1967b) and Vander Meer (1952) reported results on the delayed recall. The color effect in Vander Meer's study was only present in the delayed recall test scores. Dwyer reported that color drops out in delayed testing. It is proposed that these differential results were experimental artifacts, perhaps due to the statistical treatment employed by the authors. Dwyer's conclusions were based on delayed recall scores with immediate recall test scores covaried out. Vander Meer's conclusions were based on delayed recall test scores alone. The present author predicts that what ever effects were produced in the immediate recall tests will be maintained across time.

3522

Objectives

The preceeding section has provided both theoretical and empirical support for the investigation of the effects of color itself, in both immediate and delayed recall, and the possible differential effects of color on learning according to either race or socio-economic status. The intention of the section was to provide a logical link between the problems stated in the introduction and the objectives of the study. As a by-product of developing this linkage, a general theory of the effects of color was produced. However, since the purposes of this study relate to specific questions about the effects of color in actual learning situations, the empirical testing of the general theory must be left to another occasion. So far as the linkage which has been developed is concerned, it should be apparent that each of the objectives stated below relates directly to the theoretical and empirical data just presented.

The objectives for the present study are:

1. To ascertain if colored illustrations produce significantly different test scores (immediate recall) on tests administered at the end of the instructional period.

2. To ascertain if colored illustrations produce significantly different test scores (retention) on a test administered six weeks after the students have taken the first test, relative to similar black and white illustrations.

3. To ascertain if socio-economic status interacts with the color variable to produce a differential effect in terms of immediate recall.

4. To ascertain if socio-economic status inteacts with the color variable to produce a differential effect in terms of delayed recall.

5. To ascertain if race interacts with the color variable to produce a differential effect in terms of immediate recall.

6. To ascertain if race interacts with the color variable to produce a differential effect in terms of delayed recall.

7. To ascertain if the race by economic status effects interacts with the color variable to produce a differential effect in terms of immediate recall.

8. To ascertain if the race by economic status effects interact with the color variable to produce a differential effect in terms of delayed recall.

METHODOLOGY

This section reports on (1) the population and sample, (2) the design of the experiment, (3) the classification factors, (4) the treatment factor, (5) the dependent variables, (6) hypotheses to be tested, and (7) the experimental procedures.

Population and Sample

The population of interest was schools offering vocational agriculture in North Carolina. The population was restricted, however, by the application of two constraints. First, it was required that the superintendent of schools and the school principal be interested in participating in the study. Second, it was required that the ninth grade vocational agriculture class in the candidate schools have a minimum of eight white pupils, including four in the high socio-economic level and four in the low socio-economic level, and four black pupils in the low socio-economic level.

Dr. Charles J. Law, Director of Occupational Education, North Carolina State Department of Public Instruction, sent a letter to each superintendent in the state who was involved in programs which offered vocational agriculture to ninth grade students. The ninth grade was selected in order to maximize the probability of including pupils in the study from low socio-economic levels who might drop out of school prior to enrolling in the tenth grade. A second letter was sent to the high school principals whose superintendents expressed interest in the study to solicit their cooperation. Of the schools contacted, 83 superintendents and principals agreed to participate in the study. Thus, the actual population for the study consisted of the 83 schools whose administrators indicated willingness to participate in the study. A random sample of 20 schools was selected for the study. Two schools dropped out of the study due to school population changes as the result of court-ordered desegration. These schools were not replaced; hence, the sample consisted of 18 schools.

All students enrolled in ninth grade agriculture within each school participated in the study. Subjects were eliminated from the sample who were not classified as ninth grade students. Ninth grade students who had recorded intelligence quotas of less than 70 or scored below sixth grade level on reading achievement tests were also eliminated.

The Experimental Design

The primary concern in designing the present experiment was maximizing the inferential space. The school was the unit of intact sampling and the schools acted as replications. The design of the study provides for the replication of the entire experiment on two different instructional materials; one dealing with tractor maintenance and the

other dealing with mower repair. The data on the tractor maintenance instructional material and the data on the mower repair instructional material are treated as separate experiments. One half of the schools received the tractor instructional materials and then the mower instructional materials. The other half of the schools received the mower instructional materials and then the tractor instructional materials. The order of instruction, therefore, was a factor of interest. The 18 schools were randomly assigned to the two levels of order; hence, the schools were nested within order.

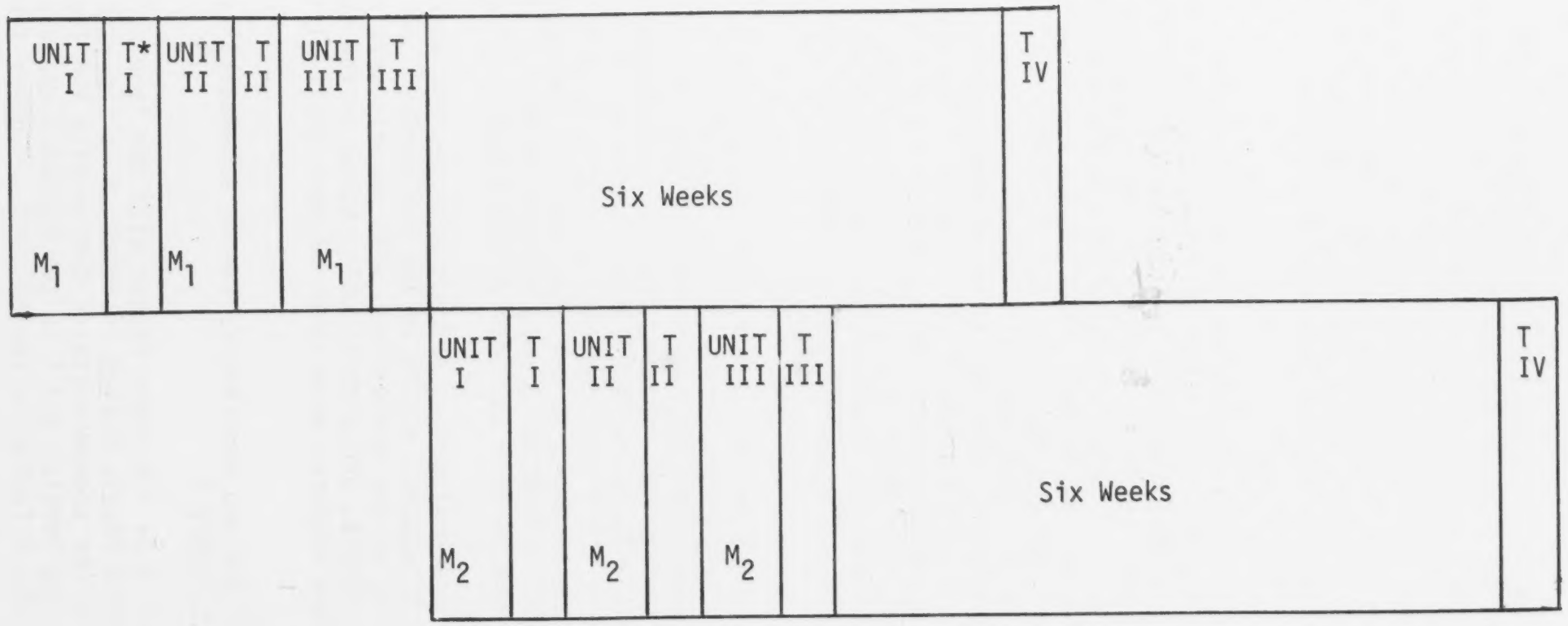
Within each school pupils were blocked on two classification factors; race and socio-economic status, each with two levels. Within each of the 18 schools, and within each cell defined by the four classification factors, pupils were randomly assigned to the two levels of the treatment factor (e.g., color materials or black and white materials). In the tractor materials experiment, half of the pupils received colored textual materials and the other half received black and white textual materials. In the mower materials experiment, the levels of treatment were reversed. That is, those students who received the black and white tractor treatment received the colored mower treatment, and those students who received the colored tractor treatment received the black and white mower treatment. The experimental unit was the cell defined by the mth level of the treatment in the lth level of race in the kth level of socio-economic status in the jth school in the ith order.

Four measures were obtained on each pupil. One measure was taken at the end of each of the three instructional units. The fourth repeat measure was obtained six weeks after the measurement of the third instructional unit. This procedure was repeated for the second experiment. The schedule of treatments is represented in Figure 1. M_1 is the subject matter covered in the first time period, and M_2 is the subject matter covered in the second time period. The unit corresponds to four 50-minute time blocks allocated to read certain pages. A 50-minute time period was allowed to take the test on the subject matter.

The study, therefore, was designed as a split-plot design, with the levels of color (i.e., treatment) acting as the split-plot, the classification factors acting as the whole-plot, with schools serving as replications of the experiment, and with schools nested in the two levels of order. Four repeat measures were taken on each split-plot cell for each experiment.

The design for each of the two experiments can be schematically represented as presented in Figure 2.

Referring to Figure 2: O is the order factor with two levels; S is the school factor with nine levels nested in order; R is the race factor with two levels; E is the economic status factor with two levels; C is the color factor with two levels; and T is the repeated measure factors with four levels. The S factor is random, and all other factors are fixed.



* The 50-minute test periods are not shown in exact proportion to reading period due to typing space.

Figure 1. The Schedule of Reading and Testing for a Given Order and a Given Subject-Matter Area

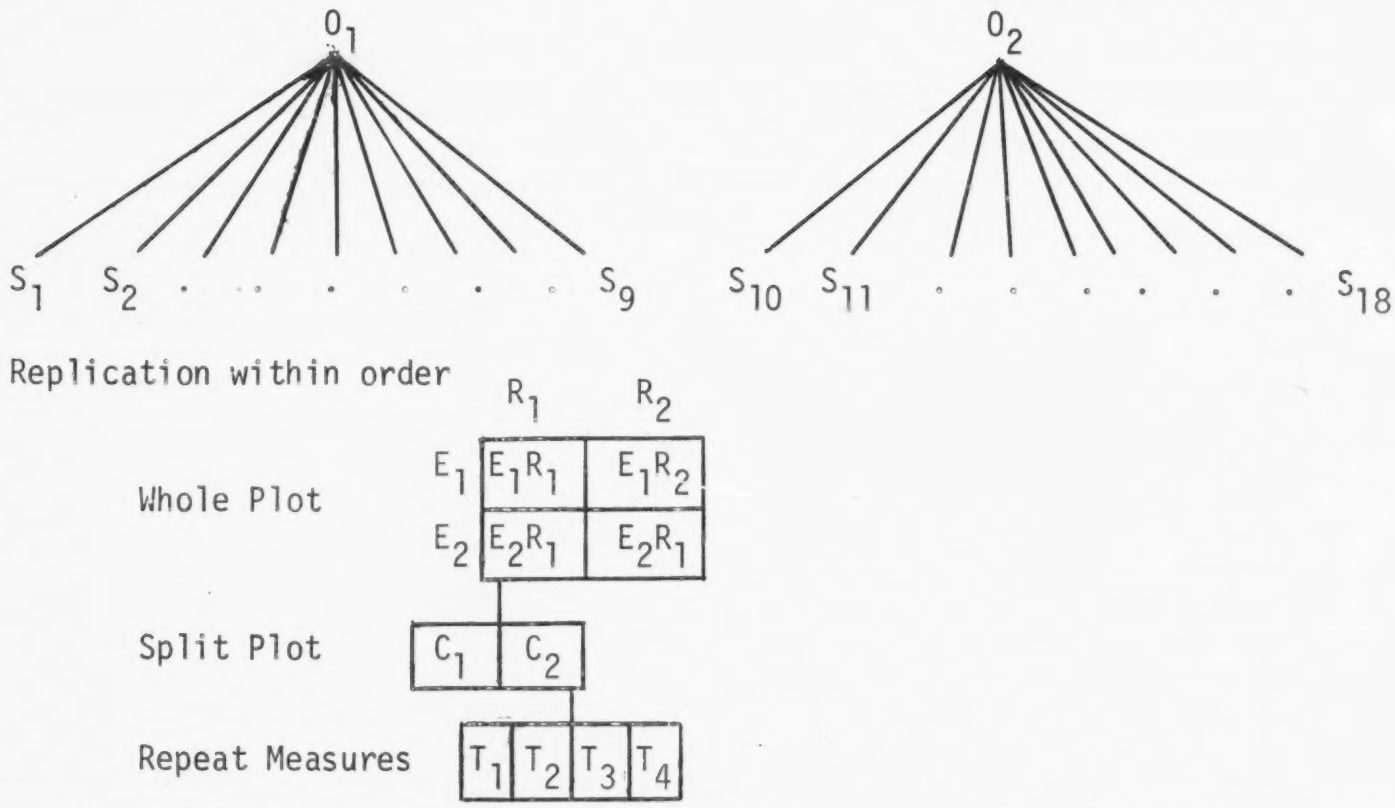


Figure 2. The Schematic Representation of the Design for the Two Experiments

The key-out for the design is presented in Table 1. It may be noted that there are two sets of degrees of freedom. The first set refers to the learning trials (repeated measures 1, 2, and 3). The second set of degrees of freedom refers to forgetting (repeated measures 3 and 4). The reason for the two analyses will be discussed in the next section.

Table 1. The Key-Out of the Design

Sources of Variation	df	df
Order (O)	1	1
Schools in Order [S(O)]	16	16
Economic Status (E)	1	1
ExO	1	1
ExS (O)	16	16
Race (R)	1	1
RxO	1	1
RxS (O)	16	16
RxE	1	1
RxOxE	1	1
ExRxS (O)	16	16

Table 1 Continued

Sources of Variation	df	df
Color (C)	1	1
CxO	1	1
CxS (O)	16	16
CxE	1	1
CxExS (O)	16	16
CxR	1	1
CxRxO	1	1
CxRxS (O)	16	16
CxExR	1	1
CxExRxO	1	1
CxExRxS (O)	16	16
Time (T)	2	1
TxO	2	1
TxS (O)	32	16
TxE	2	1
TxExO	2	1
TxExS (O)	32	16
TxR	2	1
TxRxO	2	1
TxRxS (O)	32	16
TxC	2	1
TxCxO	2	1
TxCxS (O)	32	16
TxExR	2	1
TxExRxO	2	1
TxExRxS (O)	32	16
TxCxE	2	1
TxCxExO	2	1
TxCxExS (O)	32	16
TxCxR	2	1
TxCxRxO	2	1
TxCxRxS (O)	32	16
TxCxExR	2	1
TxCxExRxO	2	1
TxCxExRxS (O)	32	16

The mathematical model associated with the design assumes that each observation (Y_{ijklmn}) is composed as follows:

3528

$$Y_{ijklmn} = H + O_i + S_{j(i)} + E_{(ij)} + E_k + R_l + ER_{kl} + EO_{ki} + RO_{li} +$$

$$ERO_{kli} + ES_{Kj(i)} + RS_{lj(i)} + ERS_{klj(i)} + E_{(ijkl)} - C_m + CO_{mi} + CE_{mk} +$$

$$CR_{ml} + CER_{mkl} + CEO_{mki} + CRO_{mli} + CERO_{mkli} + CS_{mj(i)} + CES_{mkj(i)} +$$

$$CRS_{mlj(i)} + CERS_{mklj(i)} + E_{(ijklm)} - T_n + TO_{ni} + TE_{nk} + TR_{nl} + TEO_{nki} +$$

$$TRO_{nli} + TERO_{nkli} + TC_{nm} + TCO_{nmi} + TCE_{nmk} + TCR_{nml} + TCER_{nmkl} +$$

$$TCEO_{nmki} + TCRO_{nmli} + TS_{nj(i)} + TES_{nkj(i)} + TRS_{nlj(i)} + TERS_{nklj(i)} +$$

$$TCS_{nmj(i)} + TCES_{nmkj(i)} + TCRS_{nmlj(i)} + TCERS_{nmklj(i)} + E_{(ijklmn)}.$$

Anderson (1970) contends that, at every point at which the sample is constrained, a random error term (E) should be added to the model. Each error term has zero sum of squares and zero degrees of freedom associated with it. Nevertheless, the errors enter into the mathematical model.

Anderson (1970) assumes that whenever levels of a factor are selected that constrain the selection of other factors, random error is introduced by an unknown amount, since sample variation is assumed to be less than population variation. This was the case when the schools were selected; the variance in the dependent variable scores of subjects in the RxE cells were constrained by an unknown amount. The introduction of this error component provides the rationale for the classical split-plot design where fixed interaction terms are pooled to obtain an error term. The remainder of the effects in the mathematical model were classical. That is, the observed score was composed of the effect of the grand mean (H) + N treatment effects ( ) and some error term (E), or terms.

The introduction of Anderson's (1970) restriction of variation term has no effect on the Bennett-Franklin algorithum described by Winer (1962). The expected mean squares for this design are presented in Table 2.

Table 2. The Expected Mean Squares for the Design of the Study

Source of Variance	Expected Mean Squares
Order (O)	$\sigma^2_{er} + \sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \phi^2_o + \sigma^2_s$

Table 2 Continued

Source of Variance	Expected Mean Squares
School in Order [S(O)]	$\sigma^2_{er} + \sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \sigma^2_{s}$
Economic Status (E)	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \phi^2_{e} + \sigma^2_{es}$
ExO	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \phi^2_{eo} + \sigma^2_{es}$
ExS(O)	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \sigma^2_{es}$
Race (R)	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \phi^2_{r} + \sigma^2_{rs}$
RxO	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \phi^2_{ro} + \sigma^2_{rs}$
RxS(O)	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \sigma^2_{rs}$
RxE	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \phi^2_{re} + \sigma^2_{ers}$
RxOxE	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \phi^2_{roe} + \sigma^2_{ers}$
ExRxS(O)	$\sigma^2_{ew} + \sigma^2_{es} + \sigma^2_{et} + \sigma^2_{ers}$
Color (C)	$\sigma^2_{es} + \sigma^2_{et} + \phi^2_{c} + \sigma^2_{cs}$
CxO	$\sigma^2_{es} + \sigma^2_{et} + \phi^2_{co} + \sigma^2_{cs}$
CxS(O)	$\sigma^2_{es} + \sigma^2_{et} + \sigma^2_{cs}$
CxE	$\sigma^2_{es} + \sigma^2_{et} + \phi^2_{ce} + \sigma^2_{ces}$
CxExO	$\sigma^2_{es} + \sigma^2_{et} + \phi^2_{ceo} + \sigma^2_{ces}$
CxExS(O)	$\sigma^2_{es} + \sigma^2_{et} + \sigma^2_{ces}$
CxR	$\sigma^2_{es} + \sigma^2_{et} + \phi^2_{cr} + \sigma^2_{crs}$
CxRxO	$\sigma^2_{es} + \sigma^2_{et} + \phi^2_{cro} + \sigma^2_{crs}$

Table 2 continued

Source of Variance	Expected Mean Squares
CxRxS(O)	$\sigma^2_{es} + \sigma^2_{et} + \sigma^2_{crs}$
CxExR	$\sigma^2_{es} + \sigma^2_{et} + \phi^2_{cer} + \sigma^2_{cers}$
CxExRxO	$\sigma^2_{es} + \sigma^2_{et} + \phi^2_{cero} + \sigma^2_{cers}$
CxExRxS(O)	$\sigma^2_{es} + \sigma^2_{et} + \sigma^2_{cers}$
Time (T)	$\sigma^2_{et} + \phi^2_{t} + \sigma^2_{ts}$
TxO	$\sigma^2_{et} + \phi^2_{to} + \sigma^2_{ts}$
TxS(O)	$\sigma^2_{et} + \sigma^2_{ts}$
TxE	$\sigma^2_{et} + \phi^2_{te} + \sigma^2_{tes}$
TxExO	$\sigma^2_{et} + \phi^2_{teo} + \sigma^2_{tes}$
TxExS(O)	$\sigma^2_{et} + \sigma^2_{tes}$
TxR	$\sigma^2_{et} + \phi^2_{tr} + \sigma^2_{trs}$
TxRxO	$\sigma^2_{et} + \phi^2_{tro} + \sigma^2_{trs}$
TxRxS(O)	$\sigma^2_{et} + \sigma^2_{trs}$
TxC	$\sigma^2_{et} + \phi^2_{tc} + \sigma^2_{tcs}$
TxCxO	$\sigma^2_{et} + \phi^2_{tco} + \sigma^2_{tcs}$
TxCxS(O)	$\sigma^2_{et} + \sigma^2_{tcs}$
TxExR	$\sigma^2_{et} + \phi^2_{ter} + \sigma^2_{ters}$
TxExRxO	$\sigma^2_{et} + \phi^2_{tero} + \sigma^2_{ters}$

3531

Table 2 Continued

Source of Variance	Expected Mean Squares
TxExRxS(0)	$\sigma^2_{et} + \sigma^2_{ters}$
TxCxE	$\sigma^2_{et} + \phi^2_{tce} + \sigma^2_{tces}$
TxCxExO	$\sigma^2_{et} + \phi^2_{tceo} + \sigma^2_{tces}$
TxCxExS(0)	$\sigma^2_{et} + \sigma^2_{tces}$
TxCxR	$\sigma^2_{et} + \phi^2_{tcr} + \sigma^2_{tcrs}$
TxCxRxO	$\sigma^2_{et} + \phi^2_{tcro} + \sigma^2_{tcrs}$
TxCxRxS(0)	$\sigma^2_{et} + \sigma^2_{tcrs}$
TxCxExR	$\sigma^2_{et} + \phi^2_{tcer} + \sigma^2_{tcers}$
TxCxExRxO	$\sigma^2_{et} + \phi^2_{tcero} + \sigma^2_{tcers}$
TxCxExRxS(0)	$\sigma^2_{et} + \sigma^2_{tcers}$

The factors in the experimental design may be divided into two categories: classification factors and the treatment factor. The classification factors are of experimental interest only to the extent to which they effect the treatment factor. The treatment factor, on the other hand, is of prime experimental importance and, according to Edwards' (1960) classification scheme, may be classified as a qualitative stimulus variable.

Classification Factors

The classification factors were: (1) order, (2) schools, (3) economic status, (4) race, and (5) time.

The order factor could be termed a "specific qualitative variable," (Cox, 1958). As stated before, this factor has two states: (1) Order 1 and (2) Order 2. This factor was included in the design because two subject-matter areas were treated serially. Due to the varying reac-

tions of students to the two texts (they disliked the mower text), it was felt that control for this factor was necessary. The order factor is of experimental interest only in terms of the degree to which it reduces error variation.

Schools, likewise, may be termed a "specific qualitative variable." The ninth grade classes were located in both junior and senior high schools. While being unable to substantively support this statement, the author feels that the randomly selected schools constitute a representative sample of non-urban schools. Many urban schools did not offer agriculture courses, and those schools that did, failed to appear in the sample.

Economic status and race form the whole-plot and are of experimental interest only to the extent to which they interact with the treatment factor. Economic status was determined by whether or not the student had participated in the school lunch program within the past three years. This indicated that the family made less than $1,000 per family member. This particular criterion may appear on the surface to be arbitrary, however, Griessman (personal communication from B. Eugene Griessman, Head of the Department of Socialogy and Anthropology, Auburn University, Auburn, Alabama) indicated that, not only does a family have to be poor to obtain free lunches, they also must be willing to admit it. He noted that this criterion eliminates the "poor, but proud," whose value system may more closely approximate the middle class value system.

Race, "a specific qualitative variable," was determined by the answer to the question, "What race are you?" Race in this case is considered a social phenomenon; no gene structure is implied. Race is limited to black (Negro) and white (Caucasian). Several students responded Indian to the question and were excluded from the analysis and the sample.

The time factor has four levels (repeat measures variable, both specific quantitative for the first three levels, and specific qualitative for the last two levels). The levels are one week, two weeks, three weeks, and nine weeks. The first three levels are viewed as equal time intervals, while the fourth is not. In addition, the first three levels could be considered learning trials since the instructional materials were presented to the students. The difference between the third level and the fourth level could be considered forgetting. Time is considered to be an important factor both independently and in terms of its interaction with the color factor or with interactions containing the color factor. Time, then, in the three-level case may be considered an index of learning and in the two-level case an index of forgetting.

Treatment Factor

The color factor has two levels: (1) textbooks containing black

and white visuals and (2) textbooks containing colored visuals. The subject matter varied for the two experiments.

Two textbooks were selected from those produced by the American Association for Agricultural Engineering and Vocational Agriculture. The American Association for Agricultural Engineering and Vocational Agriculture publishers have a reputation for publishing high quality technical material. The North Carolina State Director of Agricultural Education stated that these publications were probably the highest quality technical publications available (personal communication from V. B. Hairr, State Director of Agricultural Education, Raleigh, North Carolina). The selection of the two textbooks was based on the apparent use of color to isolate structural and functional units under discussion and because shaded-detailed drawings were used for the great majority of illustrations. The illustrations were integral parts of the text, not adjuncts. The text could not be understood fully without these illustrations. The texts were: (1) Tractor Operation and Daily Care (American Association for Agricultural Engineering and Vocational Agriculture, 1967) and Selecting and Maintaining Field Mowers (American Association for Agricultural Engineering and Vocational Agriculture, 1966)[4].

The readability of the textbooks was rated at approximately the sixth grade level by the American Association for Agricultural Engineering and Vocational Agriculture. Carpenter (personal correspondence from Earl T. Carpenter, Head of the Department of Agricultural Education, Clemson University, Clemson, South Carolina) reported that the Dale and Chall (1948) technique had been used to assess the readability of the two texts. The resultant grade-level ratings were 9.0 for the tractor and 10.2 for the mower text. Carpenter and Henderson (personal correspondence from Earl T. Carpenter, Head of the Department of Agricultural Education, Clemson University, Clemson, South Carolina, and Edward Henderson, Coordinator of the American Association for Agricultural Engineering and Vocational Agriculture, University of Georgia, Athens, Georgia) felt the readability figures were too high. Klare (1963) stated that the estimation of the readability of technical materials based on word difficulty yield somewhat inflated estimates of the difficulty.

Powers, Sumner, and Kearl (1958) refined the Flesch (1943) formula for readability. The present author randomly selected twelve 100-word units from each text. The resultant grade-level placements were 5.89 for the mower text and 5.75 for the tractor text. These estimates are closer to those offered by both teachers and publishers.

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[4] Steps in the preparation of a publication by the American Association for Agricultural Engineering and Vocational Agriculture are presented in Appendix B.

Dependent Variables

Two 90-item tests were developed to measure the retention of the information presented in the texts. Only the psychometric properties of the tests prior to the experiment will be discussed here; the properties of the two tests in the experimental situation will be presented in the results section.

Each test was divided into sections in two ways: (1) by instructional unit and (2) by item type. Six ninth grade agriculture teachers were asked to divide each text into three instructional units in order to assure that the major subdivisions of the book received equal emphasis. After a consensus was reached, the tractor text was divided as follows: (1) Section I, pages 1-37; (2) Section II, pages 38-82; and (3) Section III, pages 83-115. The mower text was divided into three sections: (1) Section I, pages 1-40; (2) Section II, pages 41-92; and (3) Section III, pages 93-119.

Items were written for each section (six sections for the two texts) and submitted to the six agriculture teachers for review. A pool of 30 items was developed for each section by item type classification (180 items for each text). On the two 90-item tests, there were 15 items for each of the six categories for each test.

The item types were labeled knowledge and comprehension. The knowledge item types were designed to measure "little more than the remembering of the idea or phenomenon in a form very close to that in which it was originally encountered" (Bloom, 1956, p. 29). When item development is restricted to knowledge item types, the items tend to deal primarily with the structural aspects of the material presented in both the text and the illustrations. The comprehension item types were designed to test the idea that, "when students are confronted with a communication, they are expected to know what is being communicated and be able to make some use of the material or ideas contained in it" (Bloom, 1956, p. 89). These item types were chosen rather than the structural-functional categories because of their wide usage. The comprehension item types dealt with structure and function, but primarily with function.

After the final test was developed, two agriculture teachers were asked to answer the questions on the test with the aid of the textbook. One teacher correctly answered every question on the two tests. The other teacher missed six questions. At a later date the 26 teachers who participated in the experimental phase of this study were asked if the tests were appropriate for ninth graders. Only one of the teachers thought the tests were too hard for ninth graders.

Three raters were asked to assign the items to one of the two item-type categories (knowledge or comprehension). The correlations with the original classification were: for Rater A .93; for Rater B .90; and for Rater C .83 (180 items).

The comprehension items and the knowledge items were treated as subtests, and the scores were simply summed for the total test. Each item was scored as either 1 or 0 since there was a "correct answer" for each item.

The Kuder-Richardson Formula 20 Reliability, the test-retest reliabilities, the means and the standard deviations and number of students are presented in Table 3 for the total tests and subtests by subject matter area.

The readability of the tests was estimated using Powers, Sumner, and Kearl"s (1958) refinement of the Flesch (1943) formula for readability. The resultant grade-level placements were 5.75 for tractors and 5.87 for mowers.

Hypotheses to be Tested

Due to the complexity of the design and space considerations, the author will not list the null hypotheses nor alternate hypotheses, since there would be over 700 null hypotheses to be listed. Even the most diligent reader could be overwhelmed by the magnitude of the effort required to read such a list. However, it should be noted, returning to the objectives of this study, that hypotheses concerning the main effect of color, interactions of color with the economic status and race; and color with the race by economic status interaction were of prime importance.

A hypothesis of no difference(s) between (among) means is associated with each of the variance components which do not contain the schools factor. There were no tests for the terms containing schools. The .05 alpha level was selected for rejection of the null hypotheses due to its wide usage.

Table 3. The Pyschometric Properties of Tractor and Mower Tests and Subtests Prior to Experimental Usage.

Type of Test	Total	Knowledge	Comprehension
Tractor Test			
Number of Students	57	57	57
Kuder-Richardson	.84	.73	.73
Test-Retest	.85	.75	.78
Mean	28.85	14.23	14.59
Standard Deviation	10.25	5.66	5.73
Mower Test			
Number of Students	80	80	80
Kuder-Richardson	.67	.59	.47
Test-Retest	.78	.65	.62
Mean	24.01	12.63	11.38
Standard Deviation	7.06	4.63	3.84

Experimental Procedures

The procedures undertaken in this study may be logically divided into two phases: the developmental phase and the experimental phase. The developmental phase will be treated first.

The Developmental Phase

Five major activities were undertaken and completed during the developmental phase which began February 1, 1970, and ended September 1, 1970. These activities were: (1) securing the sample; (2) developing an item pool of 180 items for each text; (3) conducting the pilot study and refining the tests; (4) preparing the materials; and (5) indoctrinating participating teachers with the procedures and methods which were to be employed in the study. The schematic representation of the activities undertaken in this study is shown in Figure 3.

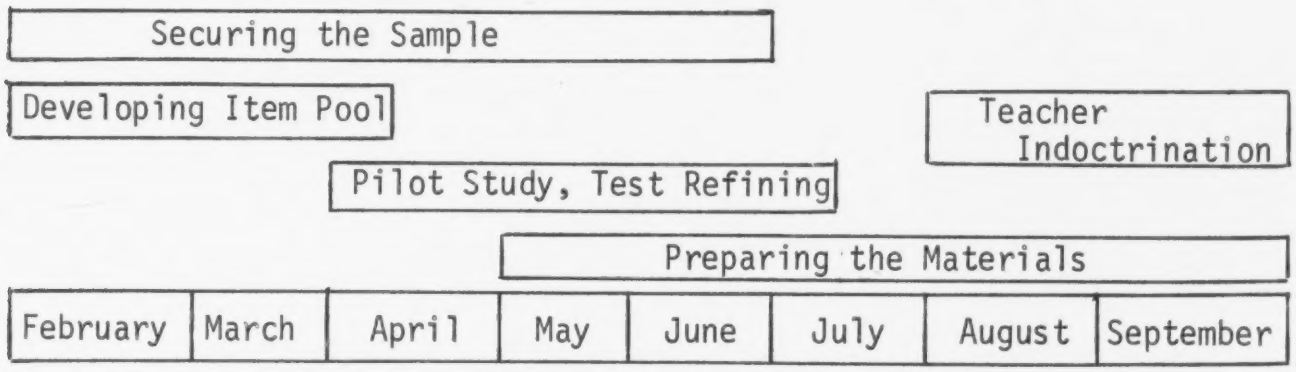

Figure 3. The Schematic Representation of the Developmental Activities Undertaken in This Study

The Experimental Phase

The month of September and the first half of October, 1970, was spent in providing each teacher with the necessary materials and tests, and reviewing the experimental procedures with each teacher. The experiment began in each of the 18 schools on October 4, 1970. The activities during that week set the pattern for the next five weeks. On Monday, Tuesday, Wednesday, and Thursday, the students entered the classroom and sat down. The roll was called, and the students were given five minutes to get settled. Each student was then given a book with the appropriate color or black and white illustrations, depending on the treatment to which they were assigned. Each student then had 45 minutes to read in the unit which he was assigned. The teacher periodically checked to make sure each book was opened and that the assigned unit was being viewed by the student. At the end of the 45-minute time period, the books were collected by the teacher. The next two units of the first textbook were studied during the next two weeks (one each week). At the beginning of the fourth week, those students who were assigned to the black and white versions of the first text

were given the color text; and those who were assigned the color texts were given the black and white texts. The first set of three tests on the first text were given on October 9, 16, and 23 for the first textbook used (nine schools used the tractor text and nine schools used the mower text). The three tests on the second text were given on October 30, and November 6 and 13. The retests were given for the first textbook on December 11 and January 8 for the second textbook. Prior to each test a set of instructions were read to each class.

RESULTS

The purpose of this section of the report is to relate the results of the statistical analyses performed on the data to the objectives of the study. As noted earlier in the methodology section, a complete iteration of the null hypotheses would include over 700 statements. In order to simplify the presentation of the results, only those results relating directly to the objectives specified in the introduction to this report will be presented here. For each objective the relevant null hypothesis is presented together with a description of the findings with regard to that hypothesis. A detailed treatment of all the statistical tests of the experimental hypotheses is included in Appendix A for those readers interested in all of the various interactions tested.[5]

Before the linkages between the results and objectives are established, certain elements of the experiment situation deserve special attention. The first and most notable element was the cooperative spirit of the participating teachers. Each teacher went "that extra mile" in assuring that the experimental procedures were properly carried out. This "spirit" was absolutely necessary since the experimenter could not be present at the 19 experimental sites simultaneously. The experimenter feels that the procedures listed in the methodology section were carried out adequately.

Another element which should be mentioned is the generally low reading levels and intelligence quotients obtained on the standardized tests of the participating students. Approximately one-fourth of the students enrolled in introductory agriculture were more than three years behind their grade level in reading or scored below 70 on standardized intelligence tests. No student scored more than 125 on the intelligence tests, and most students scored in the low 90"s.

Another element to be discussed was the reaction of the students to the experimental situation. For the first three weeks the students

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[5]The raw data from this experiment are also available. See Robert L. Morgan, "The Effects of Color in Textbook Illustrations on the Recall and Retention of Information by Students of Varying Socio-Economic Status," 1971. Unpublished Ph.D. thesis, North Carolina State University at Raleigh, Raleigh, North Carolina.

did not seem to be disturbed about reading the materials. However, as the experiment progressed, the students began expressing dissatisfaction with being required to sit quietly and read. Teachers reported having many behavior problems in the final two weeks of the experiment, and the amount of monitoring required increased to the point that the teachers had to continually walk around the room to make sure that the students were at least looking at the appropriate instructional unit. In discussing the experimental situation with the students, many students reported that the instructional material on mowers was very boring while the tractor text was interesting. When asked if they could understand the materials, all students contacted reported that they could but that the mower text was difficult.

After the experiment was completed, considerable time was spent discussing the tests with students in an attempt to determine why the students performed so poorly on the tests. In general, the students reported that they had never been required to answer such detailed questions about the materials which they read. When asked if they could have answered all of the questions if they could have used the books, all students contacted replied that they could.

The final element to be discussed is the students' opinion of the effects of color on learning. Most students reported that color aided learning because it "made the parts easier to see," No spontaneous mention was made of the functional uses of color to relate parts. However, on questioning, some few students reported that the color helped to unite parts, especially the "drive train" in tractors.

As previously stated, the objectives of this study were:

1. To ascertain if colored illustrations produce significantly different test scores (immediate recall) on tests administered at the end of the instructional period.

2. To ascertain if color illustrations produce significantly different test scores (retention) on a test administered six weeks after the students have taken the first test, relative to similar black and white illustrations.

3. To ascertain if economic status interacts with the color variable to produce a differential effect in terms of immediate recall.

4. To ascertain if economic status interacts with the color variable to produce a differential effect in terms of delayed recall.

5. To ascertain if race interacts with the color variable to produce a differential effect in terms of immediate recall.

6. To ascertain if race interacts with the color variable to produce a differential effect in terms of delayed recall.

7. To ascertain if the race by economic status effects interact with the color variable to produce a differential effect in terms of immediate recall.

8. To ascertain if the race by economic status effects interact with the color variable to produce a differential effect in terms of delayed recall.

The first objective was fulfilled by testing the null hypotheses: there is no difference between the mean test scores of students reading textbooks with color illustrations and the mean test scores of students reading textbooks with black and white illustrations or due to the color by order, the color by time, or the time by color by order interaction effect. The hypotheses were tested for each of three instructional units in two textbooks. The units were analyzed individually as well as cumulatively for each textbook. That is, the null hypotheses were tested 24 times at the .05 alpha level. Not once could the null hypothesis be rejected. Hence, if there is a difference in the immediate recall of the students reading textbooks with black and white illustrations and those reading textbooks with color illustrations, this experiment failed to find it. However, the time by color interaction was tested six times. It failed to be rejected with five of the dependent variables. On the mower knowledge subtest, the time by color interaction was rejected at the .05 alpha level. For the color treatment, students increased their scores for each time period. For the black and white treatment, there was no difference between time period one and time period two, but time period three was significantly higher. The black and white treatment had an initial advantage at time period one and was somewhat less at time period two and again less at time period three. The color by order effect was tested 24 times and was significant only on the mower knowledge subtest for the combined analysis. Order one did better on color than black and white, and for order two, there was little difference. The time by color by order interaction was tested six times and failed to be rejected with any of the six dependent variables. It should be noted that for the combined analyses of the three instructional units, the hypothesis of no difference between the mean test scores for the three tests administered immediately after the completion of 180 minutes of reading was rejected at the .01 alpha level for each of the six dependent variables. Hence, there is evidence that learning occurred on each of the dependent variables, as defined by an increased test score over time.

The second objective was fulfilled by testing the null hypotheses: there is no difference in the mean test scores of students reading textbooks with color illustrations and those reading textbooks with black and white illustrations on tests administered six weeks after final recall test due to the color by time, color by order, or time by color by order interaction effect. These hypotheses were tested on each of the two texts for each of three dependent variables, both as an isolated and as a combined analysis. That is, the null hypothesis was tested 12 times. Not once could the null hypotheses be rejected at the .05 alpha level. Hence, if there is any difference in the reten-

tion of students reading textbooks with color illustrations and those reading textbooks with black and white illustrations, this study failed to find it. The color by order interaction was tested 12 times and was found to be significant only with the mower knowledge subtest for the fourth time period analysis. For order one, color was better, and for order two, black and white was better. The color by time interaction was tested six times and failed to be rejected. The time by color by order interaction was tested 6 times and was rejected at the .05 alpha level with the mower knowledge subtest on the combined analysis. For order one in time period three, black and white was better; and for time period four, color was better. For order two in time period three, the color was better; and for the fourth time period, the color was markedly better. On the combined analysis of the tests administered at the end of the instructional period and those administered six weeks later, the time effect was significant at the .01 alpha level. The test score means for the retention test were less than final immediate recall test, hence the student forgot as defined by a lower mean test score following a passage of time.

Objective three was fulfilled by testing the null hypotheses: there is no significant interaction between economic status, economic status by time, economic status by order or economic status by time by order interactions and the treatment (color versus black and white illustrated textbooks) affecting test scores on tests administered immediately after instructional units. This hypothesis was tested 24 times in the same manner as the null hypotheses in objective one, combined and for each time period. On the combined analysis and analysis for the first and third time periods, the null hypotheses failed to be rejected at the .05 alpha level. In the second time period, the economic by color interaction null hypothesis was rejected only for the mower total test and the mower knowledge subtest. The high economic status students benefited from the use of color. Color made little difference for the low economic status students. The economic status by color by order interaction was tested 24 times and failed to be rejected even once at the .05 alpha level. The economic status by color by time interaction was tested six times and failed to be rejected even once. The economic status by color by time by order interaction was tested six times and failed to be rejected also.

Objective four was fulfilled by testing the null hypotheses: there is no interaction between the economic status, economic status by time, economic status by order, or economic status by time by order interaction and the treatment levels affecting the test scores on tests administered six weeks after the instructional unit. The color by economic status and the economic status by color by order interactions were tested 12 times, and the time by economic status by color and the time by economic status by color by order interactions were tested six times each. In each case, it was not possible to reject the null hypotheses at the .05 alpha level.

Objective five was fulfilled by testing the null hypotheses: there was no interaction between race, race by time, race by order,

or the time by race by order interaction and the treatment levels affecting the test scores on tests administered immediately after the instructional unit. The race by color and the race by color by order interactions were tested 24 times each, and the time by race by color and the time by race by color by order interactions were tested six times. All these null hypotheses failed to be rejected at the .05 alpha level.

Objective six was fulfilled by testing the null hypotheses: there was no interaction between race, race by time, race by order, or the time by race by order interaction and the treatment levels affecting the test scores on tests administered six weeks after the instructional unit. The race by color and the race by color by order interactions were tested 12 times, and the time by race by color and the time by race by color by order interactions were tested six times. All these null hypotheses failed to be rejected at the .05 alpha level.

Objective seven was fulfilled by testing the null hypotheses: there was no interaction between economic status by race, economic status by race by order, economic status by race by time, or economic status by time by order interaction and the treatment levels affecting the test scores on tests administered immediately after the instructional unit. For the combined analysis, the economic status by race by color interaction was significant at the .05 alpha level for the tractor comprehension subtest, mower total test and the mower knowledge subtest. The pattern of the interaction was certainly inconsistent. In each case, the high economic status white students appeared to benefit from color. The other three groups varied greatly in their reaction to color depending upon the dependent variable. The economic status by race by color interaction for the separate analysis was significant in time period one for the tractor comprehension subtest, mower total test, and mower knowledge subtest, and in the second time period for the tractor comprehension subtest. Likewise, no consistent pattern could be found except that the high economic status whites tended to score better with color. The null hypothesis for the color by economic status by race by order interaction was tested 24 times and failed to be rejected even once. The color by economic status by race by time interaction and the color by economic status by race by time by order interaction were tested six times for each effect, once for each dependent variable. No significant difference due to these effects were found.

Objective eight was fulfilled by testing the null hypotheses: there was no interaction between the color by economic status by race, color by race by economic status by order, color by economic status by race by time, or the color by economic status by race by time by order interaction and the treatment levels affecting the test scores on tests administered six weeks after the instructional unit. The color by economic status by race and the color by economic status by race by order interaction null hypotheses were tested 12 times each, and the color by economic status by race effect failed to reach significance on either the combined or individual analysis. The color by economic

status by race by order interaction failed to reach significance for five dependent variables. The null hypotheses were rejected at the .05 alpha level for the color by economic status by race by order effect with the tractor totoal test for the combined analysis. With order one (tractor test being first), the low economic status white students forgot more with the color treatment than did the high economic status black students. The other two groups forgot less with the color treatment. With order two, the opposite effect occurred. That is the low economic status white students and the high economic status black students appeared to benefit more from color, and the other two groups benefited more from black and white. On the individual analyses of the fourth time period scores, the color by economic status by race by order interaction was found to be significant for the tractor total test and the tractor comprehension subtest. For both the tractor total test and the tractor comprehension subtest, the pattern of the interaction was similar. With order one color was better (students scored higher) with the low economic status white students and the high economic status black students; black and white was better for the other two groups. With order two the opposite effects occurred, the low economic status whites and the high economic status blacks scored higher with black and white. The color by economic status by race by time and the color by economic status by race by time by order interaction null hypotheses were tested six times for each effect. No significant effect occurred.

Before moving to the next topic, it should be noted that due to the previous history of failures to detect differences due to the color effect, the author tested a large number of hypotheses at the .05 level. Of the 732 hypotheses tested, 384 hypotheses were tested that related to the color effect. Assuming the .05 alpha level, one would predict that significance attributable to chance variation would occur for one out of 20 hypotheses tested. That is, for this study, 19 hypotheses would be predicted to be statically significant due to random variation alone for color and interactions with color. Sixteen null hypotheses were rejected. Thirty-six null hypotheses would be predicted to reach significance due to chance variation for all of the analyses, and 72 null hypotheses were actually rejected for the total set of analyses. The purpose for including the previous discussion of alpha levels was not to "hedge" on the rejection question, since it is impossible to determine the difference between "chance" and "true" variation, but only to state that the conclusions are limited to the previous extent. Likewise, it should be noted that the conclusions are limited to: (1) the 83 schools that volunteered to participate and (2) the orders, economic status, race, time and treatment levels that were selected.

As an aside and not directly related to the problems investigated in the study, the race effect was consistently a powerful effect, with black students scoring lower than white students on both the combined and individual analyses. The economic status effects were only significant for the first time period analysis.

In order to draw conclusions it is necessary to return to the problem statement which provides the purposes for the investigation, to the literature review which provides the historical basis for the study and to the rationale which provides the theoretical basis for test development and test selection.

CONCLUSIONS AND RECOMMENDATIONS

The primary purpose of the study was to ascertain if there was a differential effect between the effect of the use of color and black and white illustrations in textbooks on two factors; the recall of information immediately after the completion of an instructional unit, and the recall of the learned material six weeks later. Little evidence was produced to demonstrate that color was a significant instructional variable with any media. The rationale section provided the theoretical framework for selecting the texts which used color to "isolate elements of a complex stimulus" and "to unite those parts into functional systems." Using this framework, the tractor and mower textbooks appeared to be adequate, and probably the best commercial texts available in terms of the rationale. The tests were developed to measure "comprehension" and "knowledge" based on concepts presented both in the written portion of the textbook and the illustrations. It was predicted that color would have a significant effect on both knowledge and comprehension as well as the combined scores on tests administered immediately after instructional units. In general, little evidence was obtained that color illustrations were superior to black and white illustrations or that the converse was true. In fact, in general, color appeared to have very little effect on any of the six dependent variables. The only major exception to the general conclusion was a color by time effect for the tractor knowledge subtest which appeared to indicate that black and white illustrations were superior on the first instructional unit test, and color was superior on the tests administered on subsequent tests. In time periods two and three, color appeared to have an advantage.

The question of delayed recall was treated in two ways, first as a forgetting analysis and then as an individual analysis. No evidence was produced that color had a significant effect produced independently of the order effect. Only when the order (sequential treatments) was added did a color effect occur. The order effects are considered to be trivial, and only act as a control variable included to increase experimental precision. It was originally predicted that a significant interaction with time would occur, but that the color would be significantly better than the black and white illustrations.

The second purpose of the experimental investigation was to ascertain if economic status, race, or an interaction of race by economic status interacts with the color variable to produce a differential effect in terms of the immediate and delayed recall of information presented in an instructional unit. The race, economic status and economic status by race effects on color have little in the way of a historical basis. The rationale section provides the theoretical framework for investigating these effects. The author's personal interest in these effects and the lack of historical treatment of these effects with respect to color provided other justification for their investigation It was predicted that no significant interaction effects would be found on the knowledge subtests, but that significant effects would be found with the comprehension subtests on the immediate recall

tests. On the tractor comprehension subtest, the mower total test, and the mower comprehension subtest for the combined analysis, the economic status by race by color interaction was significant. The only pattern detected was that high economic status white students tended to do better with color. It appears on analysis of each time period separately that the economic status by race by color interaction appeared in the first and second time periods and not in the third time period. The economic status by race by color interaction was present in the first time period with the tractor comprehension subtest, the mower total test, and the mower knowledge subtest with the same patterns as the combined analysis. For the tractor comprehension subtest, the low socio-economic status blacks benefited from the black and white illustrated texts. All other groups benefited from the color texts with low socio-economic status whites benefiting most. On the mower total test, the low economic status whites and the high economic status blacks benefited from black and white illustrations, and the other groups from color. The results were different from those expected by the author and no explanation will be attempted.

The economic status by color interaction was significant in the first time period, but insignificant in both the combined analyses and in the second and third time period analyses. It was significant with the mower total test and the mower knowledge subtest. High economic status students did better with color. This interaction was also not expected, and no explanation will be forwarded.

Hence, for the immediate recall of information in studies for short periods of time, the low economic status white students appear to benefit from color, and high economic status students appear to benefit from color on certain tests and subjects. Other groups did not appear to benefit from the addition of color.

The recall of information appears to be unaffected by the interaction with color, economic status, race, and race by economic status except in the trivial case of the OxExRxC interaction.

In general, if color is the powerful instructional variable that many people believe it to be, experimental investigations have failed in general, as this study did, to provide evidence to support this belief. Certainly this study, like all field studies, was subject to numerous confounding effects; however, taken in conjunction with previous studies, one must question the current use of color in illustrations, and probably re-examine the entire problem of the effective use of visual aids in instruction. The author's suggestion for attempting to deal with the color problem is in the area of basic research. The importance of the instructional process makes the assertation of the answers a worthwhile endeavor for future research and development activities.

There are a number of recommendations for action which may be made based on the present research and the review of literature. The recommendations here apply only to textbooks and not to reference

materials, since illustrations may increase the probability that a book will be selected in a free reading situation. Recommendations provided here will be (1) the use of illustrations in textbooks, (2) the use of color in illustrations in textbooks, and (3) research needs on textbooks in general.

The Use of Illustrations in Textbooks

The most fundamental question to approach here is that of whether or not illustrations of any type have an effect on learning. The body of research literature surveyed in connection with this study indicates that there is no sound pedagogical reason for the inclusion of many types of illustrations in present textbooks. In fact, some studies have indicated that, contrary to the supposed facilatory affect on learning, illustrations used as adjuncts to textual material may actually have a detrimental effect on learning. Since there is a differential cost involved in the production of textbooks with illustrations, it is recommended that the practice of including illustrations as adjuncts to textbooks cease. As a practical matter, it is apparent that textbooks are not sold directly to the ultimate consumer, the student, but rather to some intermediate group; the teacher, a local selection committee, or a statewide selection board. Thus any pressure for a change in practices will ultimately have to come from those responsible for text selection. Unfortunately, these are the very people who presently believe in the efficacy of illustrations in general, and color illustrations in particular, as useful pedagogical instruments.

If the author and the publisher insist on the use of illustrations for aesthetic purposes, as adjuncts to the text, it is recommended that these illustrations be relegated to a position in the text where they will not interfere with the reading material. Either the front or the rear of the text would seem appropriate for the placement of illustrations, or, in those cases where it is deemed necessary to associate the illustrations with specific chapters, they should be placed at the end of the chapter.

These recommendations do not apply to the use of illustrations as integral parts of the textbook material (that is, where the text cannot be understood in the absence of the illustration). With regard to this illustration type, it is recommended that each key aspect of the illustration be pointed out in the text and the reason for the inclusion of the illustration be clearly stated.

The Use of Color in Illustrations in Textbooks

At present there is little evidence to demonstrate either a facilatory or a detrimental effect on learning through the use of color in any illustration type. Thus, regardless of illustration type, color should only be used when the cost of publication is not a significant factor.

Research Needs on Textbooks

It may be noted that textbooks have received very little research attention in the past. Certainly, the textbook has been and at least for a period of a few years will continue to be the primary instrument of conveying information. In the past textbook design has received very little attention. In fact, most publishing houses of those surveyed admitted that they had no criterion for designing textbooks and in particular that they had no set of rules for including particular illustrations. One publisher believes that textbooks are not amendable to scientific research techniques.

The publisher's doubts notwithstanding, it does appear that textbooks may be examined using available scientific research techniques. After all, a textbook does have a function and a specific purpose. If we can describe the function and state the purpose, we can certainly evaluate the textbooks performance. In evaluating textbooks, there is bound to be the obvious objection that the teaching process involves not simply a text, but a text, a teacher and an interaction between these and many other factors. Yet this is a naive objection in the face of adequate control over sample size and the utilization of sufficiently powerful analytical techniques. The fact of the matter is, we can at this point in time apply empirical procedures which will allow us to evaluate the comparative capabilities of textbooks.

Thus, the first step that is needed is a committment of the funds necessary to develop empirical tests for use in evaluating textbooks. Once procedures, or perhaps even standardized tests, have been developed from a solid empirical base, the problems of textbook selection can be reduced largely to a question of cost and effect. If research can provide the evaluative techniques, it would not then be unreasonable to ask that publishers be prepared to present selection committees with the hard results of the tests of their books. In order that this request not result in too high a risk in developmental costs for textbook publishers, it is also recommended that basic research be undertaken in order to ascertain the factors which help make a textbook a successful instrument. This would give publishers a sounder basis on which to design their texts and would help to insure the creation of a better teaching instrument. Obviously, this will require a great deal more effort and time than the development of evaluation instruments. However, the effort is worth the cost. We cannot afford to have the production of textbooks treated as a form of art, for we are committed as a country to the development of well educated and comparably educated people. Textbook production, like all other facets of the educational process must begin to move toward a science.

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APPENDICES

Appendix A

DEPENDENT VARIABLES, INFERENTIAL STATISTICS AND DESCRIPTIVE STATISTICS

This Appendix section is divided into three subsections: (1) the dependent variables, (2) the inferential statistics, and (3) the descriptive statistics. The dependent variable section presents the statistical properties of the six dependent variables for each of the four time periods. The inferential statistics section presents the results on the statistical tests of the experimental hypotheses. The descriptive statistics section presents selected data based on the dependent variable scores of all students participating in the experiment treated as the population of interest.

Dependent Variables

The dependent variable reliabilities, means, standard deviations, and number of observations are presented for each of the six dependent variables for each of the four time periods. The reliabilities for the six dependent variables are presented in Tables 1 and 2, and the means standard deviations, and number of observations are presented in Table 3. These statistics were based on the test scores of each participant in the study. The test scores were simply the unweighted sum of correct answers.

Two types of reliability coefficients were computed. The Kuder-Richardson Formula 20 Reliabilities are presented in Table 1. It may be noted that the reliabilities increased until the fourth time period. This pattern of reliabilities was expected because in the first two periods students had not completed the three instructional units upon which the tests were based. The fourth test was administered six weeks after instruction had ceased, hence lower reliability was expected. The reliability estimates of the third time period should be considered the most accurate because the tests were administered immediately after the instructional units were completed.

Table 1. The Reliabilities for the Six Dependent Variables by Test

Dependent Variables	Test 1	Test 2	Test 3	Test 4
Tractor Total	.752	.813	.912	.853
Tractor Knowledge	.673	.721	.851	.758
Tractor Comprehension	.652	.737	.843	.722
Mower Total	.712	.843	.901	.827
Mower Knowledge	.637	.752	.815	.743
Mower Comprehension	.686	.764	.839	.724

The test-retest reliabilities are presented in Table 2. The reliabilities were somewhat lower than those found in the test development phase because of the long period between test and retest (six weeks). This is probably accounts for the low reliabilities obtained. Only the reliabilities of Test 3 with Test 4 can be considered as the traditional test-retest reliability.

Table 2. The Test-Retest Reliabilities for the Six Dependent Variables

Dependent Variables	Test 1 with 2	Test 2 with 3	Test 3 with 4
Tractor Total	.793	.794	.762
Tractor Knowledge	.723	.743	.703
Tractor Comprehension	.704	.701	.675
Mower Total	.442	.719	.592
Mower Knowledge	.385	.695	.561
Mower Comprehension	.339	.609	.502

The means, standard deviations, and number of observations are presented in Table 3. The mean scores for the tests are quite low in terms of the preadministration predictions by the ninth grade agriculture teachers. The teachers predicted the mean score on both total test to be approximately 54.

Table 3. The Number, Means and Standard Deviations for the Six Dependent Variables by Test

Test Type	Number	Mean	Standard Deviation
TRACTOR TEST I			
Total	625	25.955	9.028
Knowledge	625	12.574	4.875
Comprehension	625	13.381	5.079
TRACTOR TEST II			
Total	611	28.718	11.734
Knowledge	611	14.119	6.159
Comprehension	611	14.599	6.289

Table 3 Continued

Test Type	Number	Mean	Standard Deviation
TRACTOR TEST III			
Total	592	33.304	15.009
Knowledge	592	16.589	7.957
Comprehension	592	16.715	8.019
TRACTOR RETENTION			
Total	589	27.390	13.662
Knowledge	589	13.421	7.257
Comprehension	589	13.969	7.013
MOWER TEST I			
Total	605	22.093	6.423
Knowledge	605	11.495	4.178
Comprehension	605	10.598	3.498
MOWER TEST II			
Total	597	24.735	10.114
Knowledge	597	12.998	6.121
Comprehension	597	11.737	4.923
MOWER TEST III			
Total	578	27.161	12.888
Knowledge	578	14.052	7.255
Comprehension	578	13.109	6.285
MOWER RETENTION TEST			
Total	589	23.115	9.448
Knowledge	589	11.772	5.562
Comprehension	589	11.343	4.722

The means for each of the six dependent variables for each of the four time periods are graphically presented in Figure 1. The key for reading Figure 1 is as follows:

Tractor Total	————————————	(TT)
Tractor Knowledge	----------	(TK)
Tractor Comprehension	——— --- ——— --- ———	(TC)
Mower Total	——— . ——— . ——— .	(MT)
Mower Knowledge	. . . . .	(MK)
Mower Comprehension	——— - ——— - ——— -	(MC)

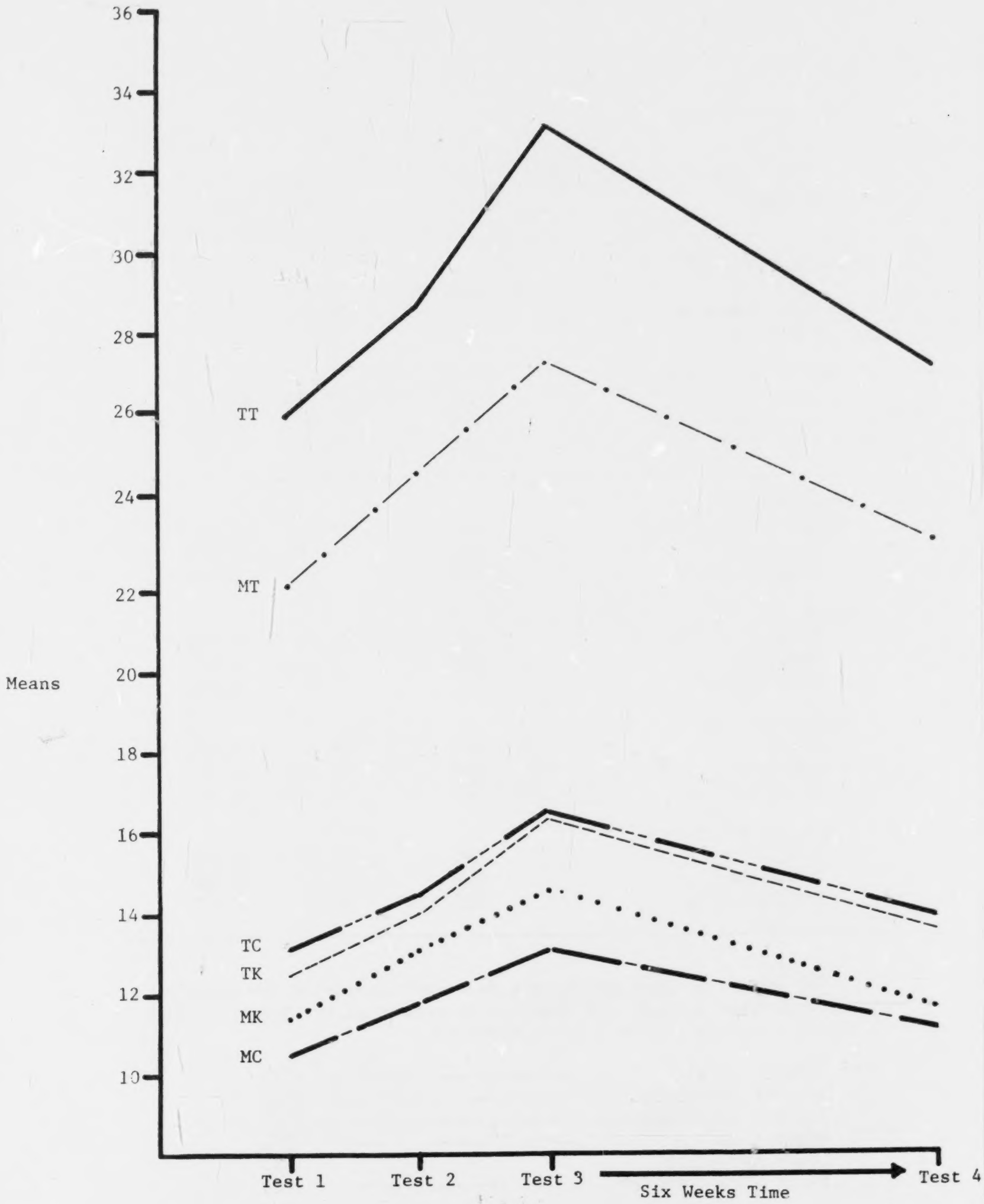

Figure 1. The means for the Six Dependent Variables

3560

Referring to Figure 1, the six lines between the six dependent variable means for the first three time periods may be considered as a "learning curve." It was evident that there was an increase in the mean number of correct responses over time and that this increase was almost linear. Between the third and fourth time periods, the dependent variable lines represent "forgetting." This decrease in the mean number of correct responses was represented as a line. However, in the author's opinion, it is more likely that a curve occurred with more rapid forgetting occurring earlier, rather than the line which is presented.

Inferential Statistics

This section deals primarily with the statistical testing of the experimental hypotheses. Referring to the design section of the Methodology chapter, the experimental unit is the order by schools in order by economic status by race by color cell means (144 means per time period). It should be pointed out that the numbers of observations per cell were unequal. The section on descriptive statistics which follows will treat this problem.

Prior to presenting the analyses, it is necessary to discuss two changes that were made in the original plans for data analysis. Due to the difficulty of the tests, severely skewed distributions of the test scores occurred. Chi square tests for "goodness of fit" were performed on the data with five degrees of freedom. The hypotheses of normality were rejected for each of the six dependent variables for each of the four time periods at the .05 level (Guilford, 1965). Winer (1962) stated that, while the F-test is robust against deviations from normality, skewed non-normal distributions require transformation. He recommends that a log transformation should be made on the skewed data when $u \neq o^2$. Hence, the data were transformed to natural logs. The sum of squares and mean squares were based on the transformed scores. Referring to the design section in the Methodology chapter, the E(MS) for the analysis was modified. Based on a weighted mean analysis of the data, it was observed that the interaction terms did not differ from the subjects within treatment term. The subjects within treatment terms were not included in the original model since cell means were treated as the experimental unit, and all subjects in each school were sampled. However, the subject was considered to be the "best estimate" of o^2; and, if the factor were assumed to be random, the subject within error terms would test the schools factor and all interactions the with schools factor. It was observed that the pooled mean squares very closely approximated the subjects within school factor mean square, much more so than the components of the pooled mean square did. Hence, a decision was made to pool the error terms into four error terms. Error A was the mean square associated with schools in order [S(O)]. Error B was the pooled mean square for SxE, SxR, and SxExR. Error C was the pooled mean square for SxC, SxExC, SxRxC, and SxExRxC. Error D was the pooled mean square for SxT, SxTxE, SxtxR, SxTxC, SxTxExR, SxTxExC, SxTxRxC, and SxTxExRxC. Error A (Reps) tests O, Error B (whole-plot) tests E. R. ExO, RxO, ExR, and ExRxO; Error C (split-plot) tests C, CxO, CxE, CxR, CxExO, CxRxO, CxExR, and CxExRxO; and Error D tests T, TxO, TxE, TxR, TxC, TxExO, TxRxO, TxCxO, TxExR, TxExC, TxRxC, TxExRxO, TxExCxO, TxRxCxO, TxExRxC, and TxExRxCxO. This configuration is the traditional nested split-plot design with repeat measures.

The remainder of this section is divided into four parts: (1) the learning analyses, (2) the forgetting analyses, (3) the third time period analyses, and (4) the fourth time period analyses. The third and fourth time period scores are included because, tradition-

Table 12. Analysis of Variance of the Tractor Comprehension Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.081	.081	1.360
Schools in Order S(O)	16		9.531	Error A	
				.596	
Economic Status (E)	1		.175	.175	2.011
Race (R)	1		3.854	3.854	44.299
ExO	1		.060	.060	.690
RxO	1		.758	.758	8.712
ExR	1		.023	.023	.264
ExRxO	1		.029	.029	.333
S(O)xE	16		2.104		
S(O)xR	16	48	4.663	Error B	
S(O)xExR	16		.597	.087	
Color (C)	1		.088	.088	.687
CxO	1		.069	.069	.539
CxE	1		.001	.001	.008
CxR	1		.010	.010	.078
CxExO	1		.043	.043	.336
CxRxO	1		.078	.078	.609
CxExR	1		.129	.129	1.007
CxExRxO	1		.510	.510	3.997
S(O)xC	16		2.310		
S(O)xCxE	16		.943	Error C	
S(O)xCxR	16	64	1.295	.128	
S(O)xCxExR	16		3.629		
Time (T)	1		.974	.974	14.325
TxO	1		.017	.017	.250
TxE	1		.119	.119	1.750
TxR	1		.333	.333	4.897
TxC	1		.001	.001	.014
TxExO	1		.125	.125	1.838
TxRxO	1		.013	.013	.190
TxCxO	1		.025	.025	.368
TxExR	1		.014	.014	.020
TxExC	1		.008	.008	.012
TxRxC	1		.083	.083	1.220
TxExRxO	1		.039	.039	.573
TxExCxO	1		.005	.005	.001
TxRxCxO	1		.002	.002	.000
TxExRxC	1		.036	.036	.529
TxExRxCxO	1		.179	.179	2.632
S(O)xT	16		1.633		
S(O)xTxE	16		1.059		
S(O)xTxR	16		1.804		
S(O)xTxC	16		.589	Error D	
S(O)xTxExR	16	256	.859	.068	
S(O)xTxExC	16		.963		
S(O)xTxRxC	16		1.060		
S(O)xTxExRxC	16		.848		

R_2T_4 = 2.423.

The ANOVA summary table for the total mower test is presented in Table 13. The race effect was significant at the .05 alpha level [F(1,48) = 15.629; C.V. = 4.04]. The means were R_1 = 3.184 and R_2 = 3.031. The time effect was significant at the .05 level [F(1,128) = 22.478; C.V. = 3.92]. The means were T_3 = 3.165 and T_4 = 3.046. The OxCxT interaction was significant at the .05 alpha level [F(1,128) = 4.731; C.V. = 3.92]. The means were $O_1C_1T_3$ = 2.750, $O_1C_1T_4$ = 2.540, $O_1C_2T_3$ = 2.460, $O_1C_2T_4$ = 2.380, $O_2C_1T_3$ = 2.460, $O_2C_1T_4$ = 2.791, $O_2C_2T_3$ = 2.663, and $O_2C_2T_4$ = 2.466.

The ANOVA summary table for the mower knowledge subtest is presented in Table 14. The race effect was significant at the .05 level [F(1,48) = 15.415; C.V. = 4.04]. The means were R_1 = 2.505 and R_2 = 2.355. The time effect was significant at the .05 alpha level [F(1,128) = 16.869; C.V. = 3.92]. The means were T_3 = 2.483 and T_4 = 2.356. The OxCxT interaction was significant at the .05 alpha level [F(1,128) = 5.813; C.V. = 3.92]. The means were $O_1C_1T_3$ = 2.474, $O_1C_1T_4$ = 2.389, $O_1C_2T_3$ = 2.534, $O_1C_2T_4$ = 2.320, $O_2C_1T_3$ = 2.497, $O_2C_1T_4$ = 2.482, $O_2C_2T_3$ = 2.398, and $O_2C_2T_4$ = 2.301. The OxCxT interaction is graphically presented in Figure 9.

The ANOVA summary table for mower comprehension is presented in Table 15. The race effect was significant at the .05 alpha level [F(1,48) = 12.531; C.V. = 4.04]. The means were R_1 = 2.504 and R_2 = 2.330. The time effect was significant at the .05 alpha level [F(1,128) = 16.917; C.V. = 6.84]. The means were T_3 = 2.483 and T_4 = 2.391. The OxT interaction was significant at the .05 alpha level [F(1,128) = 4.550; C.V. = 3.92]. The means were O_1T_3 = 2.510, O_1T_4 = 2.559, O_2T_3 = 2.369, and O_2T_4 = 2.710.

The analyses of forgetting just presented could be summarized rather simply. The race and time effects were consistently found to be significant for all six dependent variables. The RxT and OxExRxC interactions were significant with the tractor total test, and the OxCxT interaction was significant with the mower knowledge subtest.

The Third Time Period Analyses

The third time period is akin to the traditional postest used in previous studies. The third time period test scores were, for the purposes of this set of analyses, assumed to be independent of previous measures. The design is the same as the previous design with T and all interactions with T removed, since only one time period is treated. As stated before, it was felt that any significant color effect in this time period would come out in the color effect or CxT interaction; yet the possibility remains that it would not.

Table 13. Analysis of Variance of the Mower Total Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		1.256	1.256	3.841
Schools in Order S(O)	16		5.233	Error A	
				.327	
Economic Status (E)	1		.030	.030	.286
Race (R)	1		1.641	1.641	15.629
ExO	1		.104	.104	.990
RxO	1		.022	.022	.209
ExR	1		.099	.099	.943
ExRxO	1		.007	.007	.066
S(O)xE	16		.995		
S(O)xR	16	48	2.794	Error B	
S(O)xExR	16		1.273	.105	
Color (C)	1		.101	.101	1.443
CxO	1		.012	.012	.171
CxE	1		.081	.081	1.157
CxR	1		.010	.010	1.443
CxExO	1		.004	.004	.057
CxRxO	1		.109	.109	1.557
CxExR	1		.171	.171	2.443
CxExRxO	1		.027	.027	.386
S(O)xC	16		1.464		
S(O)xCxE	16	64	1.090	Error C	
S(O)xCxR	16		.969	.070	
S(O)xCxExR	16		.983		
Time (T)	1		1.034	1.034	22.478
TxO	1		.178	.178	3.869
TxE	1		.057	.057	1.239
TxR	1		.017	.017	.369
TxC	1		.049	.049	1.065
TxExO	1		.013	.013	.283
TxRxO	1		.009	.009	.196
TxCxO	1		.175	.175	3.858
TxExR	1		.080	.080	1.739
TxExC	1		.002	.002	.043
TxRxC	1		.005	.005	.109
TxExRxO	1		.096	.096	2.087
TxExCxO	1		.000	.000	.000
TxRxCxO	1		.000	.000	.000
TxExRxC	1		.000	.000	.000
TxExRxCxO	1		.010	.010	2.196
S(O)xT	16		.886		
S(O)xTxE	16		.930		
S(O)xTxR	16		.637		
S(O)xTxC	16		.624	Error D	
S(O)xTxExR	16	256	.876	.046	
S(O)xTxExC	16		.784		
S(O)xTxRxC	16		.346		
S(O)xTxExRxC	16		.772		

Table 14. Analysis of Variance of Mower Knowledge

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		1.416	1.416	3.879
Schools in Order S(O)	16		5.834	Error A	
				.365	
Economic Status (E)	1		.018	.018	.785
Race (R)	1		2.081	2.081	15.415
ExO	1		.110	.110	.815
RxO	1		.022	.022	.163
ExR	1		.141	.141	1.037
ExRxO	1		.013	.013	.097
S(O)xE	16		1.139		
S(O)xR	16	48	3.505	Error B	
S(O)xExR	16		1.835	.135	
Color (C)	1		.228	.228	2.326
CxO	1		.119	.119	1.214
CxE	1		.072	.072	.735
CxR	1		.070	.070	.714
CxExO	1		.001	.001	.010
CxRxO	1		.282	.282	2.877
CxExR	1		.132	.132	1.347
CxExRxO	1		.019	.019	.938
S(O)xC	16		2.272		
S(O)xCxE	16		1.096	Error C	
S(O)xCxR	16	64	1.578	.098	
S(O)xCxExR	16		1.348		
Time (T)	1		1.164	1.164	16.869
TxO	1		.060	.060	.869
TxE	1		.063	.063	.913
TxR	1		.043	.043	.623
TxC	1		.001	.001	.014
TxExO	1		.000	.000	.000
TxRxO	1		.122	.122	1.768
TxCxO	1		.401	.401	5.812
TxExR	1		.102	.102	1.478
TxExC	1		.014	.014	.203
TxRxC	1		.000	.000	.000
TxExRxO	1		.090	.090	1.304
TxExCxO	1		.011	.011	.159
TxRxCxO	1		.014	.014	.203
TxExRxC	1		.008	.008	.116
TxExRxCxO	1		.175	.175	2.536
S(O)xT	16		1.593		
S(O)xTxE	16		.927		
S(O)xTxR	16		.953		
S(O)xTxC	16		.975		
S(O)xTxExR	16	256	1.346	Error D	
S(O)xTxExC	16		1.464	.069	
S(O)xTxRxC	16		.703		
S(O)xTxExRxC	16		.861		

3566

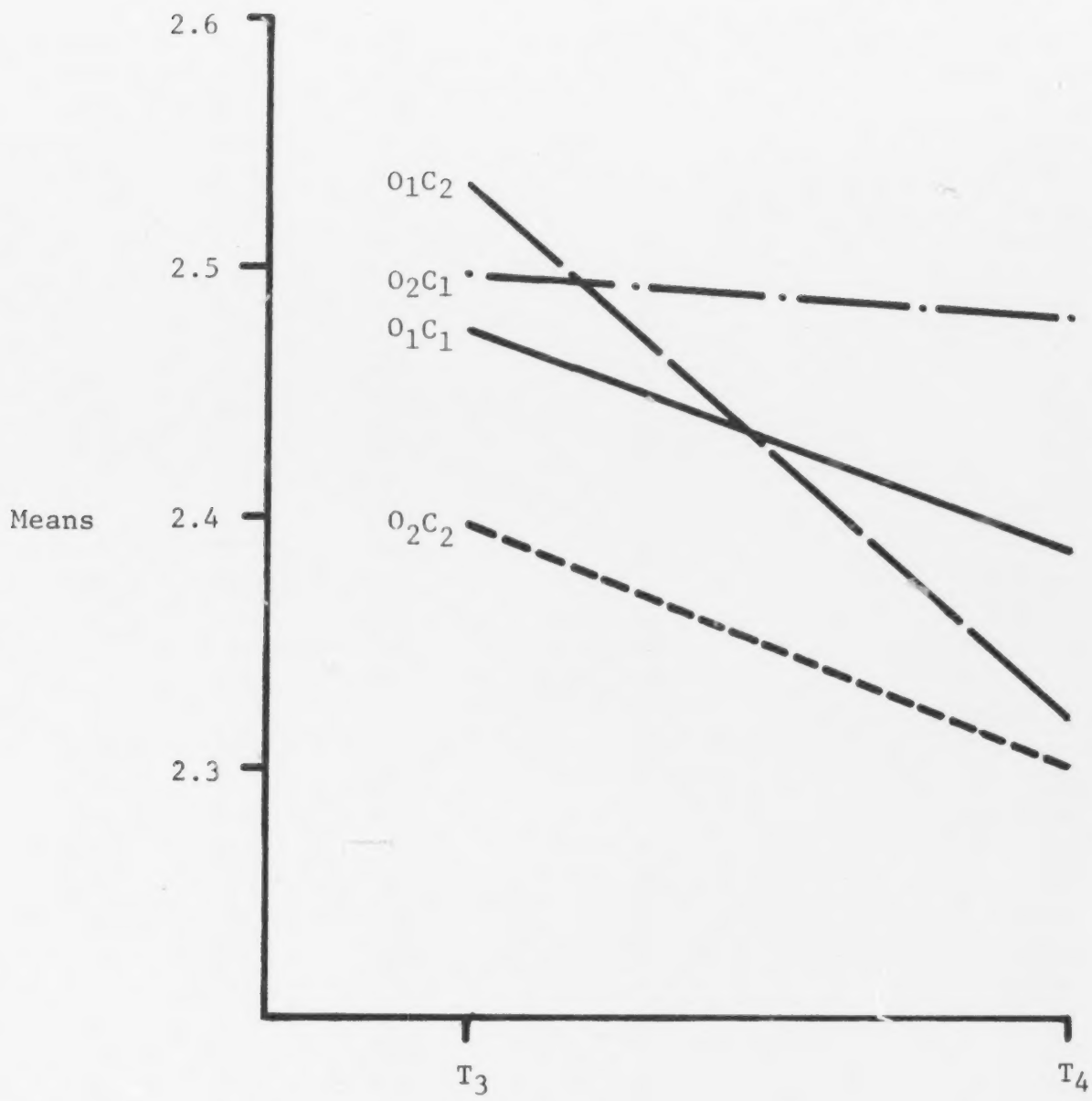

Figure 9. The TxCxO Interaction for Mower Knowledge Subtest for the Forgetting Analyses

Table 15. Analysis of Variance of the Mower Comprehension Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		1.337	1.337	3.967
Schools in Order S(O)	16		5.390	Error A	
				.337	
Economic Status (E)	1		.041	.041	.363
Race (R)	1		1.416	1.416	12.531
ExO	1		.096	.096	.849
RxO	1		.027	.027	.239
ExR	1		.095	.095	.841
ExRxO	1		.017	.017	.947
S(O)xE	16		1.154		
S(O)xR	16	48	2.700	Error B	
S(O)xExR	16		1.561	.113	
Color (C)	1		.032	.032	.376
CxO	1		.005	.005	.059
CxE	1		.068	.068	.800
CxR	1		.008	.008	.094
CxExO	1		.010	.010	.118
CxRxO	1		.028	.028	.329
CxExR	1		.142	.142	.167
CxExRxO	1		.034	.034	.400
S(O)xC	16		1.852		
S(O)xCxE	16		1.750	Error C	
S(O)xCxR	16	64	.784	.085	
S(O)xCxExR	16		1.073		
Time (T)	1		1.015	1.015	16.917
TxO	1		.238	.238	3.971
TxE	1		.094	.094	1.567
TxR	1		.015	.015	.250
TxC	1		.147	.147	.245
TxExO	1		.022	.022	.367
TxRxO	1		.018	.018	.300
TxCxO	1		.177	.177	2.950
TxExR	1		.038	.038	.633
TxExC	1		.039	.039	.650
TxRxC	1		.010	.010	1.683
TxExRxO	1		.114	.114	1.900
TxExCxO	1		.007	.007	.117
TxRxCxO	1		.009	.009	.150
TxExRxC	1		.001	.001	.017
TxExRxCxO	1		.059	.059	.983
S(O)xT	16		.941		
S(O)xTxE	16		1.453		
S(O)xTxR	16		.927		
S(O)xTxC	16		.784	Error D	
S(O)xTxExR	16	256	1.007	.060	
S(O)xTxExC	16		.824		
S(O)xTxRxC	16		.841		
S(O)xTxExRxC	16		.960		

The ANOVA summary table for the total tractor test is presented in Table 16. The race effect was significant at the .05 level [F(1,48) = 19.305; C.V. = 7.19]. The means were R_1 = 2.753 and R_2 = 2.457.

The ANOVA summary table for the tractor comprehension subtest is presented in Table 17. The race effect was significant at the .05 level [F(1,48) = 24.310; C.V. = 7.19]. The means were R_1 = 2.771 and R_2 = 2.472.

The ANOVA summary table for the mower total test is presented in Table 18. The order effect was significant at the .05 level [F(1,16) = 5.885; C.V. = 4.49]. The means were O_1 = 3.257 and O_2 = 3.079. The race effect was significant at the .05 alpha level [F(1,48) = 12.480; C.V. = 4.04]. The means were R_1 = 3.249 and R_2 = 3.088.

The ANOVA summary table for the mower knowledge subtest is presented in Table 19. The order effect was significant at the .05 level [F(1,48) = 4.530; C.V. = 4.49]. The means were O_1 = 2.568 and O_2 = 2.402. The race effect was significant at the .05 level [F(1,48) = 12.225; C.V. = 4.04]. The means were R_1 = 2.572 and R_2 = 2.398.

The ANOVA summary table for mower comprehension is presented in Table 20. The order effect was significant at the .05 level [F(1,16) = 6.938; C.V. = 4.49]. The means were O_1 = 2.548 and O_2 = 2.356. The race effect was significant at the .05 level [F(1,48) = 8.820; C.V. = 4.04]. The means were R_1 = 2.526 and R_2 = 2.378.

The results of the third time period analyses could be simply summarized. The race effect was significant with each of the six dependent variables. The order effect was significant with the mower total test and the mower knowledge and comprehension subtests.

The Fourth Time Period Analyses

The fourth time period scores were analyzed separately like the third time period scores. The underlying logic is the same.

The ANOVA summary table for the tractor total test is presented in Table 21. The race effect was significant at the .05 level [F(1,48) = 15.271; C.V. = 4.04]. The means were R_1 = 3.265 and R_2 = 3.080. The OxExRxC interaction was significant at the .05 level [F(1,64) = 5.452; C.V. = 3.99].

The ANOVA summary table for the tractor knowledge subtest is presented in Table 22. The race effect was significant at the .05 level [F(1,48) = 18.795; C.V. = 4.04]. The means were R_1 = 2.548 and R_2 = 2.330.

The ANOVA summary table for tractor comprehension is presented in Table 23. The race effect was significant at the .05 level

Table 16. Analysis of Variance of the Tractor Total Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.070	.070	.167
Schools in Order S(O)	16		6.693	Error A	
				.418	
Economic Status (E)	1		.002	.002	.015
Race (R)	1		3.259	3.259	24.689
ExO	1		.012	.012	.091
RxO	1		.254	.254	1.924
ExR	1		.053	.053	.402
ExRxO	1		.001	.001	.000
S(O)xE	16		1.939		
S(O)xR	16	48	3.692	Error B	
S(O)xExR	16		.687	.132	
Color (C)	1		.034	.034	.494
CxO	1		.004	.004	.051
CxE	1		.014	.014	.177
CxR	1		.033	.033	.418
CxExO	1		.000	.000	.000
CxRxO	1		.052	.052	.658
CxExR	1		.142	.142	1.797
CxExRxO	1		.132	.132	1.671
S(O)xC	16		1.365		
S(O)xCxE	16		.771		
S(O)xCxR	16	64	.989	Error C	
S(O)xCxExR	16		1.960	.079	

Table 17. Analysis of Variance of the Tractor Comprehension Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.011	.011	.024
Schools in Order S(O)	16		7.355	Error A	
				.460	
Economic Status (E)	1		.003	.003	.023
Race (R)	1		3.220	3.220	24.310
ExO	1		.177	.177	1.331
RxO	1		.286	.286	2.150
ExR	1		.036	.036	.027
ExRxO	1		.066	.066	.496
S(O)xE	16		1.268		
S(O)xR	16	48	4.388	Error B	
S(O)xExR	16		.743	.133	
Color (C)	1		.035	.035	.385
CxO	1		.006	.006	.066
CxE	1		.007	.007	.077
CxR	1		.075	.075	.824
CxExO	1		.009	.009	.099
CxRxO	1		.050	.050	.549
CxExR	1		.149	.149	1.637
CxExRxO	1		.054	.054	.593
S(O)xC	16		1.442		
S(O)xCxE	16		1.039	Error C	
S(O)xCxR	16	64	.944	.091	
S(O)xCxExR	16		2.413		

3571

Table 18. Analysis of Variance of the Mower Total Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		1.130	1.130	5.885
Schools in Order S(O)	16		3.070	Error A	
				.192	
Economic Status (E)	1		.103	.103	1.373
Race (R)	1		.936	.936	12.480
ExO	1		.114	.114	1.520
RxO	1		.020	.020	.267
ExR	1		.000	.000	.000
ExRxO	1		.094	.094	1.253
S(O)xE	16		.675		
S(O)xR	16	48	1.900	Error B	
S(O)xExR	16		1.020	.075	
Color (C)	1		.001	.001	.017
CxO	1		.080	.080	1.379
CxE	1		.040	.040	.689
CxR	1		.009	.009	.155
CxExO	1		.000	.000	.000
CxRxO	1		.037	.037	.638
CxExR	1		.069	.069	1.189
CxExRxO	1		.137	.137	2.362
S(O)xC	16		1.173		
S(O)xCxE	16		1.207	Error C	
S(O)xCxR	16	64	.429	.058	
S(O)xCxExR	16		.905		

3572

Table 19. Analysis of Variance of the Mower Knowledge Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.992	.992	4.530
Schools in Order S(O)	16		3.509	Error A	
				.219	
Economic Status (E)	1		.087	.087	.977
Race (R)	1		1.088	1.088	12.225
ExO	1		.070	.070	.786
RxO	1		.108	.108	1.213
ExR	1		.000	.000	.000
ExRxO	1		.099	.099	1.112
S(O)xE	16		.623		
S(O)xR	16	48	2.261	Error B	
S(O)xExR	16		1.412	.089	
Color (C)	1		.109	.109	1.298
CxO	1		.051	.051	.607
CxE	1		.088	.088	1.048
CxR	1		.023	.023	.274
CxExO	1		.006	.006	.071
CxRxO	1		.189	.189	2.250
CxExR	1		.089	.089	1.060
CxExRxO	1		.172	.172	2.048
S(O)xC	16		1.403		
S(O)xCxE	16		1.557	Error C	
S(O)xCxR	16	64	.919	.084	
S(O)xCxExR	16		1.510		

3573

Table 20. Analysis of Variance of the Mower Comprehension Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		1.315	1.315	6.958
Schools in Order S(O)	16		3.033	Error A	
				.189	
Economic Status (E)	1		.162	.162	1.820
Race (R)	1		.785	.785	8.820
ExO	1		.134	.134	1.506
RxO	1		.000	.000	.000
ExR	1		.001	.001	.011
ExRxO	1		.139	.139	1.562
S(O)xE	16		.913		
S(O)xR	16	48	2.104	Error B	
S(O)xExR	16		1.264	.089	
Color (C)	1		.035	.035	.530
CxO	1		.151	.151	2.288
CxE	1		.007	.007	.106
CxR	1		.001	.001	.015
CxExO	1		.000	.000	.000
CxRxO	1		.000	.000	.000
CxExR	1		.060	.060	.909
CxExRxO	1		.118	.118	1.788
S(O)xC	16		1.558		
S(O)xCxE	16		1.526		
S(O)xCxR	16	64	.420	Error C	
S(O)xCxExR	16		.702	.066	

3574

Table 21. Analysis of Variance of the Tractor Total Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.187	.187	.719
Schools of Order S(O)	16		4.159	Error A	
				.260	
Economic Status (E)	1		.241	.241	3.089
Race (R)	1		1.227	1.227	15.731
ExO	1		.002	.002	.026
RxO	1		.277	.277	3.551
ExR	1		.001	.001	.103
ExRxO	1		.065	.065	.833
S(O)xE	16		1.254		
S(O)xR	16	48	2.115	Error B	
S(O)xExR	16		.368	.078	
Color (C)	1		.038	.038	.520
CxO	1		.040	.040	.548
CxE	1		.017	.017	.233
CxR	1		.012	.012	.164
CxExO	1		.127	.127	1.740
CxRxO	1		.045	.045	.616
CxExR	1		.005	.005	.068
CxExRxO	1		.398	.398	5.452
S(O)xC	16		1.315		
S(O)xCxE	16		.611	Error C	
S(O)xCxR	16	64	1.116	.073	
S(O)xCxExR	16		1.596		

3575

Table 22. Analysis of Variance of the Tractor Knowledge Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.319	.319	1.259
Schools in Order S(O)	16		5.663	Error A	
				.354	
Economic Status (E)	1		.131	.131	1.488
Race (R)	1		1.654	1.654	18.795
ExO	1		.001	.001	.011
RxO	1		.175	.175	1.989
ExR	1		.025	.025	.284
ExRxO	1		.229	.229	.260
X(O)xE	16		1.211		
S(O)xR	16	48	2.548	Error B	
S(O)xExR	16		.479	.088	
Color (C)	1		.061	.061	.803
CxO	1		.009	.009	.118
CxE	1		.059	.059	.776
CxR	1		.027	.027	.355
CxExO	1		.036	.236	3.105
CxRxO	1		.076	.076	1.000
CxExR	1		.000	.000	.000
CxExRxO	1		.204	.204	2.684
S(O)xC	16		1.708		
S(O)xCxE	16		1.369	Error C	
S(O)xCxR	16	64	1.270	.076	
S(O)xCxExR	16		1.942		

3576

Table 23. Analysis of Variance of the Tractor Comprehension Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.087	.087	.365
Schools in Order S(O)	16		3.807	Error A	
				.238	
Economic Status (E)	1		.291	.291	2.970
Race (R)	1		.961	.961	9.806
ExO	1		.006	.006	.061
RxO	1		.486	.486	4.959
ExR	1		.000	.000	.000
ExRxO	1		.000	.000	.000
S(O)xE	16		1.893		
S(O)xR	16	48	2.084	Error B	
S(O)xExR	16		.711	.098	
Color (C)	1		.053	.053	.582
CxO	1		.089	.089	.978
CxE	1		.002	.002	.021
CxR	1		.018	.018	.198
CxExO	1		.039	.039	.428
CxRxO	1		.029	.029	.319
CxExR	1		.015	.015	.165
CxExRxO	1		.688	.688	7.560
S(O)xC	16		1.454		
S(O)xCxE	16	64	.866	Error C	
S(O)xCxR	16		1.414	.091	
S(O)xCxExR	16		2.070		

3577

[F(1,48) = 9.806; C.V. = 4.04]. The means were R_1 = 2.587 and R_2 = 2.423. The RxO interaction was significant at the .05 level [F(1,48) = 4.959; C.V. = 4.04]. The means were R_1O_1 = 2.669, R_1O_2 = 2.390, R_2O_1 = 2.504, and R_2O_2 = 2.457. The OxExRxC interaction was significant at the .05 level [F(1,64) = 7.560; C.V. = 3.99].

The ANOVA summary table for the total mower test is presented in Table 24. The race effect was significant at the .05 level [F(1,48) = 8.073; C.V. = 4.04]. The means were R_1 = 3.144 and R_2 = 2.978.

The ANOVA summary table for the mower knowledge subtest is presented in Table 25. The race effect was significant at the .05 level [F(1,48) = 7.850; C.V. = 4.04]. The means were R_1 = 2.437 and R_2 = 2.274. The CxO interaction was significant at the .05 level [F(1,64) = 6.303; C.V. = 3.99]. The means were C_1O_1 = 2.442, C_1O_2 = 2.216, C_2O_1 = 2.381, and C_2O_2 = 2.385.

The ANOVA summary table for the mower comprehension subtest is presented in Table 26. The race effect was significant at the .05 level [F(1,48) = 6.196; C.V. = 4.04]. The means were R_1 = 2.393 and R_2 = 2.267.

The results of the fourth time period may be simply summarized. The race effect was significant for each of the six dependent variables. The OxExRxC interaction was significant with the total tractor test and the tractor comprehension subtest.

Time periods one and two were also analyzed but, due to space considerations, the results for these 12 analyses will be summarized. For the first time period, the race effect was significant at the .05 level for each of the six dependent variables. The economic status effect was significant for the tractor total test and subtests at the .05 level. The ExRxC interaction was significant for the tractor comprehension and mower knowledge subtests and the mower total test. The low economic status black subjects did better with black and white illustrations. All other groups did better with color on each of the associated dependent variables. No other significant effects were found.

In the second time period, the race effect was significant for all six dependent variables. The economic status effect was significant at the .05 level for the tractor total test and subtests. The ExRxC interaction was significant with the tractor comprehension subtest. The low economic status blacks scored higher with black and white illustrations; the other groups scored higher with color illustrations. The ExR interaction was significant with the mower total test. The ExC interaction was significant on both the mower total test and the mower knowledge subtest. The high economic status students benefited more from color and color made little difference for low economic status students.

Table 24. Analysis of Variance of the Mower Total Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.241	.241	1.324
Schools in Order S(O)	16		2.919	Error A	
				.182	
Economic Status (E)	1		.002	.002	.024
Race (R)	1		.662	.662	8.073
ExO	1		.022	.022	.268
RxO	1		.002	.002	.024
ExR	1		.179	.179	2.176
ExRxO	1		.026	.026	.317
S(O)xE	16		1.188		
S(O)xR	16	48	1.590	Error B	
S(O)xExR	16		1.144	.082	
Color (C)	1		.144	.144	2.880
CxO	1		.167	.167	3.340
CxE	1		.054	.054	1.080
CxR	1		.000	.000	.000
CxExO	1		.002	.002	.040
ExRxO	1		.059	.059	1.180
CxExR	1		.085	.085	1.700
CxExRxO	1		.011	.011	.220
S(O)xC	16		.864		
S(O)xCxE	16		.687	Error C	
S(O)xCxR	16	64	.803	.050	
S(O)xCxExR	16		.847		

3579

Table 25. Analysis of Variance of the Knowledge Mower Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.442	.442	1.849
Schools in Order S(O)	16		3.828	Error A	
				.239	
Economic Status (E)	1		.007	.007	.058
Race (R)	1		.950	.950	7.850
ExO	1		.051	.051	.421
RxO	1		.021	.021	.173
ExR	1		.242	.242	2.000
ExRxO	1		.017	.017	.140
S(O)xE	16		1.400		
S(O)xR	16	48	2.263	Error B	
S(O)xExR	16		1.809	.121	
Color (C)	1		.105	.105	1.381
CxO	1		.479	.479	6.303
CxE	1		..011	.011	.145
CxR	1		.040	.040	.526
CxExO	1		.002	.002	.026
CxRxO	1		.086	.086	1.131
CxExR	1		.038	.038	.500
CxExRxO	1		.040	.040	.526
S(O)xC	16		1.806		
S(O)xCxE	16		1.053	Error C	
S(O)xCxR	16	64	1.307	.076	
S(O)xCxExR	16		.716		

3580

Table 26. Analysis of Variance of the Comprehension Mower Test

Source of Variation	Degrees of Freedom		Sum of Squares	Mean Squares	F-Value
Order (O)	1		.200	.200	1.031
Schools in Order S(O)	16		3.110	Error A	
				.194	
Economic Status (E)	1		.005	.005	.054
Race (R)	1		.570	.570	6.196
ExO	1		.013	.013	.141
RxO	1		.045	.045	.489
ExR	1		.127	.127	1.380
ExRxO	1		.021	.021	.228
S(O)xE	16		1.602		
S(O)xR	16	48	1.555	Error B	
S(O)xExR	16		1.269	.092	
Color (C)	1		.158	.158	2.323
CxO	1		.062	.062	.912
CxE	1		.105	.105	1.544
CxR	1		.018	.018	.264
CxExO	1		.016	.016	.235
CxRxO	1		.034	.034	.500
CxExR	1		.061	.061	.897
CxExRxO	1		.002	.002	.029
S(O)xC	16		1.011		
S(O)xCxE	16		1.009	Error C	
S(O)xCxR	16	64	1.073	.068	
S(O)xCxExR	16		1.293		

3581

Descriptive Statistics

This section serves two primary purposes. The first is to provide evidence that no violence was done to the data by either the use of cell means or the log transformation. The second is to provide the population parameters, where the participating subjects (all ninth grade agriculture students in the eighteen schools) are treated as the population of interest.

The statistics reported in this section, as in the dependent variables section, apply to the students within school-order combinations summed across schools in order. The means, based on the original test scores, were defined as the unweighted sum of correct answers.

The means, standard deviations, and number of observations across schools in order are reported in Appendix A for the main effects (order, schools, economic status, race, and color) for each of the six dependent variables for each of the four time periods. The economic status and race statistics should be carefully interpreted due to the large difference in the number of observations within levels. The same statistics are presented for each of the economic status by race by color combinations across schools and for each of the order by school by economic status by race by color cells (144). The cell means for the later set of treatment combinations (144), the means for each of the six dependent variables and for each time period serve as the raw data for the inferential statistics which was previously presented.

The color main effect means for students summed across students within schools are presented in Figures 10, 11, 12, 13, 14, and 15. The key for reading these figures is as follows: C_1 (Color) ——— C_2 (Black and white) - - - - - . It may be noted that the difference in the means are very small. It also may be noted that the effects of color do not appear to differ by item type. That is, the lines for tractor knowledge and tractor comprehension, and mower knowledge and mower comprehension appear to be very similar, and deviate only slightly for the mean scores for all students. Comparing the total test scores for mowers with those for tractors, one can observe a different slope and intercept. However, the differences in the color effects were very small.

The means for each economic status by race by color cell is graphically presented in Figures 16, 17, 18, 19, 20, and 21. On each of the six graphs, the key for reading the lines is as follows:

$E_1R_1C_1$ ——— — ——— — ———

$E_1R_1C_2$ ——— - ——— -

$E_1R_2C_1$ ———————————

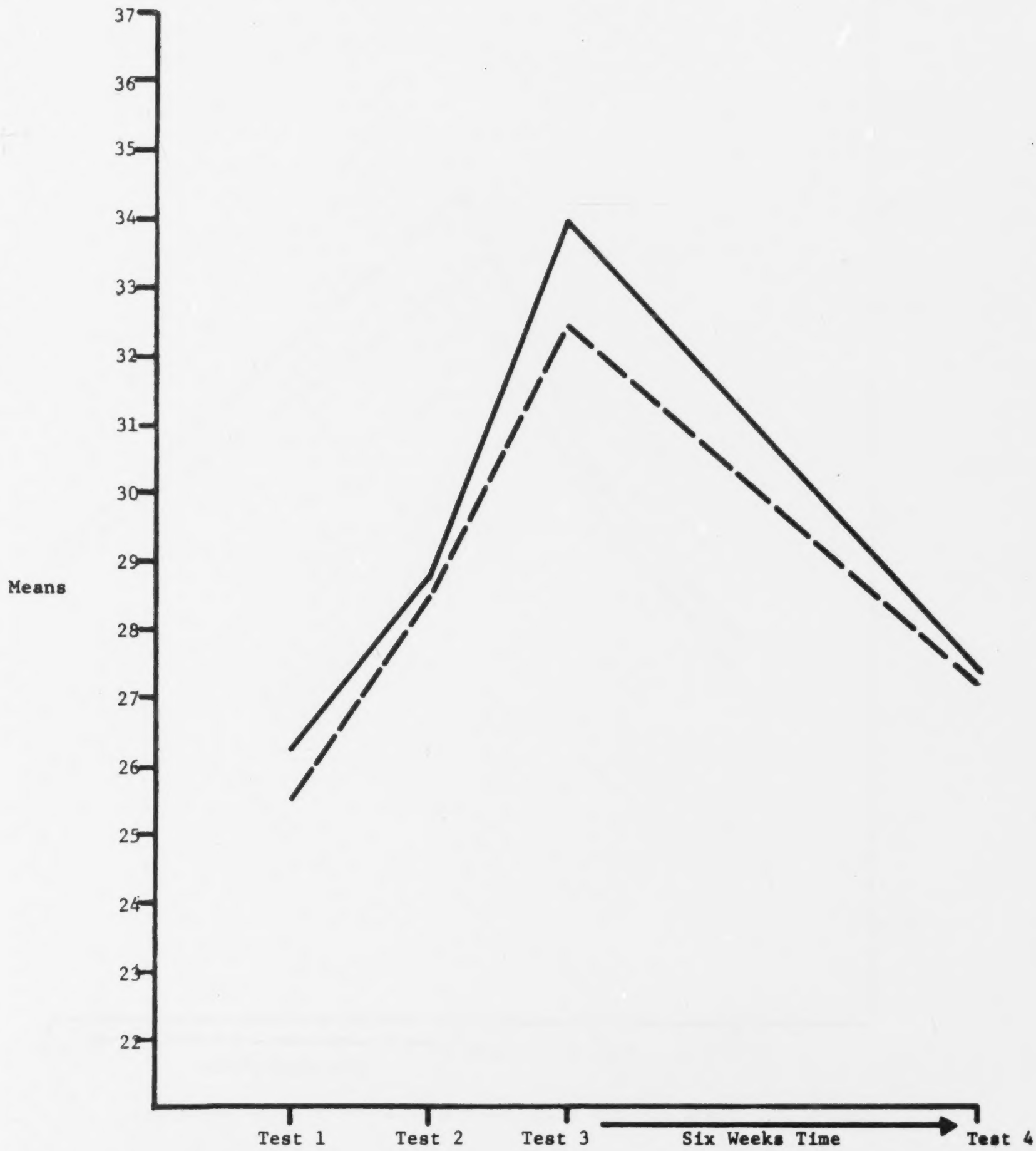

Figure 10. Means for the Color Main Effect for Tractor Total Tests

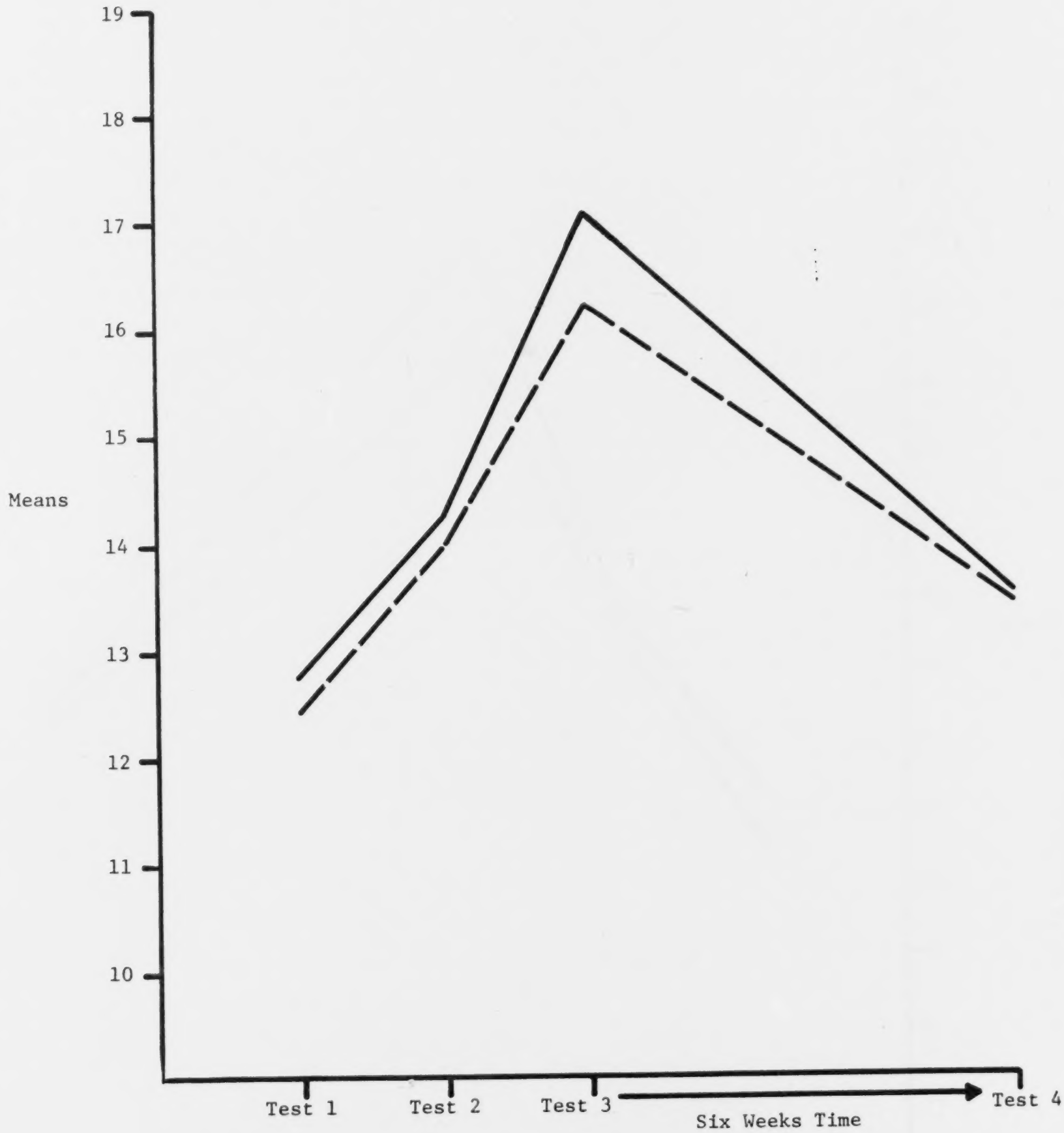

Figure 11. Means for the Color Main Effect for Tractor Knowledge

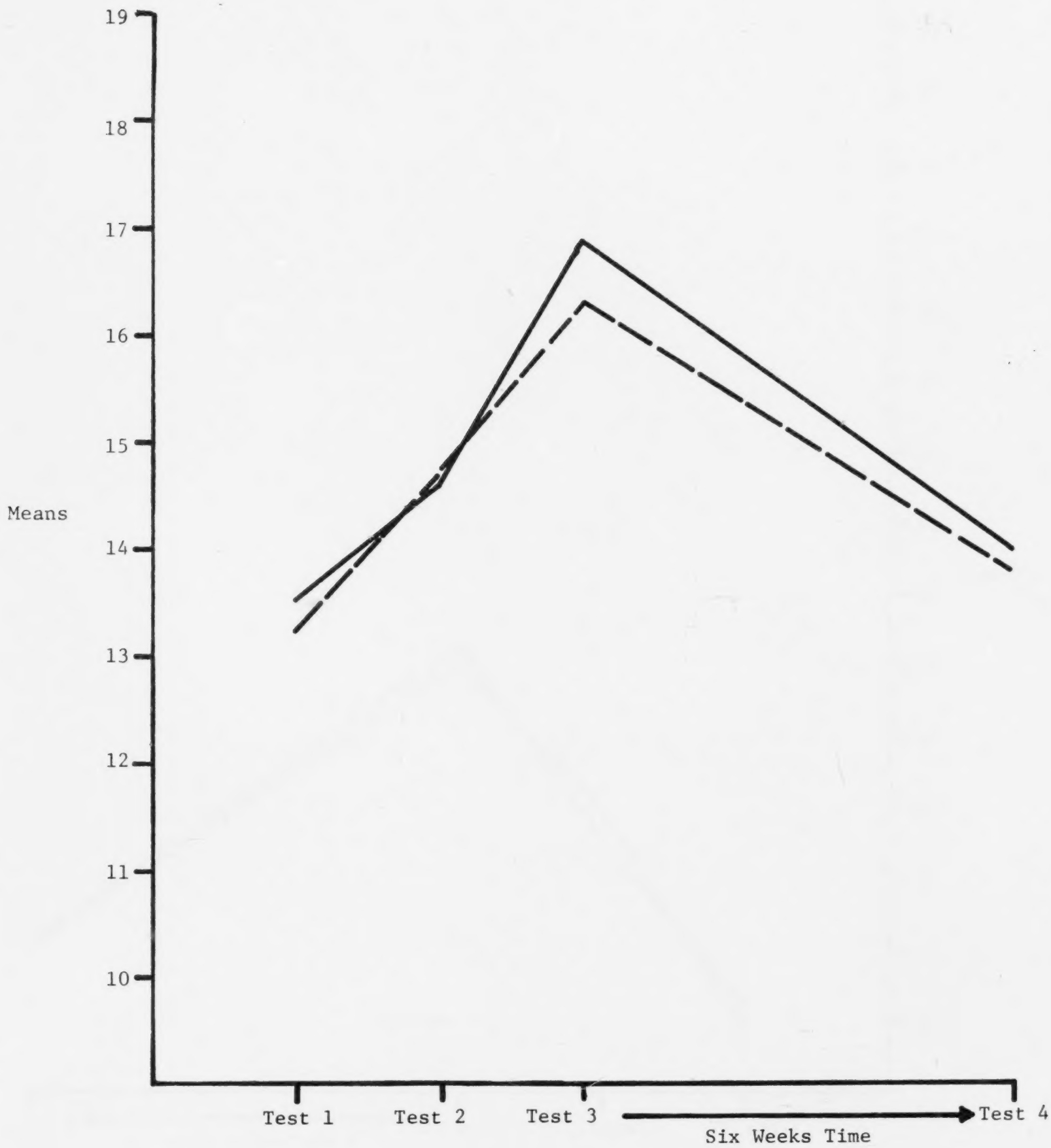

Figure 12. Means for the Color Main Effect for Tractor Comprehension

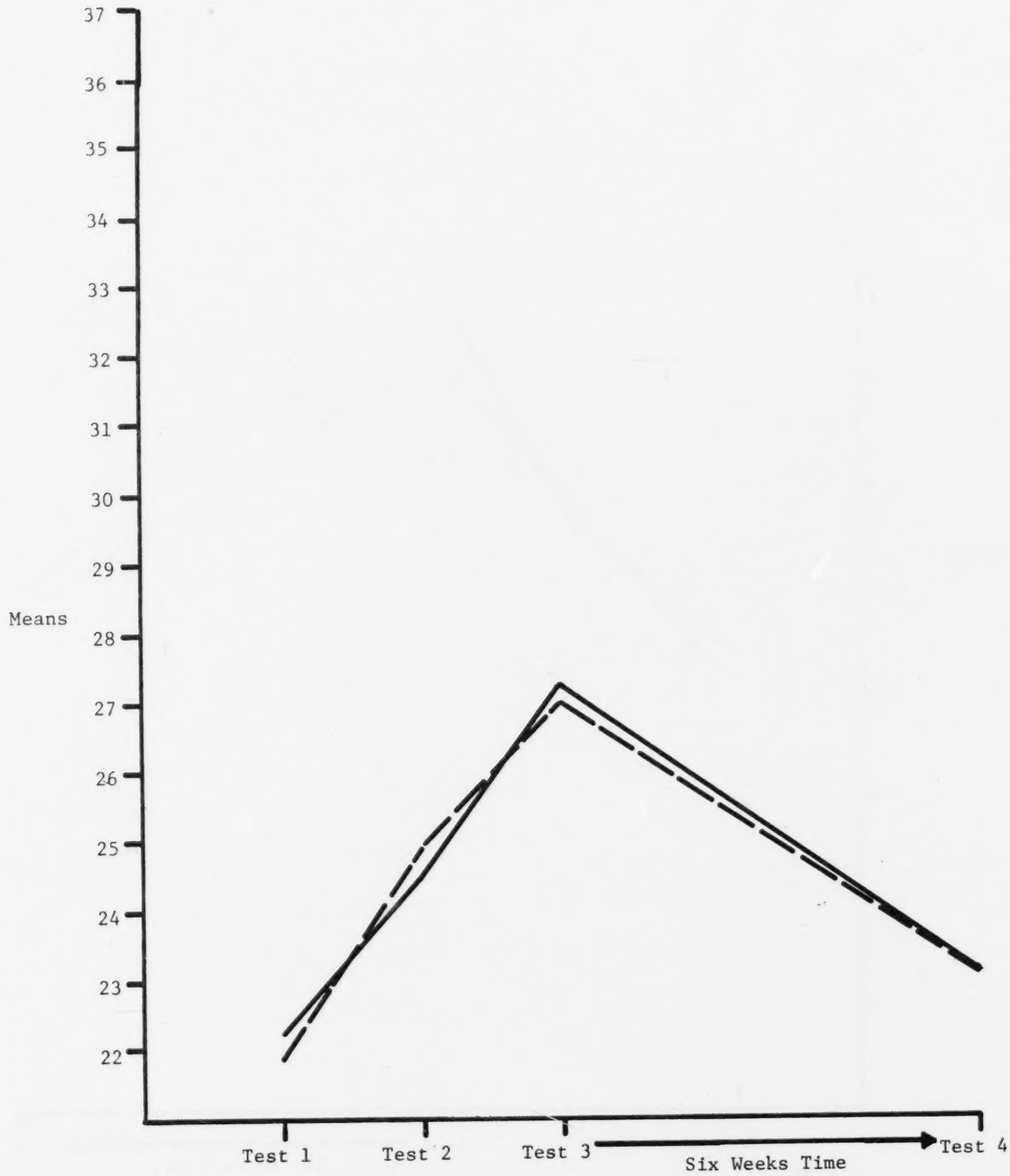

Figure 13. Means for the Color Main Effect for Mower Total Tests

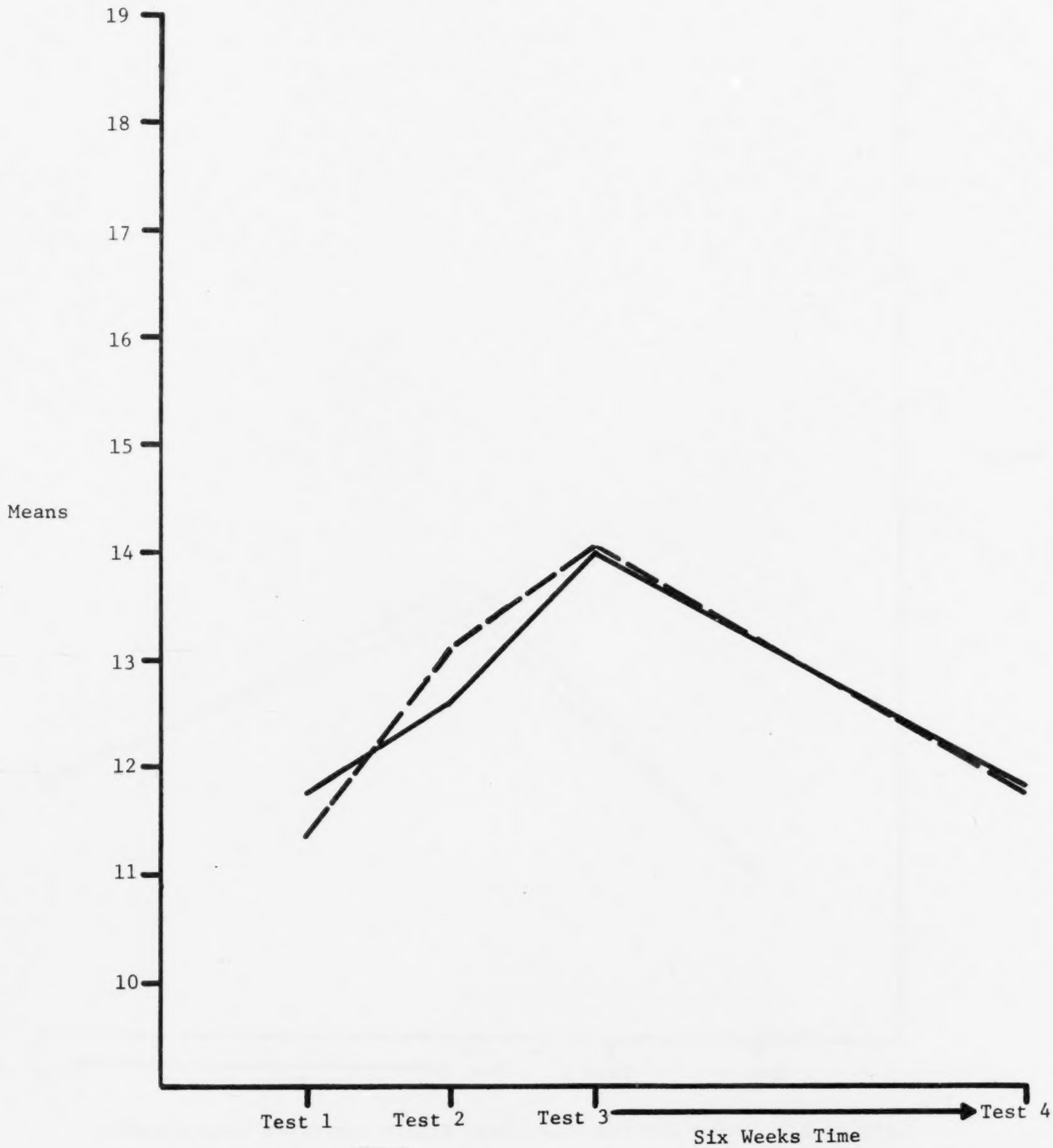

Figure 14. Means for the Color Main Effect for Mower Knowledge

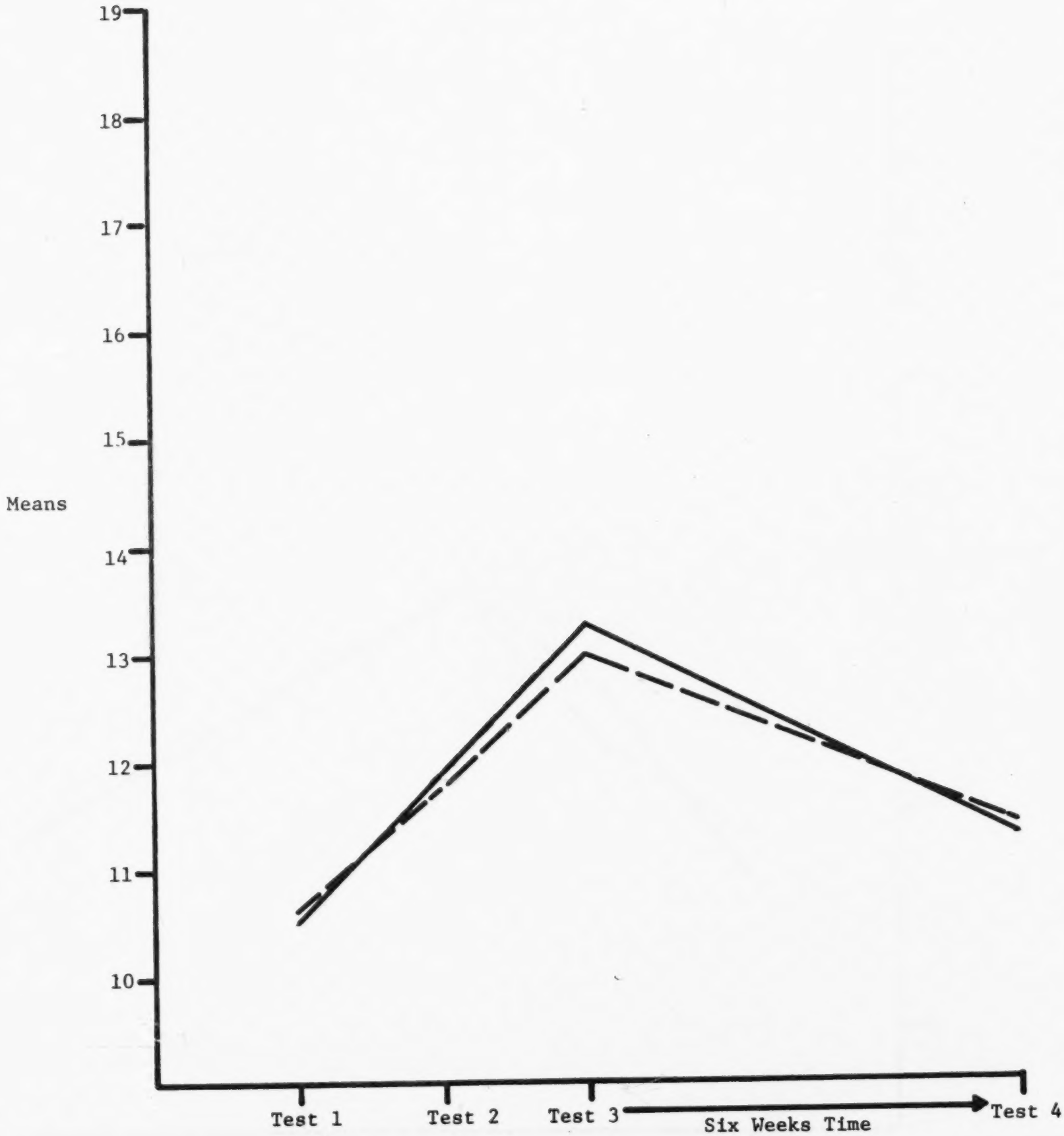

Figure 25. Means for the Color Main Effect for Mower Comprehension

3588

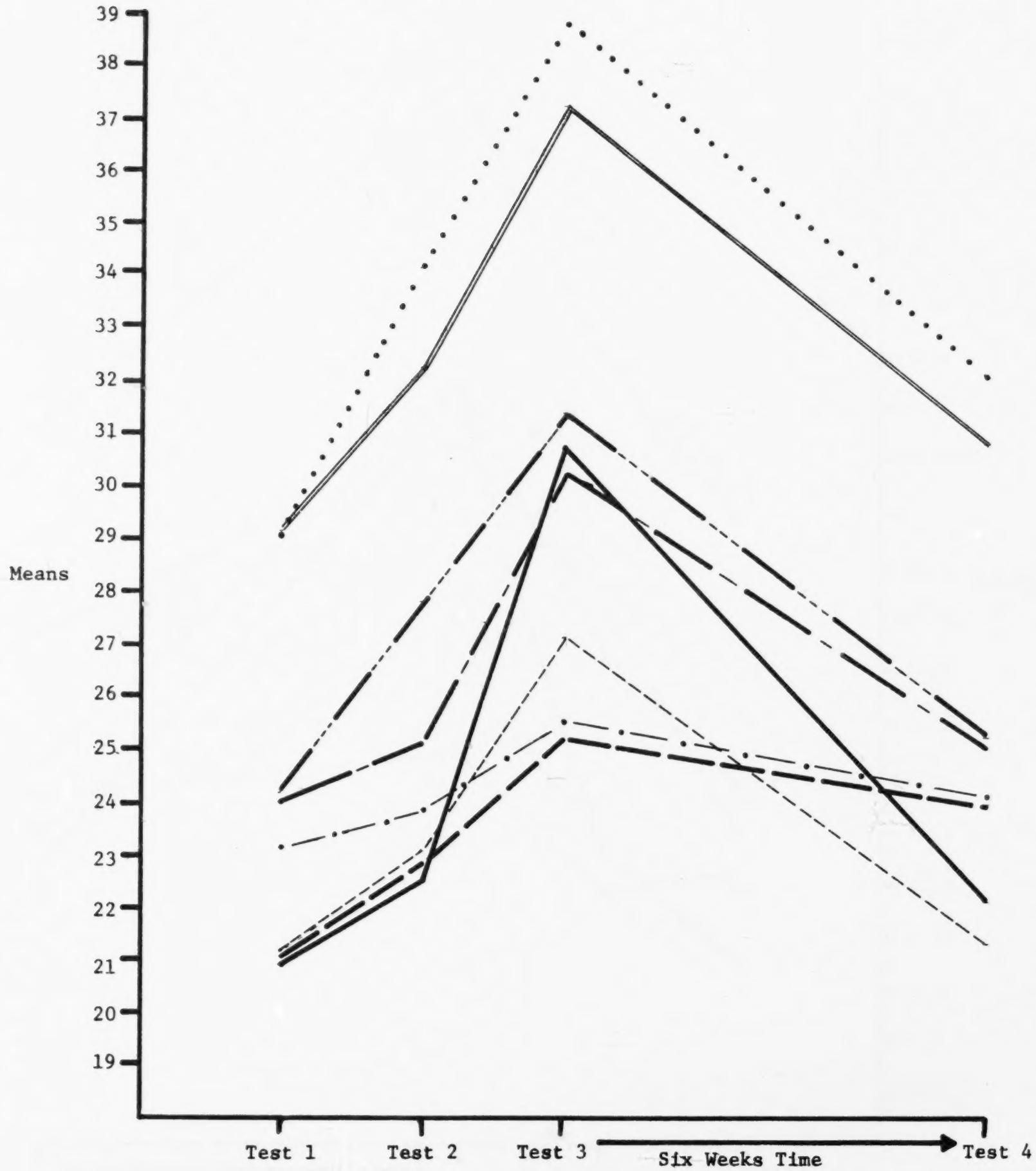

Figure 16. Mean Test Scores for Students in the ExRxC Treatments for Tractor Total Test

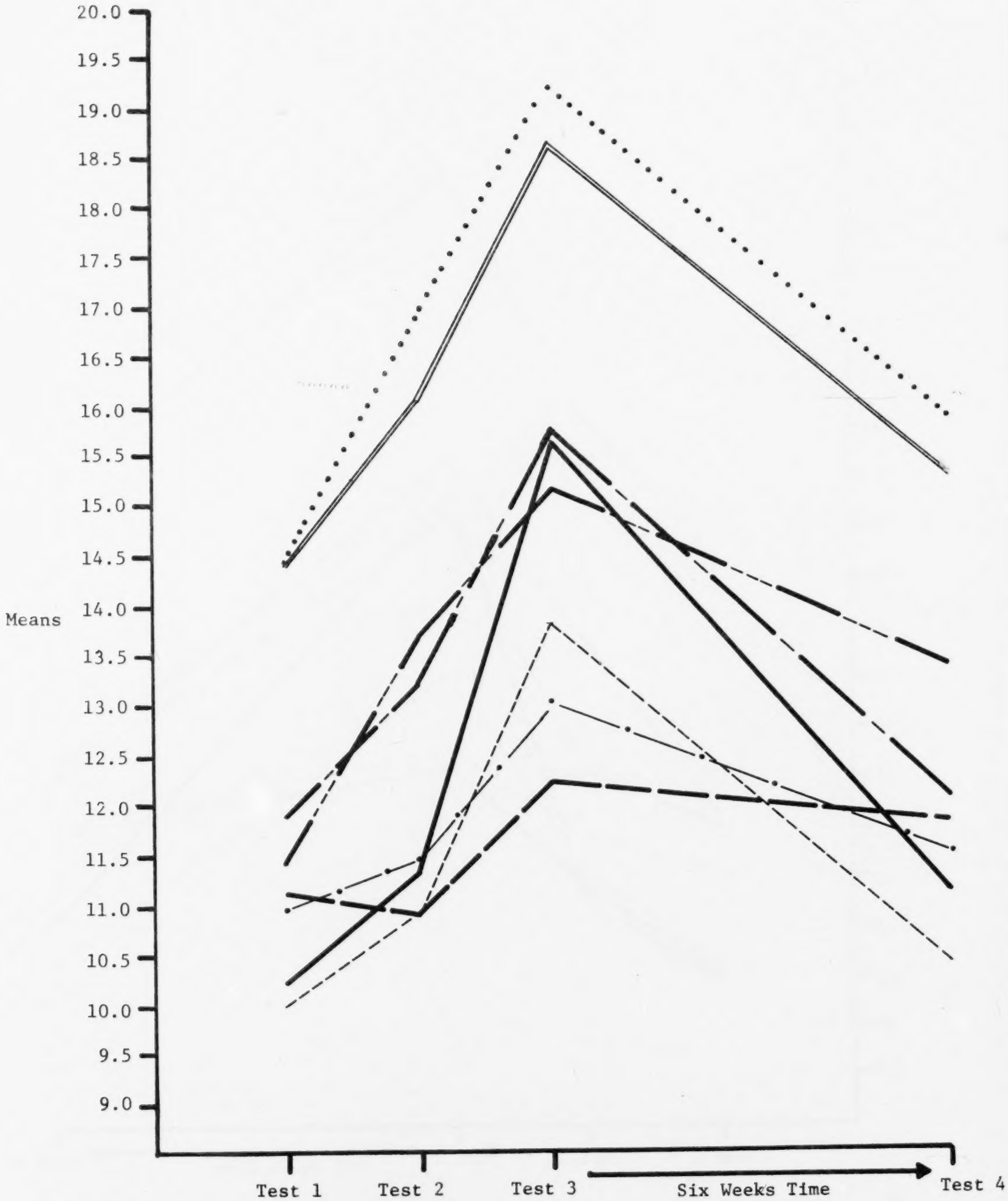

Figure 17. Mean Test Scores for Students in the ExRxC Treatments for Tractor Knowledge

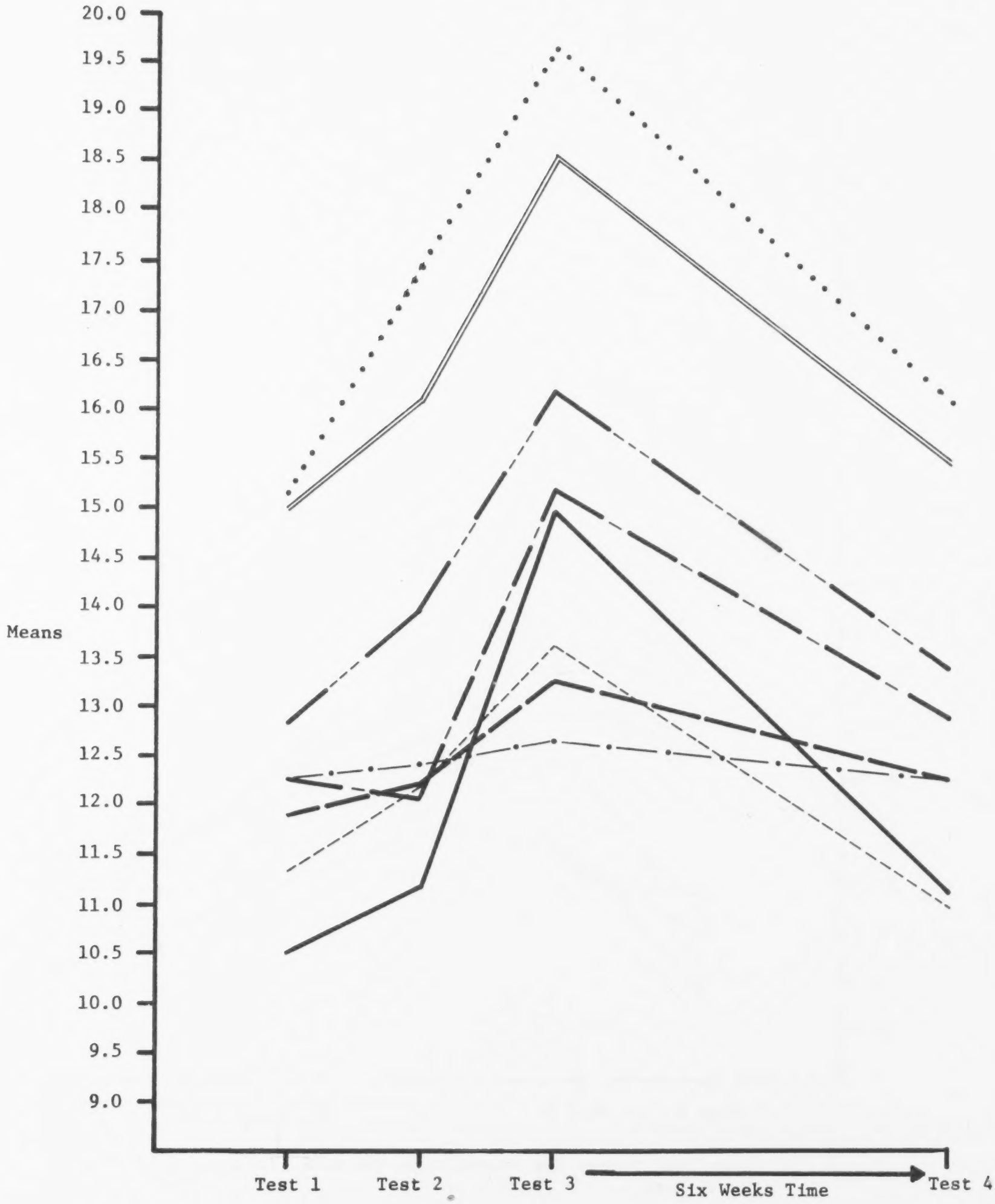

Figure 18. Mean Test Scores for Students in the ExRxC Treatments for Tractor Comprehension

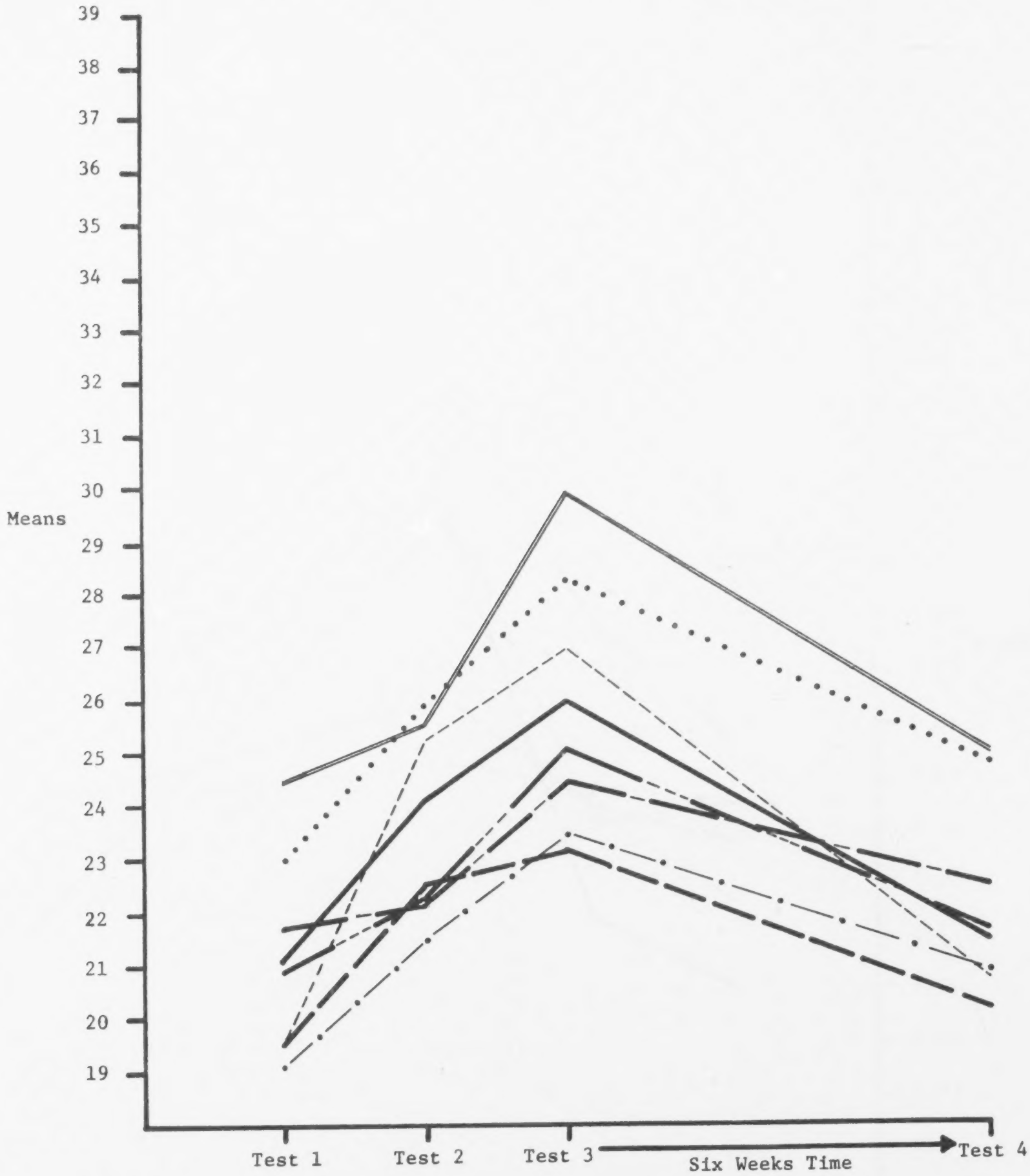

Figure 29. Mean Test Scores for Students in the ExRxC Treatments for Mower Total Test

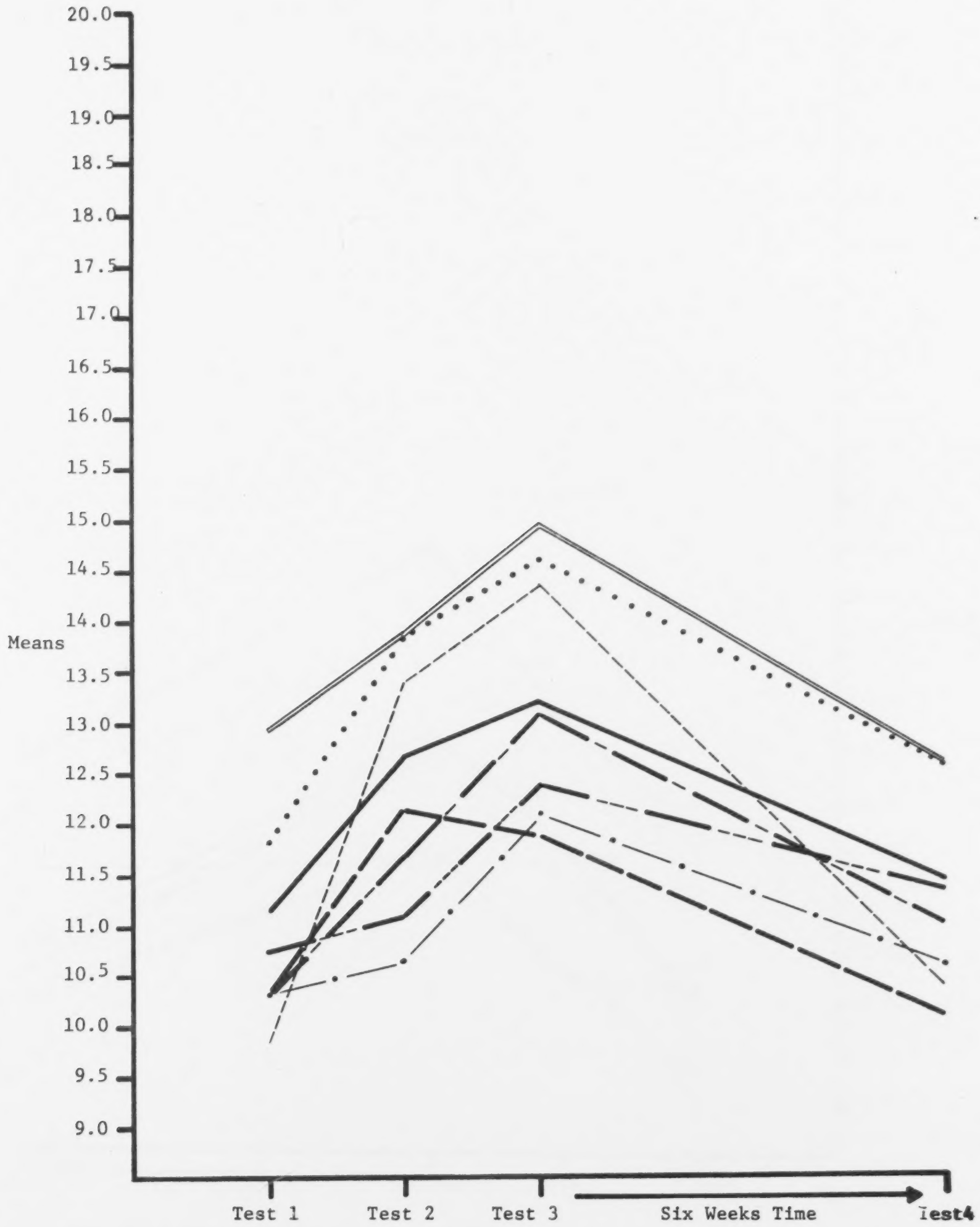

Figure 20. Mean Test Scores for Students in the ExRxC Treatments for Mower Knowledge

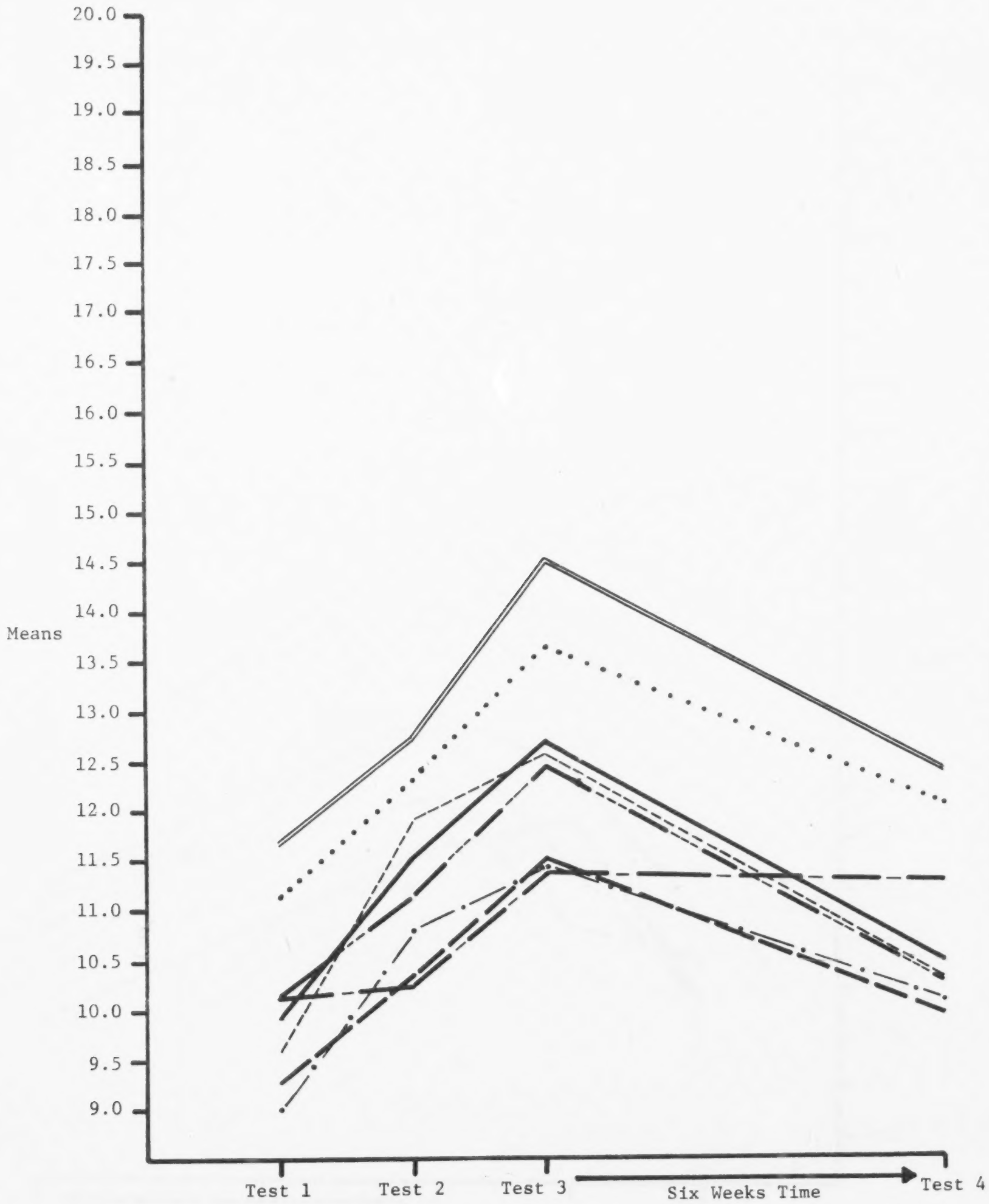

Figure 21. Mean Test Scores for Students in the ExRxC Treatments for Mower Comprehension

$E_1R_2C_2$

$E_2R_1C_1$

$E_2R_1C_2$

$E_2R_2C_1$

$E_2R_2C_2$

In each of these figures (Figures 16, 17, 18, 19, 20, and 21), E_1 is low economic status and E_2 is high economic status; R_1 is white and R_2 is black; and C_1 is color and C_2 is black and white.

3595

APPENDIX B

STEPS IN THE PREPARATION OF A PUBLICATION BY THE AMERICAN ASSOCIATION FOR AGRICULTURAL ENGINEERING AND VOCATIONAL AGRICULTURE

The Subject Matter Committee selects the subject matter to be published and submits the subject to the Board of Directors for approval. After approval by the Board of Directors, an outline is prepared and submitted to key people (subject-matter specialists, practitioners, industrial representatives, and state-level curriculum personnel) for criticism.

Information for the publication is collected from many sources (e.g., industry, education, experiment stations, and trade associations). The references are then cataloged. The information is reviewed, and important subjects are extracted and filed under the outline headings. The information is then organized in logical order. From this information and outline, the first draft is dictated; and the illustrations are selected or developed in rough form.

The first draft is edited for adequacy and clarity. A preliminary draft is reproduced with the rough illustrations. Copies of this draft are sent to key people for review. For example, copies of the Small Engines: Care, Operation, Maintenance and Repair were sent to industrialists, engineers, and educators for review. Also, teachers of small engines taught the subject from the draft and answered a prepared questionnaire about the draft. In order to test the accuracy of the preliminary draft, graduate engineering students performed service jobs on two small engines following the procedures given in the draft. Copies were also given to local mechanics to review and make suggestions.

Following this review, an extended-margin copy is prepared so that criticisms and suggestions can be recorded in the margins. The draft is re-edited to incorporate the applicable suggestions, and those doubtful suggestions are checked for accuracy. The illustrations are re-edited, and instructions are given to the illustrator for necessary changes.

After the re-editing process is completed, a final draft is prepared. The final manuscript is then edited for clarity, accuracy, and simplification. At this time, the revising, retoughing, and color separations of the final illustrations are completed on the art work. Next, a table of contents, index, and bibliography are prepared for the final manuscript.

The necessary photographs or illustrations are solicited from industry or produced in-house. The manuscript is submitted to the University of Georgia Print Shop for galley proofs, which are then read and turned over to the illustrator for page layout. The print shop also prepared the page proofs. These are checked and given to the print shop to prepare camera-ready copy.

Bids are then secured for printing costs. The art work and camera-ready copy are turned over to the printer, who prepares color-coded layout. The diazo-foil overlay (3M color key) is checked for errors in color. After the checking is completed, the printer prints, collates, sews, trims, and binds the books.

The two texts used in this study, Tractor Operation and Daily Care and Selecting and Maintaining Field Mowers, were prepared according to the above process. This study required producing black and white versions of each text. The following describes the procedures entailed in this reproduction process.

Tests were performed on approximately 18 pages, randomly selected from each of the two color texts, to determine the best method for reproducing the texts. The randomly selected pages contained some complicated illustrations, such as those with halftones in color, those with large amounts of red, and those with blue screens. This was done because, in the photomechanical process, the reds tend to become black and the blues tend to drop out using orthocratic film. Each test page was then photographed both as a halftone and as a line shot.

The halftone process had the effect of converting everything into dots, some of which formed dot patterns, and had the benefit of retaining a majority of the gradients of the tones of the reds, blues, blacks and yellows used on the illustrations. However, a morie pattern occured in the halftones along with a fuzzing of the black solids (e.g., on the type and line drawings).

Shooting each page as a line shot had the benefit of retaining all of the strength of the black type and line drawings. It was feared that the screened areas would either "fill" into black areas or "drop out" into white areas. This proved to be true, but it was not a serious problem.

As a result of the tests, it was decided that the line method would be the most acceptable. Each page was then shot on a 24" by 24" Robertson "Reliable" Series, C. D. Camera at 100 percent of size. GAF Reproline Film, developed in Gevert T-865 developer was used. Pages were stripped up in eight signatures. After stripping and before printing, Van Dyke proofs were made and furnished for proofing and evaluation to check for clarity of detail and loss of definition as a result of the reproductive method used.

After approval and some small changes--some headings, in which large amounts of blue and/or yellow overprinting had dropped out--printing plates were made and the job placed on the press. The press used was a Harris 23" by 36" LTN Offset Press. The text paper stock was 70 lb. Wedgewood Offset Enamel, which was the same quality as the color counterpart. A 65 lb. Khromekota sheet was used for printing the cover.

After the black and white versions of the text were produced, it was necessary to find an acceptable method of binding the publications. The original publications were sewn signatures with a drawn-on cover (Smythe-sewn with drawn-on cover). Because of the limited use of the books, the lower cost "perfect" binding method was selected. The covers were then drawn onto the perfect-bound text.

3598

VT 014 348
SELECTED APPROACHES IN VOCATIONAL EDUCATION.
FINAL REPORT.

FLORIDA STATE UNIV., TALLAHASSEE. DEPT. OF
VOCATIONAL EDUCATION.
MF AVAILABLE IN VT-ERIC SET.
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PUB DATE - 13AUG71 74P.

DESCRIPTORS - *VOCATIONAL EDUCATION;
SEMINARS; *GRADUATE STUDY; *TEACHING;
*LEARNING CHARACTERISTICS; EDUCATIONAL
ACCOUNTABILITY; CURRICULUM PROBLEMS; STUDENT
ROLE; TEACHER BEHAVIOR; STUDENT MOTIVATION;
SELF ESTEEM; VOCATIONAL DEVELOPMENT;
CURRICULUM DEVELOPMENT

ABSTRACT - THIS VOCATIONAL EDUCATION SEMINAR
WAS ORGANIZED WITH THE OVERALL OBJECTIVE OF
ASSISTING GRADUATE STUDENTS TO INVESTIGATE
AND REPORT ON TIMELY DEVELOPMENTS IN THE
FIELD. THE SEMINAR DEALS WITH SEVERAL
APPROACHES TO TEACHING AND LEARNING IN
VARIOUS AREAS OF VOCATIONAL EDUCATION. SEVEN
PRESENTATIONS INCLUDE: (1) "ACCOUNTABILITY IN
VOCATIONAL EDUCATION" BY JAY T. WINN, (2)
"CURRICULUM RESPONSIBILITIES" BY RALPH O.
GALLINGTON, (3) "ACCOUNTABILITY IN VOCATIONAL
GUIDANCE" BY MARIAN B. FOREMAN, (4) "STUDENT
INVOLVEMENT WITH VOCATIONAL DEVELOPMENT" BY
STEPHEN A. STAHLSMITH, (5) "TEACHER BEHAVIOR"
BY JEANETTE MCGLAMORY, (6) "MOTIVATIONAL
DEVICES AND TECHNOLOGIES" BY DAVID N.
COLTRIN, AND (7) "ADAPTABILITY OF SELF-ESTEEM
AS AN APPROACH TO VOCATIONAL EDUCATION" BY
WILLIAM WYCHE. A LIST OF 16 ADDITIONAL TOPICS
WHICH WERE DISCUSSED BUT NOT RESEARCHED ARE
GIVEN. (GEB)

VT 014 348

SELECTED *Approaches* in

Vocational Education

A Seminar Report
Summer 1971

VOCATIONAL EDUCATION DIVISION

904 Wildwood Drive
Florida State University
Tallahassee, Florida 32306

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VT014348

3600

SELECTED APPROACHES IN VOCATIONAL EDUCATION

VEN 519 - SEMINAR

THE FINAL REPORT

SUMMER QUARTER

1971

COLLEGE OF EDUCATION
THE FLORIDA STATE UNIVERSITY
DEPARTMENT OF VOCATIONAL EDUCATION
904 WILDWOOD DRIVE
TALLAHASSEE, FLORIDA 32306

AUGUST 13, 1971

Preface

The Vocational Education Seminars at The Florida State University are organized with the overall objective of assisting graduate students to investigate and report on timely developments in the field. This seminar deals with several "approaches" to the teaching and learning in various areas of vocational education. These approaches, if applied well, are structured to yield an effective program. In order for leadership in vocational education to be made accountable, some guidelines are needed to develop competence and occupational preparedness among participants in the teaching and learning process. A productive program would develop competent and confident persons to enter the world of work with minimal periods of adjustment required.

It is hoped that this presentation may be of value (a) to those involved in its research and development, (b) to other, future, students of vocational education that may read it, and (c) to various educators and laymen that are interested in vocational education in the State of Florida.

No attempt was made to come to grips with the entire topic. As the title indicates, each chapter deals with a "selected" approach in a limited, timely presentation. Some approaches not included in this study are recognized in the addendum of the report.

Historically, vocational education has had periods of public activity and lethargy usually depending upon how great the need was to train or retrain workers. In part, the approaches included here are a response to a very active period in vocational education. Moreover, all of public education in recent years has been actively involved in change and the suggested approaches in this report are just one response to that on-going change process. The seminar participants realized from the beginning that this report would be only representative of the diverse theories and materials related to this many-faceted topic.

Stephen A. Stahlsmith

MEMBERS OF THE SEMINAR

David N. Coltrin	Tallahassee
Marion B. Foreman	Tallahassee
Jeanette McGlamory	Tallahassee
Stephen A. Stahlsmith	Tallahassee
Jay T. Winn	Jacksonville
William Wyche	Melbourne

R. O. Gallinton
Professor in charge

3603

TABLE OF CONTENTS

Preface ii

Members of the Seminar iii

Table of Contents . . . . . iv, v

Chapters

I. ACCOUNTABILITY IN VOCATIONAL EDUCATION - Winn 1

Who is Accountable
Legal Basis for Accountability
Educational Objectives
Quality Control
Educational Approach
Proposed Approach to Design
Validation of Objectives
Developing Measures of Objectives
Generalizations

II. CURRICULUM RESPONSIBILITIES - Gallington 12

Leadership
Surveying for Needs
Who Determines Which Approach and What Curricula?
Who Writes Guidelines?
Procuring the Guidelines
The Preparatory Stage
Developing Curricula
Developing Coursework to Support Curricula
Instructional Systems
Meeting Curricular Responsibilities
An Organizational Plan
Order of Cycling

III. ACCOUNTABILITY IN VOCATIONAL GUIDANCE - Foreman 20

Some Priorities in Vocational Guidance
Improvements Needed
Occupational Specialist
Toward Becoming More Accountable
A Developmental Approach
Evaluation for Accountability

IV. STUDENT INVOLVEMENT WITH VOCATIONAL DEVELOPMENT - Stahlsmith 29

Background
Theoretical Considerations
Resources
Vocational Development in the Classroom

V. TEACHER BEHAVIOR - McGLAMORY 39

Introduction
The Stereotype Teacher
The Effective Teacher
Change in Teacher Behavior

VI. MOTIVATIONAL DEVICES AND TECHNOLOGIES - Coltrin 47

What is Motivation?
Theories of Learning and Motivation
Instructional Materials
The Transmission of Knowledge

VII. ADAPTABILITY OF SELF-ESTEEM AS AN APPROACH TO VOCATIONAL EDUCATION - Wyche 59

The Meaning of Self-Esteem
Background of Self-Esteem and Learning
The Effect of Self-Esteem on the Learning Process in Vocational Teaching
The Student
Changing Self-Esteem in Learning

ADDENDUM 67

CHAPTER I

ACCOUNTABILITY IN VOCATIONAL EDUCATION

Winn

Accountability is being discussed by educators and by many people who are interested in the public school system. Manpower planners believe a system of accountability is needed for the purpose of achieving basic goals. Accountability is feared by many classroom teachers as a threat to them or their jobs. Hence measuring accountability may provide a rich source of data for the planner while becoming a scourge to some people. Accountability is seen by many as having two principle facets through which vocational education may be evaluated and developed. Educational objectives and quality control are the two principle facets considered here in a system of accountability. These principles will be discussed and applied to vocational education and its development. The system should give vocational education direction and drive toward more appropriate and true goals. Educational objectives and quality control constitutes the tap-root and feeder roots respectively in this treatise.

Who is Accountable

Any system that works must result from the policy laid down by management and the policy must be understood and adhered to by everyone in the organization. Accountability findings will aid educational managers in analyzing the system

while the purposes of maintaining and improving the system are achieved.

As managers lead other educators, the classroom teacher will become involved. Moreover, parents are to be held accountable for preparing their children to receive formal education and the student in turn must be held to account for his behavior and educational growth.

Legal Basis for Accountability

Public law 90.375, "The Vocational Education Act of 1968." Section 104 (a) (1) calls for the creation of a council composed of 21 persons who are:

(A) Representatives of labor and management. . . have knowledge of semi-skilled, skilled, and technical employment in. . . agriculture, home economics, distribution and marketing, health, trades, manufacturing, office, and service industries, and persons representative of emerging manpower fields;

(B) Familiar with manpower problems and administration of manpower programs.

(C) Knowledge about the administration of state and local vocational educational programs:

(D) Experienced in education and training of handicapped persons;

(E) Familiar with the special problems and needs of individuals disadvantaged by their socioeconomic background;

(F) Have special knowledge of post-educational programs, and

(G) Representative of the general public. (8: 3-4)

The duties of this committee include:

(A) ----------

(B) Review the administration and operation of vocational education programs. . . and make annual reports of its findings and. . . recommendations for changes in the provision of this title. . . and

(C) Conduct independent evaluations of programs carried out under this title and publish and distribute the results thereof. (8: 4)

This law states that every participating state shall submit its own plan which will declare how the provisions of the Vocational Education Amendment of 1968 shall be met. The Florida State Plan for the Administration of Vocational Education states in article 1: 51 that the state program shall be evaluated annually (5: prt. I).

Total program evaluation shall be done in the terms of progress toward achieving the annual and long range goals and objectives established by the board (5 prt. I: 13).

Educational Objectives

Educational objectives could be discussed at length, but Mager's approach will be used here in determining educational objectives.

a. What is it that we must teach?

b. How will we know we have taught it?

c. What materials and procedures will work best to teach what we wish to teach?

These questions must be answered in order to instruct effectively. . . the order in which they are answered is important. The first must be answered before the other two (3:v).

The teacher must have a clear understanding of just what will be taught. An approach to the development of materials and a course of instruction would be necessary.

The teacher must then prepare himself with adequate methods, techniques and teaching aids. He must teach.

In order to know what has been taught:

> Measure or evaluate the student's performance according to the objectives or goals that were originally selected. (4: 1)
>
> The educational objective tells what the learner is to be like at the end of a course. (4: 6)

Quality Control

The Industrial Approach

In using the quality control principle we are making use of a term that is understood by many people in our society. Grant has mentioned that "statistical quality control" may be confusing but there is a type of quality control that controls quality by <u>any appropriate method</u> (2: 12).

Grant also suggested that close cooperation is needed between the three families that are the production complex of industry.

> A common complaint among production personnel is that engineers responsible for specifications do not understand production problems. Inspection personnel often complain not only about the poor quality of manufactured products, but about the unreasonableness of tolerances. . . In the past, many arguments have been carried on among these three groups . . . . . (2: 4)

In a peculiar way our educational complex fits the Grant description of industrial production. The administrators do not understand just how to meet the public with the issue of accountability and the classroom teachers exhibit trepidation.

Educational Approach

Once the student has been taught in line with the educational objectives, a system of quality control should be used which is based on positive thinking. Daniel has called for the "no reject" concept (1: 42). This means that every vocational education student must demonstrate marketable skills as a result of having achieved to some minimal level the educational objectives designated for his curriculum and courses of study.

Proposed Approach to Design

Kaufman has defined "process" as being the steps or manner in which an outcome is achieved. A product is an outcome (3: 21).

If we see vocational education as a process which provides skills and knowledge, along with proper attitudes, for the learner to achieve, we should be able to measure our product and give a good account of our stewardship.

Validation of Objectives

Tuttle, et.al. (6) have described a system by which the state of Oklahoma hopes to match the labor pool with the labor market.

If vocational educators are to correctly choose educational objectives they must have the information which Tuttle describes. In order for the vocational educational objectives to be valid the student must be made ready for the world of work which has a need for his talents. Oklahoma's "Occupational Training Information System" (OTIS) is designed to supply this much needed data according to Tuttle.

> Until recently Oklahoma was in the position of most states. . . In addition to suffering the public, private and personal costs of disparities between the training taking place and the needs for trained people. . . the need for up-to-date information is evident to anyone who has worked with education or training systems or the labor market. (6)

Daniel reports that the State of Florida Department of Education recognizes two issues that represent the central concern of educational decision-makers. In telling of these concerns Daniel has quoted Florida Commissioner of Education, Floyd T. Christian:

a. What do we expect from the schools?

b. What is required in terms of financial support, moral support and legal directives to assure that schools will live up to our expectations? (1: 42)

Developing Measures of Quality

Some educational managers (decision-makers) do not have certain prerogatives needed to meet accountability requirements.

a. Managers must master techniques for analyzing and explaining resource utilization and educational results.

b. Managers must have control over their resources--time, space, personnel and money--so that uses of these resources can be modified when the desired results are not realized. (1)

Some developments in Florida are worthy of note:

a. Statewide utilization of behavioral objectives.

b. Feasibility studies for flexible staff utilization--three pilot programs.

c. Programmed budgeting and cost effectiveness pilot programs.

d. Three pilot programs for extending the school year to make more effective use of facilities.

e. Non-categorical allocation of funds for educational improvements. (1)

The projects just listed in Florida can be combined with Oklahoma's OTIS approach to develop accountability to an art. The Florida projects point the way for providing utilities and freedom to act in a purposeful manner while the OTIS system works toward combining complete supply data with full demand data.

The United States Air Force uses a training record system that answers Mager's "How shall we know when we have taught it."

For each airman, there is a consolidated training record, AF FORM 623 (see illustrations A and B).

> . . . AF FORM 623 represents a consolidation of all the information necessary to reflect the complete training status of the airman . . over the entire career of an airman. . . designed. . . . . for training personnel to use in making decisions . . . used by supervisory personnel. . . determining who to recommend for upgrade action. (7: 5-1)

If each vocational education student traveled through his vocational curriculum and to his first job with a diary of his achievements, the teacher's accounting would be pretty well done. The diary should show no rating value. The diary should include two forms, one for informing the educational managers of his initial employment after he legally leaves school. The second for reporting his adjustment to the world of work after one year or when he leaves his initial employment --whichever is first. Employer cooperation would be needed.

Generalizations

Florida has shown how to equip and free educational managers to do the accounting job. OTIS relates labor supply to labor demands--educational objectives are kept valid. Well-kept student diaries would be the report on teacher and student accountability. All are involved with objective and quality control systems for vocational education programs

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CONSOLIDATED TRAINING RECORD

SECTION I PART A		ON-THE-JOB TRAINING
Step 1	Unit Commander *(Grade and Name)*	Insures that your assignment is in accord with your classification and specific skills background.
Step 2	Unit Training Officer *(Grade and Name)*	Interviews and counsels you regarding: a. Overall squadron training program and how you will fit into it. b. Completeness of your incoming training records. c. Career development and importance of your own initiative. Introduces your Unit Training NCO.
Step 3	Unit Training NCO *(Grade and Name)*	Prepares consolidated training record and delivers it to section supervisor. Introduces your Section Supervisor.
Step 4	Section Supervisor *(Grade and Name)*	Briefs you on section training program and explains the following items: a. Specific AFS description. b. Training requirements. c. Explanation of training folder with emphasis on Air Force Job Training Standard. d. Personal gain from your own initiative. e. Enrollment in career development courses. f. ECI and USAFI courses. g. Upgrading to promotion. h. Specialty Knowledge Test (SKT) procedures. i. Proficiency testing. j. Use of DAF OJT Packages, CDCs and Job Proficiency Guides.

Illustration A

SECTION III PART B — JOB PERFORMANCE EVALUATION

DATE	JOB TITLE	REMARKS

SECTION III PART C — REMARKS *(Grade Name, Instructor or Training ch.)*

DATE

SECTION IV — DATE TOTAL TRAINING COMPLETED — GRADE AND SIGNATURE OF SECTION CHIEF

ON I PART B

TITLE	TRAINEE SIGNATURE	REFERRAL TO TRAINING OFFICER FOR CAREER DEVELOPMENT ☐ YES ☐ NO

AMEND DIRECTIVE	DATE ENTERED TRAINING AND AUTHORITY	ESTIMATED COMPLETION DATE	AFSC AWARDED	DATE OF AND AUTHORITY FOR AWARD	DATE OF BOARD ACTION	ACTION
LEVEL						
LEVEL						
LEVEL						

ON I PART C MANDATORY CDC (If trainee not enrolled in available required CDC, enter reason in Section III Part C)

CAREER DEVELOPMENT COURSE TITLE AND NUMBER	DATE STARTED	E CC	FB F ON	DATE OF SATISFACTORY COMPLETION	END OF VOL SCORE	UNIT TRAINING OFFICER SIGNATURE

	SCORE	AUTHORITY

ON I PART D UPGRADE AND PROFICIENCY TRAINING

AFR 39-1 STS JTS AND OR JPG PHASE OF TRAINING	DATE STARTED	DATE SATISFACTORY COMPL	TYPE TEST	RESULT	SECTION SUPERVISOR SIGNATURE	TRAINEE INITIAL

SECTION II PART A ACT/ACB/AQE TEST RESULTS

MECHANICAL	ADMIN	GENERAL	BASIC	ELECTRONICS	TEST OF ENGLISH LEVEL — YEARS	REFERRAL TO EDUCATION OFFICER ☐ YES ☐ NO

SECTION II PART B USAFI, ECI, ETC. PARTICIPATION

CRS NR	NR OF VOL	DATE STARTED	DATE SATISFACTORY COMPL	UNIT TRG OFFICER SIGNATURE	REMARKS (USAFI, ECI, Test Results, etc.)

SECTION II PART C TECHNICAL TRAINING

COURSE TITLE AND NUMBER	COURSE DURATION	LOCATION	COMPLETION DATE	CERTIFICATION

SECTION II PART D SUPERVISORY TRAINING

COURSE TITLE	LOCATION	DATE SATISFACTORY COMPL
Prior Level Management Course		
NCO Academy		
ECI Course Number 6		
OJT Administrative Course		
OJT Trainer/Supervisor Course		

SECTION III PART A SPECIAL QUALIFICATIONS IN ADDITION TO UPGRADE TRAINING

(Significant Additional Duties, Licenses to Operate, Special and Field Training, Log of Periods Held, etc.)

CURRENT POSITION ASSIGNMENT

TRAINING STATUS CODE

Illustration B

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CHAPTER II

CURRICULUM RESPONSIBILITIES

Gallington

Leadership

With curriculum responsibilities so diversified, many individuals will be required to head up facets of curricular construction and revision. Even the two approaches (construction and revision) require somewhat different types of leadership. In well established schools some of both approaches will be required. New schools in developmental stages will have many curricula to be contemplated and courses to be constructed. Doubtless teachers, supervisors, coordinators, and administrators will become involved as well as a number of consultants and staff people. The purpose in this chapter is to show the various tasks and provide guidance to the selection of personnel to man them.

Surveying for Needs

To determine needs the federal government in 1970 provide for a national advisory council ($200,000 budget) and state advisory councils ($2,000,000 budgeted). Further accountability was provided for with (a) $900,000 for program evaluation and (b) $880,000 for curriculum development (21). All this demands that needs be surveyed, services evaluated, and change provided to better meet needs. Whereas at the national and state levels these councils are needed for advising at

higher levels, it follows that the local levels also need this type of service. The main appeal of school boards representative in a recent issue of the American Vocational Journal (22) was that accountability begins at the local level. That youth will be sewed to avoid educational termination without saleable skills; and that adults be given employment training is the responsibility of the local community. Advisory committees will provide the check and balance on these.

Who Determines Which Approach and What Curricula?

Dal Santo points out that the principal of a school should not stand alone in determining curricula (3). He states further that no school could ever hope to offer "the ultimate in curriculum. . ." A curriculum director is recommended and he in turn should work with students, parents, teachers, and the administration to resolve the curricular needs. Articulation with feeder and higher schools is essential and a sequential order should be established to allow for individual progress with the least of frustration. Filogano (9) believes that "direct involvement of private industry. . ." may become a required approach to curriculum development in the future.

Who Writes Guidelines?

Ultimately the group approach would dominate in a democratic administration. Persons would be delegated to write sections and parts. The curriculum director would duplicate the sections for adoption. Dal Santo (3) gives a very good list of general suggestions for preparing guidelines for curriculum development.

Procuring the Guidelines

This requires persons with an understanding of the many facts of the problem and considerable experience in or knowledge of the several approaches to curriculum development. Guidelines are established to provide direction to what is to be done. Further, direction sets forth the order in which steps are to be taken in getting the task done.

The Preparatory Stage

Deciding on the purposes and methods to use and the type of revision or development to be undertaken is the objective here. Philosophies, aims and purposes will be identified at this point. Here, some thought will be given to and action taken on the types of programs to be developed and the physical needs and limitations involved. Manpower to operate contemplated programs will be decided or discussed. Actually the school board is responsible for authorizing all curricula.

Developing Curricula

At this point in the thrust toward curricula, courses and courses of study for a given school, most of the leadership will have already become involved. Philosophies, needs, and purposes will have been developed rather completely. Courses and courses of instruction will not have been developed but will have been identified.

Developing Coursework to Support Curricula

Age grading has been mentioned by Wattenberg (19) as a factor in establishing classes and courses. Just as there are generation gaps there are also minor gaps among age levels. Whether or not age grading is appropriate it should be considered along with achievement, interest, aptitudes, and intelligence levels. Certainly between in school and out-of-school youth and adults there are considerable individual differences to be taken into account.

Instructional Systems

The textbook has been the backbone of much of our instruction to date in spite of the so called multimedia successes or failures (10). Fruehling has said that publishers are now being asked to develop "learning systems" based on multimedia. The "media mix" would include a coordination of appropriate textbooks, workbooks, programmed books, tapes, records, motion pictures, film strips, film loop, soundslide cartridges, etc.

The teacher may as well become indoctrinated early with the idea that he is to become a very important person in the program of courses development and instructional systems endeavor suited to each course. He must begin to see himself as a director of learning activities making use of a multiplicity of classroom and laboratory teaching "hardware" and "software" tailored to individual students' needs.

Gattegno (11: 64) would subordinate teaching to learning and provide education as a quality of knowing rather than

knowledge per se. He recognizes an approach long espoused by vocational educators: know how and understandings. The first deals with technical knowledge necessary to do a job and the latter deals with the know why and the faceted consequences involved with any performance act.

The supervisor, according to Hughes and Achilles (12), certainly has a major responsibility for curricular change and must be fully competent to cope with change process and develop strategies to help teachers move from one step to the next. They would warn that supervisors and teachers do not create change. Rather they follow through on an idea from the research stage to the institutionalization stage.

Meeting Curricular Responsibilities

The actual steps through which a local school system should proceed to provide adequate vocational curricula are somewhat traditional and are based on early experimentation and action programs in Arkansas (1936), Kansas (1937), Oregon (1937), Texas (1936), and Virginia (1938). These programs started with state boards of education providing leadership and structural guides. Some states used "executive" or "steering" committees to make the thrust more effective. Curriculum directors at the state and local levels are needed. This is mentioned in early literature as well as current articles in major educational journals. State and local supervisors are key persons to organize and utilize in the endeavor. Outside consultants are of inestimable value to resolve internal

differences. State and local advisory committees cannot be overlooked. These are the laymen who represent the public. State, county and regional committees are useful if their work is structured and coordinated to attain maximum input. Local administrators and boards of education must be in on the planning from the beginning, because they are the ones to take the responsibility for initiating new programs or discontinuing old ones. Finally, teachers must provide as much or more input than other groups, especially at the teaching level where courses are planned, systems of instruction are developed, field testing occurs and when prodedural adoptions are made.

An Organizational Plan

This plan was devised from a coverage of selected literature and borrows from many sources. It develops the ideas set forth in the above sections of this chapter but has no authoritative background except from these sources. Any plan for curriculum construction and revision is a recycling one illustrated on the following page.

Order of Cycling

1. The Pupils (Varied Environments)
2. Societial Needs
3. Broad Goals or Purposes
4. Objectives in Terms of Outcomes
5. The Program (Facilities & Instruction)
6. Field Test
7. Evaluation (Production & Procedures)
8. Decision Making

1a. Reconsider Pupils
2a. Reassess Societial Needs
3a. Restate Goals & Purposes
4a. Devise Objectives
5a. Redesign Program
6a. Field Test
7a. Evaluation
8a. Decision Making

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CHAPTER III

ACCOUNTABILITY IN VOCATIONAL GUIDANCE

Foreman

Accountability in education is a responsibility today. It is demanded by the public at all levels of education, including Vocational Counseling services (11). Some approaches to increase accountability in vocational guidance services will be suggested in this chapter.

The existence of vocational guidance must be justified on the basis of its ability to assist in carrying out the goals of the educational framework within which it functions. The goals of vocational guidance can be none other than the goals of education in general (7: 3-14).

Some Priorities in Vocational Guidance

In order to be complete, the guidance program must attempt to serve students needs at all academic levels. Student outcomes outside of school are its concern as well as those within the school (3: 1-15). The guidance program must also be comprehensive in cognizance of and responsiveness to all of the needs of each student. Guidance-oriented learning activities in such guidance program would be closely coordinated with the basic instructional program at all academic levels. The result, each student would be helped in the formulation and pursuit of suitable immediate and long-range goals (8).

Vocational guidance builds upon premises which assume students to be capable of learning how to contribute to the planning of their careers and that upon acquiring the necessary information and skills they should therefore be permitted to contribute to the making of decisions which will affect their development. In order to create information on which to base decisions the individual must actively process data, rather than be guided passively by data. Thus, the individual must become a significant and active agent in the process of making decisions, and the individual is responsible for the consequences of his decisions. This freedom is a basic inherent right of the individual. The basis for this is found in the philosophy that human choices are the responsibilities of the individual and that they are not completely determined by external forces (1).

Improvements Needed

In order for students to exercise this freedom of actively planning and making responsible decisions about their future, there must exist career guidance facilities which provide adequate information about or means of understanding the implications of such choices for human beings (6). This idea is not new. But its implementation and measured success in the schools would be new.

The adequate career guidance center brings together all the career guidance foundations of the school so that students can accurately perceive the relationship between work experience and the vocational guidance program. Job placement, occupational,

vocational, college, and scholarship information readily available in the student-centered library of career information. It as also a place where students can meet with vocational and educational representatives for future planning, a factor in good public relations as well as an aid to students (7: 365-400).

Too often, most of the information needed by students for vocational and educational planning is stored in the school libraries because of insufficient space in the counseling office. The career information center can be located almost anywhere that is easily accessible to students. It is a place where all this information is on file for immediate use by students with assistance available from a counselor or career information specialist. Paraprofessional help can provide the basic information services, leaving the counselor more time for working with individual students and group counseling activities (2).

Occupational Specialist

Florida combined Senate-House Bill 3893, passed June 5, 1970, allows district schools to use occupational specialists' services as a supplement to existing guidance services. This is a new departure and should permit staffing of occupational career centers and providing additional occupational services without sacrificing existing guidance functions. The bill provides that occupational specialists may be used and that 50% of the number of fully certified counselore in a school district may be used as a base for hiring these occupational specialists. This should provide 50% more people to serve in specialized

assignments as identifying and counseling potential or actual dropouts and their parents and counseling students and faculty regarding job and career opportunities available. This should also improve school public relations. (5).

Thus through the use of paraprofessionals some guidance services which have received inadequate attention, if any at all, in the past may be improved and counselors freed for more time for individual and group counseling activities.

Toward Becoming More Accountable

Making guidance services available to all students should be the first step toward accountability. Among drop-outs needs for a great deal more guidance will have been apparent. Had guidance been given earlier, the drop-out might not have materialized in the first place. For young people who are planning to seek employment immediately after leaving school, the need is critical. Vast needs for guidance exist also among students with special problems. If guidance is to seek the maximum development of all young people, it must be provided for all (13).

Even though vocational guidance, vocational counseling, and occupational information are merely parts of the broader area of guidance and counseling, the vocational aspects are of inestimable significance in an individual's life. The individual should expect to receive the counsel of specialists who have had a broad understanding of the world of work and its complexities. What would obviously meet the need is a complete

guidance program with counselors who meet professional requirements in pupil personnel services as well as being specialists in occupational information, vocational guidance, and vocational counseling (6).

Participation in occupational work is much more successful and satisfactory, both for the individual persons and for the community when sufficient training and guidance have been provided. Just as the job market runs the range of all possible types of skills, from common laborer to skilled surgeon, so also, the possible types of training and guidance are of a like range. Vocational guidance and training for the high school drop-out is probably of greater importance than educational guidance is for the college-bound youth. The halting action taken toward vocational guidance, vocational counseling and the vocational training of youth are becoming more and more obvious as preparation of youth for the world of work is viewed as a social responsibility. Our guidance efforts may be truly "too little, too late" if the drop-out rate is any indication.

The estimates are that as many as one out of every three drop-outs did not get beyond the eighth grade and that almost two out of every three drop-outs never reached senior high school are of enormous significance. It is to be noted that a substantial proportion of drop-outs start occurring in schools well before most kinds of occupational information or other functions of the guidance and counseling services begin. These findings suggest that some of our occupational education and

guidance should begin much sooner than it does now. The task of developing attitudes and imparting information should begin early in the elementary school rather than in the high school. This suggests that vocational guidance and vocational counseling should become more and more a developmental program beginning in elementary school and continuing through high school.

A Developmental Approach

The facilitation of student development through a continuous squential program rather than mere remedial aid demands a very comprehensive guidance system. A comprehensive guidance system, however, must include both developmentally oriented services and prescriptive services for remedying problems (15).

The developmentally oriented services involve meeting the needs for instructional activities for all students with emphasis on problem prevention while assisting students in the formulation and pursuit of their immediate and long-range goals. These include orientation, as into a new educational system or specific educational setting, and personal assessment of student abilities, interests, physical and social characteristics, and values. Also included are personal choice opportunities, as in educational vocational, citizenship, social, learning, and leisure-cultural-recreational areas, and personal problem-solving skills for making plans wisely and for implementing plans and decisions. Of importance here also is the setting and obtaining of personal goals to assist each

student to formulate and pursue goals and plans for achieving these goals (1).

In the prescriptive phase emphasis shifts from problem prevention to problem correction, and related instructional activities are intended only for those experiencing specific problems for which help can be provided. In such assistance, coordination of efforts to help the individual in the formulation and pursuit of agreed upon immediate and long-range goals is important. The prescriptive services include within-school prescribed learning experiences, intrapersonal and interpersonal problems and orientation-out prescribed learning experiences, such as, entering the world of work, dropping out without specific plans, enlisting in the military (10).

A comprehensive guidance system also involves more indirect intervention on behalf of the students, and the use of such media as various counseling educational technology to monitor and research from the viewpoint of protecting and fostering the development of the individuality of the students. There must be research and evaluation, experimentally controlled studies, follow-up studies, analysis of changes in the characteristics and needs of the student population (14).

Evaluation For Accountability

Evaluation of any part of the guidance program, or all, must include assessment of the degree to which each student achieving previously agreed upon immediate and long-range goals and objectives within the educational framework, more

particularly within the guidance system. Evaluation must produce feedback to the guidance system so that corrections can be made if students' needs are not being met due to program deficiencies. Some deficiencies might be the result of emerging and everchanging needs of students, as they change and adapt to a complex and ever-changing world. This flexibility of adaptation to changing conditions is necessary for all viable guidance activities and programs (9).

Instruments of evaluation are needed and will have to be developed before the society will know whether vocational counseling and guidance are being achieved. Accountability of guidance people is just as essential as the accountability of teaching personnel. Until measurable success is evident, guidance personnel will also be suspected of inefficiency.

Vocational guidance has come a long way, but before claims can be made that it meets the public demand for accountability, considerable work must still be done in such areas as educational decision-making, values and their influence in the career choice process, individual motivational patterns, and career development (13). This is the responsibility of guidance people!

In order to become effective, vocational educators and professional counselors must join forces in developing new methods, refining existing techniques and conducting research into vocational guidance services. To determine (a) which services are more effective than others and to determine (b) just what current accountability measures will be the things research should uncover.

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CHAPTER IV

STUDENT INVOLVEMENT WITH VOCATIONAL DEVELOPMENT

STAHLSMITH

Background

In nearly every culture since early times, entry into an occupation or work has meant that the child has entered upon the adult world. Planning and decision making were generally not necessary considerations for work and occupation before the late ninteenth century. Occupations for the common man were rarely chosen and, when choice was possible, the alternatives were few. In most instances an occupation or work was passed from father to son for many generations. Thus, the son usually followed the father into farming, a trade, or other familial occupation.

The industrial revolution and the more recent technology revolution has changed the simple practices of career development. More and more, education and other socializing agencies are becoming responsible for career development and related career orientation and exploration activities. This chapter is intended to explore this topic in a very limited way.

Theoretical Considerations

Many writers including Bailey (1), and Perrone (13) have reviewed the literature related to vocational development (career development). Most agree that it is a life-long developmental process involving both vocational attitude and vocational choice. One of the most comprehensive publications in this area is a

recent book by Crites (5) that deals with vocational behavior and development. Most writers view career choice as developmental in nature based on principles of developmental psychology. Vocational Development is considered to be one aspect of the maturation process involving these developmental principles.

A review of the literature and research related to vocational development indicated that the public schools should include Vocational development activities at all grade levels. Values, attitudes, and interests in relation to a wide range of educational and career opportunities available should be explored to avoid premature educational and occupational foreclosure. Bailey says, "the literature on career development convincingly states that a sequential, integrated curriculum is essential to systematically influence vocational behavior" (1: 3).

Crites (5) includes five dispositional tendencies in his discussion of vocational maturity as follows:

a. Involvement in the choice process,

b. Orientation toward work,

c. Independence in decision making,

d. Preference for vocational choice factors,

e. Conceptions of the choice process.

The relative presence or absence of these tendencies in the individual may be thought of as an indicator of vocational attitude maturity.

Concerning career development and the attitudes an

individual has about the work world, Herr says, "If schools are in fact to develop the requisites of career development, emphasis must be given from the elementary school forward to the identification and facilitation of the positive elements, strengths, and talents, which for each individual represent the best coin for future career success". (11: 19)

Clearly, the direction of vocational education is toward more concern for career development rather than specific job training. An emphasis on individual needs was reaffirmed by the Advisory Council on Vocational Education Act. The Council recommended that ". . . the objective of vocational education should be the development of the individual, not the needs of the labor market. . . Preparation for employment should be flexible and capable of adapting the system to the individual's need rather than the reverse". (3: 49) To achieve this objective the Council recommended a broad program of vocational education which would include the following characteristics. "Occupational preparation should begin in the elementary school with a realistic picture of the world of work. Its fundamental purpose should be to familiarize the student with his world and to provide him with the intellectual tools and rational habits of thought to play a satisfying role in it". (3: 50)

Resources

Evans states: "Sometimes vocational education is poor in quality." (7: 23) This, unfortunately is true in many school systems usually due to lack of or inadequate planning to meet student needs. Student interest is encouraged in "prestigious occupational fields" and as a result the more "common" vocational education offerings suffer. Some of the following suggested resources may prove valuable as sources of potentially useful information for vocational development activities for all students.

Project Learner-Oriented Occupational Materials (LOOM) at The Florida State University has been funded to develop student learning activity packages of pre-vocational orientation in the elementary schools of Florida. The project objectives, simply stated, are as follows:

a. Teachers will be able to identify the goals of vocational education in the elementary grades.

b. LOOM will convey vocational concepts to elementary school youth.

c. Selected occupations for study will be relevant to the learner's maturity and his socioeconomic condition.

d. LOOM will enhance learning through psychomotor activities.

e. Curriculum materials will be designed to meet state (Florida) accreditation standards....(14: 6-7)

A vocational information system useful for vocational development activities in the middle and high school years is called VIEW. VIEW was developed in San Diego County, California. The program includes (a) student imput for types of

data available, (b) use of microfilm aperature data cards, (c) basic information on each occupation surveyed, and (d) being made available to students at Regional Career Information Centers (9).

Achievement and ability testing as well as interest inventories continue to gain acceptance in the many facets of vocational education. Cronbach (6: 432) indicates that inventories hold great potential as a preliminary step either to group study of careers or to some form of individual counseling. There are many types of vocational interest inventories available that have been standardized on diverse groups. The interested educator would do well in consulting the literature to fill specific needs arising from this important area of interest.

Gribbons (10) and Crites (5) have each developed, separately, criterion measures useful to both researchers and developers of materials related to vocational development. Each instrument attempts in its own way to measure some aspect of vocational development such as vocational attitude development or readiness for vocational planning.

In summary, it may be interesting to note that the first "formal" theory of vocational development was proposed only twenty years ago. Since that first, early effort there has been quite a proliferation of vocational development theory, vocational development materials for classrooms and various models for application of the theories and materials. It may appear that much has been accomplished, and rightly; however,

much more must be completed in order to help students find themselves vocationally in this complex society.

Vocational Development in the Classroom

No comprehensive "classical" studies were revealed in a recent review of the literature dealing with the teaching of vocational decision making. However, there seems to be an increasing number of studies related to vocational choice, vocational attitudes and vocational decision making reported in the professional journals. Much research, apparently, needs to be done to improve educators' and students' ability to cope adequately with the complexities of vocational decision making and development.

Yabroff (16) reported on a study in California that was designed to improve the quality of vocational decision making for all students in a school system. The study reported dealt only with ninth grade students. Significant differences were found indicating that teaching decision making skills in the ninth grade for boys and girls of all ability levels is both feasible and desirable

Katz (12) has provided a booklet for use in classroom guidance that seems to produce student insight into factors related to making vocational choices. However, the book has not been up-dated or revised in any way indicating its limited use by educators.

Field (8) has developed a curriculum for college freshmen that would (a) involve self-evaluation using as many

criteria as possible, (b) ask each student to analyze the world of work, with emphasis on personal classification and value systems, and (c) produce synthesis of the first two into a view of self and occupation as an integrated explanation for indicated points of congruence or non-congruence.

Other approaches to presenting vocational decision making in the classroom will not be included in this report. Two areas that show a lot of developmental activity are computer technology and simulation gaming.

Computer technology now includes applications in every field including teaching and counseling related to vocational development according to Silberman and Coulson (15) and Cogswell and Estaven (4). Simulation and gaming behavior have been used increasingly in classrooms to provide stimulation for vocational development learning activities reports Boocock and Coleman (2).

In summary, vocational development (career development) has become a complex phenomenon in this technological society. Public schools are recently realizing that students need developmental learnings in order to be successful vocationally in this complex society. Attitude and choice factors are part of vocational development that is a life-long developmental process. There are many resources related to vocations; however, not many have been evaluated adequately with research. Classroom teachers in vocational education can make use of materials and resources now available through becoming aware of what materials are available and what the student needs are in their classrooms.

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CHAPTER V

TEACHER BEHAVIOR

McGlamory

Introduction

If we accept as a working premise a statement by Don Davies that the single, most important and influential factor in terms of pupil performance is the impact of the teacher (3), we must then elicit that now is the time for effective teachers to add their own personality and creativity to the time-tested role of the classroom teacher: Determining what he (the teacher) needs to do; assessing what the students need to do; and then determining the physical and social climate required to support student and teacher activity.

Although it may appear somewhat contradictory in view of the events of our times, the re-discovery of the infinite value of the individual person characterizes our society and the world as a whole. As a result of this re-discovery, vocational education can no longer be thought of exclusively in terms of the pupil, the teacher and the curriculum. Instead, the challenge is now upon the schools to offer "Person Education." However, in order for us to arrive at "Person Education" within society, a revolution is necessary which involves getting rid of the stereotype notions concerning the vocational teacher and his behavior and identifying the model of an effective vocational teacher. This chapter will examine criteria for this model.

The Stereotype Teacher

Too often the essential role of the vocational teacher is considered to be that of transmitting or communicating particular information or particular skills to a group of, hopefully, passive individuals (7: 287). Perhaps this suggests oneway communication--teacher giving; student receiving. This might have been the role of the vocational teacher fifteen or more years ago because sources of information were quite restricted.

Today's technological teaching--learning aids range from simple printed materials to complex electronic devices for multi-sensory learning (See Chapter VI). Today students are also exposed to TV, radio and a great many other communication devices. If there is one thing that the machine can do better than people can, it is to transmit information and even develop specific or particular attitudes or biases. The child of today is no longer coming to school to be informed. He is so informed he doesn't know what to do with himself. He is coming to school to be transformed. It is up to vocational teachers to know their role in this transformation.

Another of the stereotyped notions is that a vocational teacher is someone who must possess many, many skills (the same notion also applies to academic qualifications), but this is not what it means to be a good vocational teacher. Teaching is not just a matter of possessing skills. For many, it is all too easy to hide behind the skills and so avoid having to relate to people. Skills are things which a teacher adds to what he already is as a person, and only when he integrates those skills with what he

is first and foremost as a teacher do they become alive for him, and for his pupils, too (6: 25).

Today's vocational teachers are being called on to communicate to the fullest. They must become involved and relate to people--students, faculty, businessmen, professional groups, legislators, advisory committees, school boards, etc. The effectiveness of vocational education itself depends on the vocational teacher being able to communicate and relate to others (1).

The Effective Teacher

There are certain qualities which pupils invariably mention when they are asked to describe the good vocational teacher. They describe him as someone who is human--someone who is friendly, humorous, and interested in them. Records also indicate that the good vocational teacher is flexible, that he personalizes his teaching, and that he relates to his pupils; he feels adequate, wanted and worthy and, above all, feels identified with people. He also feels positive about others, even the administration, the establishment and parents

Whether or not a vocational teacher possesses these qualities determines the manner in which his pupils achieve or do not achieve. Therefore, it would seem very appropriate to mention each of these areas in more detail.

Self-Concept

Every person is a product of his self-concept, and a vocational teacher's self-concept is the foundation on which effective teaching is based. Some very important areas in the self-concept

of a vocational teacher are: (a) He must be aware of his greatness--self-esteem and pride. If he is, he will be respectful of others and express positive feelings of interest and affection toward the problem and non-problem students alike. His program and students will mirror his confidence and pride. (b) He should be aware of his uniqueness--individual qualities peculiar to himself as a person. If he accepts his own uniqueness, he will allow the students to be individuals even though he makes them "toe the line" when necessary. He respects the fact that each of them is also unique (10).

Student-Teacher Interaction

All teachers perform the very basic tasks required in teaching classes such as the following actions: ask questions; write or draw on the board; give information; give descriptions; approve; encourage; commend; repeat; reinforce; summarize; show things; and demonstrate skills. However, effective vocational teachers are doing additional tasks such as offering explanations; participating in panel discussions; counseling students; providing evaluative experiences for students; pre-testing; individualizing instruction; organizing instruction so that students may apply learning in realistic situations; listening to students; deliberately attempting to influence student attitude; placing vocational graduates; and conducting followups in order to up-grade programs (7: 285-287).

It seems rather clear that effective vocational teachers act in ways designed to encourage student "thinking" on a more

sophisticated level and also to elicit student involvement. They have their students doing things--working on projects; interviewing people in the business world; participating in role playing, debating, discussing; writing on the board; presenting programs for faculty and civic clubs; writing news releases; evaluating learning experiences; and seeking information to better understand the social and employment needs in their community. In other words, effective vocational teachers tend to focus on what they can do to increase student doings.

In the classical Dewey sense, needs and interests become inseparable when students help to make the reality of the classroom conform to the reality of their total experience (5). Chapter IV is addressed to this type of student involvement.

Organization

It is important to remember that regardless of the system, the teacher remains as the key figure in evaluating and reporting pupil performance. The vocational teacher is truly functioning as a professional when he himself develops and applies an objective, dependable procedure for determining pupil progress toward the defined goals of his course. Therefore, effective vocational teachers must be able to write behavioral objectives for their courses and then meaningfully and skillfully orchestrate student comments, questions, and the material under study in such a way that the desired goals are reached (11). Today is the day of Accountability in Education (Chapter I), and realistic behavioral objectives which stress development of competent and confident

persons to enter the world of work with a minimal period of adjustment will enable the teacher and his program to be found accountable.

Communication

The fact that man is equipped with a verbal means of communicating does not diminish at all the importance of non-verbal means available to him. The vocational teacher necessarily relies on verbal means of communication, but he should not rely exclusively on words to transmit information. The vocational teacher who places himself statue-like in front of his class and relies exclusively on verbal forms of expression is seriously limiting his power of communication.

Many effective vocational teachers enjoy dramatizing their subject through enthusiasm, variety and expressions and/or gestures. This can be most effective as a technique for imparting information when the verbal and non-verbal expressions which the teacher employs are appropriate to the level of understanding of the students (not the level of knowledge of the instructor). Information must be on target to be most effective (3).

Classroom Control

One primary goal of classroom control is that an atmosphere of learning shall prevail. While the ultimate goal is to develop inner control in students, it is necessary for a vocational teacher to set limits upon student behavior and to maintain them in order that his students may learn effectively. However, excessive control over students elicits feelings of rebellion and

hostility which result in counter-agressive behavior by students. To circumvent classroom behavior problems, effective vocational teachers will vary learning devices, techniques and activity--change (2).

One other very important teacher-student behavior parallel arises from instructional factors in the classroom. A teacher's approach to instruction can produce student misbehaviors. The achievement expectations which a vocational teacher has for a class are very important since great student frustration, hostility, and boredom can be elicited when these expectations are either too low or too high. When a teacher feels that students have low ability and learning potential, he often establishes lower achievement standards and teaches in a boring and uninspired fashion--two mistakes which are conducive to student apathy and hostility. This is referred to in vocational education circle as the "self-fulfilling prophecy". Or as the vocational teacher feels that his program is being used for a "dumping ground" (for those who are unable to succeed in other areas) his behavior will definitely be affected. In turn, the effectiveness of his program will be impaired

Change in Teacher Behavior

To continue to be effective, all teachers must keep pace with the changing demands of society.

There are many innovative (Chapter VI) evolutions which will alter the traditional behavior of the teacher. Some are saying that educators should recognize individual differences

in the teaching tasks, just as they have attempted to differentiate between students' needs and abilities. In differentiated staffing planning, for example, teaching tasks are assigned according to teacher training, background, and professional motivation. Non-teaching duties are assigned to teacher aides, educational technicians, and para-professionals.

Florida as well as other states seem to be headed toward a broader definition of teacher responsibilities and roles. This may allow for better deployment of educational manpower.

Today's vocational teacher must be conducive to providing "Person Education" in the most innovative, yet effective, means available to him.

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CHAPTER VI

MOTIVATIONAL DEVICES AND TECHNOLOGIES

Coltrin

It is the purpose of this chapter to present the role of instructional technology and how it relates to motivation, the theories of learning, instructional materials, programmed instruction and transfer.

What is Motivation?

Psychologically

In its purest form motivation is a psychological factor. Specifically it consists of that union of drives and associations which activates an individual to perform in a certain manner under a given set of conditions (13: 1-5). Moreover, the theory of motivation has as its basic unit, the key word, "activity." It has been called "the principle of action" and it implies that "the strongest of a set of tendences competing at a given moment will be evoked as an activity." (2: 2) One must also consider, ". . . in what manner do tendencies arise? What determines their strength? These questions prompt the psychologist to discover principles of the determination of tendences, which, along with the principles of action, constitute a theory of motivation." (2: 2)

Educationally

Educationally speaking any effective transmission of particular information is dependent upon students' motivation

or desire to learn. This factor is in turn dependent upon a learning environment which makes learning rewarding and attractive. Further, any specific motivating type of equipment is less important than its particular effect upon the structure of the learning situation (3).

Sociologically

In the final analysis, motivation must be considered to have a sociological facet. Motivation is concerned with the recurring question of "why" individuals behave as they do. Therefore, motivation can also be considered to be a study of behavior (6: 3).

Theories of Learning and Motivation

The Drive Theory

According to Miller and Dollard, the first theory is drive. "Drive is a strong stimulus which impels action." (9: 42) It is comprised of primary and secondary drives. Primary drives are ones like money, hunger, cold, and sex, while secondary drives are ones like anxiety, pride, and ambition. "Without these drives, either primary or secondary, the organism does not behave and hence does not learn." (9: 45)

Cue Theory

These authors continue, "Drive impels a person to respond. Cue then determines when the person will respond, where he will respond, and which response he will make." (9;46) The drive and cue functions are really two different aspects of the same thing:

stimulus. Therefore, any given stimulus may possess an important amount of both functions. Thus a drive stimulus, such as hunger, may have a cue function as well as a drive function (9: 47).

The Theory of Response

The authors list response as the third theory. Response is dependent on both drive and cue. Upon a given cue basked by a certain drive the individual will respond. This role of response is difficult to observe because of external stimuli that continually bombard the individual. Response then is a reaction to both drive and cue (9: 48-49).

Reward as a Theory

Miller and Dollard list the fourth and final theory as reward. Reward is dependent on all three theories, although more so on response, for without response there would be no need for reward. Also, repeated responses are dependent on whether or not they are positively rewarded. If the response is a non-reward, the tendency to repeat that response to the same cue is very unlikely (9: 52-53).

Instructional Materials

According to some, instructional equipment or devices should be properly classified in a field commonly referred to as instructional technology. Another title used to describe teaching equipment is technological hardware. Software generally refers to books, programmed material, laboratory manuals and the like.

Technology is by definition "a field of systemized and

accumulated knowledge, techniques, and intellectual skills and their practical application in creating useful goods and services for mankind." (1) It is appropriate, therefore, to describe technology as it imparts learning.

Technological Hardware for Teaching

Instructional Television

Instructional television (ITV) has been in use for approximately two decades as teaching technological hardware. The terms educational television and instructional television are used interchangeably. It should be noted here that by and large most of the support for ITV in the United States has come from a small group of philanthropists such as represented by the Ford Foundation, for example--not from educators, educational schools, groups of administrators, or even the general public. Due to "outside" funding, over 800 educational institutions operate closed-circuit or ITV installations. Florida State University is one of these institutions. The ITV system is composed basically of a modern television studio from which they broadcast to the many receivers (regular TV's) scattered throughout the campus buildings and the local television viewing area (5: 20-22&27).

Concerning motivation educators can learn little from individual institutions using ITV. Everyone is not motivated in the same way. For example, factory workers may be motivated differently from young adults in vocational education. According to Gordon, educational technologies require that their user should assume a certain level or degree of motivation beforehand, and

this degree of motivation may be a critical factor in determining the success of the program (5: 10).

Video Tape Recorder

An obvious by-product of ITV was the video tape recorder or VTR. Basically a VTR is an instrument which is capable of recording both audio and video signals on a magnetic tape (5: 239). The instrument is used in conjunction with a camera which sends the video signals to the recorder, a microphone to pick up the audio, and a conventional television receiver which is used to view and hear the tape when it is played back. The VTR has become quite popular among educators for it enjoys the following characteristics: (a) lightweight (quite portable) (b) relatively inexpensive, and (c) easy to operate (5: 67).

Motivating the student using the VTR is relatively simple because:

(a) It permits students and teachers to indulge their appetites into the pleasure of technology;

(b) The system provides for immediate feedback, thereby maintaining the student's interest;

(c) The system can be easily edited for correction of mistakes or taking out of undesirable material;

(d) The system seems to work at any level in education and works reasonable well; and

(e) The system can be easily adapted to most any vocational education class. (5: 37, 66, 71)

Audio-Tutorial

The audio-tutorial methods of instruction was conceived and developed by Dr. Samuel N. Postlethwait while at Purdue University, where he is famous for his work with large numbers of botany students.

His approach basically encompasses three major divisions. They are, (a) Independent Study Sessions, I.S.S., (b) Integrated Quiz Sessions, I.Q.S. and, (c) General Assembly Session, G.A.S. Each division or section is independent of the others, but they are considered together when discussing the whole approach (7).

In the Independent Study Session (I.S.S.) students come and go at their own free will. The student comes and checks into the center by signing his name on a card which he places into an assignment file. By doing this he is assigned to an independent study booth or carrel. A carrel is nothing more than a booth with one side open where the student sits. Each booth contains a tape recorder with play back capabilities, the tape itself with one week's assignment, an 8mm movie or slide projected and other materials necessary for the week's lesson along with all instructions (7).

In the Integrated Quiz Session (I.Q.S.) the students are divided up into small groups of about eight each. Each group of eight has been assigned an instructor to direct the discussion. During these usually short seesions each student is expected to give a short talk on some topic in the week's lesson, and then each student is orally quizzed about the material presented (7).

In the General Assembly Session (G.A.S.) all students meet together in a large lecture auditorium. The purpose of this session is to present special guest speakers, show large films, and to give major exams (7).

In a recent article written by David P. Husband of the Integrated Quiz Session he said, "You never really learn something until you have to teach it," and "Learning is done by the learner." (7) According to Husband, students seem to be motivated to learn by the variety that this approach provides. They are free to cover the subject matter in any way in which they choose. The audio-tutorial approach is easily adapted to vocational education courses and is encouraged by a great many vocational educators.

8mm Closed Loop Films

The 8mm film loops can be obtained in regular 8mm or super 8mm. However, the super 8mm films have become the most widely used because of the relative cost. Some features of the 8mm film loops are:

(a) The material presented covers one concept and one concept only;

(b) The film is a continuous loop and can be stopped at any point in its progression and studied more closely;

(c) Each film is generally contained in a cartridge and thereby facilitates loading and unloading;

(d) The film can be shown in the classroom to a group or to an individual student; and

(e) Projectors are small and easily operated. (14)

Motivation is a feature here, particularly when students are allowed to make their own 8mm film loops. Film making is not difficult and is usually well within the budgets of most vocational education classes. Another approach to learning and motivation is the practice of including students in the development of the script with the specific understanding that they, the students, would be included as actors in the film. The

idea here is to use students to motivate each other in learning and teaching of a particular concept. The closed loop device is a unique approach to vocational education particularly as a replacement of or a supplement to operation and other instructional sheets presenting long processes in which many steps are involved (14).

Technological Software

Programmed Instruction

Programmed instruction is a by-product of the collective effort among educators to individualize instruction. It had its beginning in the early 1900's. S. L. Pressey developed a self-scoring instrument to be used in connection with fast scoring of objective tests. It was a device about the size of a 3 x 5 inch card. The device had a slot in which you slipped an answer sheet then by punching the answer sheet through holes in the top, you recorded your answer. The holes themselves were laid out in rows of four, thereby providing four possible choices (multiple-choice) answers to approximately thirty questions. The idea was that as the student answered each question his answer would be immediately scored, and therefore, recorded as right or wrong. Also, the results of the test would be immediately available to the student providing him immediate feedback (11). This was the Original concept on which the "teaching machine" idea developed.

Linear Programs

Later, Professor B. F. Skinner, working with reinforcement in learning, developed the "linear" program method. The steps

involved in linear programmed learning are:

(a) The program and material itself is self-pacing in that the student proceeds at his own rate and speed;

(b) The program provides for active responding in that the student answers each question in order to advance through the presented material;

(c) The program provides for immediate confirmation of either correctness or incorrectness of each answer. This is considered to be the reinforcement mechanism part of the program;

(d) The program is set up to take in small bits of information through small steps. This is an important section of the program, for studies show that the error rate is very low, between 5 and 10%; and

(e) The program in itself is self-testing in that the detailed record which the student keeps provides the basis for revising the programmed course material. (8: 84-85)

In this approach every learner continues along the same path with little or no deviation from that specific path. Each bit of information is provided in one or two sentences. Each step is kept as simple as possible, thereby minimizing the risk of error. The error rate is most critical in this type of program. Usually the student is asked to respond by providing a word, phrase, or perhaps a number. All the students are exposed to the same sequence of information (12: 5). No feedback develops as a result of decisions based on individual differences exposed by responses.

Branching Programs

In 1964 Norman Crowder, a United States Air Force psychologist, developed what he called the branching program of learning. This approach, although connected with programmed learning, seems to be based on somewhat traditional tutorial methods. It differs from the linear approach in that the units of information them-

selves are rather long, maybe two or three paragraphs. The student usually responds by indicating his answer to a multiple choice question. In this approach the error rate is not nearly so critical, for if the student makes a mistake he is provided with additional information and immediately helped. It differs from the linear approach in that, depending upon the rate of progress, all students are not provided with the same sequence of information (12: 5).

Lab Manual

A self-contained laboratory manual is a type of workbook with which the student himself can proceed at his own speed through an entire unit of instruction. All necessary instructions are contained inside the manual and the instruction is self-pacing allowing the student to proceed at his own speed. The teacher in this case gives individual supplemental instruction and acts as a resource person. The lab manual probably has a great potential use in vocational education classes. It and other books (references, textbooks, and technical handbooks) are considered software.

The Transmission of Knowledge

Any teaching device or technology mentioned in this chapter is limited by its material being fixed. At the outset the material may be good. As time passes it, like any published book, may become obsolete. Updating any instructional material in "canned" packages is very essential. Another factor of content validity is in the "transfer" value. Transmission of ideas (locked in

the packages) to the student is dependent upon the combination of effective words, pictures, diagrams and other symbols to transmit ideas. Much of the success depends upon the ability of the student to read, decipher and solve problems based on word, symbol and picture descriptions. A careful selection of these is necessary for the achievement and age level of the student.

Teachers about to develop their own content for instructional hardware or software should heed the following:

(a) Selection - Select a major technology area to be investigated.

(b) Delimitation - Select a small element or process from the major technology for study from which to develop a usable unit of instruction.

(c) Venture Analysis - Time consideration of the venture is important. Is it feasible in the alloted amount of time?

(d) Prototype Development - Develop and demonstrate its technical feasibility. Can it be done by the average student?

(e) Dissemination - The publication of the finished unit to the students and to other teachers. (1)

Vocational teachers have pioneered in the development of individual instruction. Since the late 1920's and early 1930's individual instruction sheets have been developed by vocational teachers and teacher educators. Even today they are being developed and used successfully by teachers who can write well or select good published instruction sheets. To produce instructional material to be locked into devices of educational technology, a very high level of competence is required. To select instructional programs of software or for hardware, knowledgable consultants are essential.

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CHAPTER VII

ADAPTABILITY OF SELF-ESTEEM AS AN APPROACH TO VOCATIONAL EDUCATION

Wyche

Thousands of students leave school each year with one of the bitterest feelings of their lives. They have been told and led to believe that they are stupid and that no hope exists for their successful adjustment to society and the world of work. Maybe if these students had achieved some degree of success or had been led to feel that way--even when their performance was slightly above zero--they might have entered into society as contributors rather than as psychological and sociological problems (5).

If education is to become relevant to every individual learner, the educational process must move toward the development and understanding of self-esteem. To create a learning environment which might make learning conducive, exciting and enriching for the learner, it must be relevant.

Vocational Education does not only encompass the teaching of specific vocational knowledge and competencies but develops confident persons to enter the world of work and take an active role in society. The self-esteem approach would enhance and facilitate a productive program in Vocational Education because it focuses on the personality of the learner-teacher and how it effects the educational process.

The Meaning of Self-Esteem

A person's self-esteem is the evaluation he brings to a situation which will determine his performance when in interaction with others. Arthur R. Cohen views self-esteem ". . . as a function of the coincidence between an individual's aspirations and his achievement of these aspirations." (3: 383) The behaviorist would define self-esteem in terms of the statements that the person makes about himself. The concept of self-esteem involves the self evaluation, and the nature of that evaluation has profound effects on a man's thinking processes, emotions, desires, values and goals (2: 105).

Background of Self-Esteem and Learning

Traves (10) indicated that credit for developing the self concept as a tool of learning was produced by Carl Rogers. Rogers noticed that of the many persons seeking counseling, problems in education stem from the fact that they had inappropriate concepts and evaluations of themselves. Much earlier, Fraud had stressed the fact that disturbed patients were often in conflict with themselves about inappropriate feelings of guilt which was a part of their life. Carl Rogers and William Stephenson "suggested a research technique that might be applied to the study changes in the self concept." They conducted studies of the effects of counseling on changing the self-esteem concept of individuals after counseling. The studies show that counseling was effective in changing the self-esteem concept of individuals.

> . . . .research in which measures of self-concept are repeatedly applied to people not counseled shows increased consistency of measures as they are repeated, but less over-all change than in these who receive counseling. The data fit well the position that the learning occurring during counseling of Rogerian type can be represented by change in the self-concept. (10: 436)

It was pointed out in Wylie's book that in the studies, self-concept had little to do with learning and generally led to the development of useful psychological concepts. However, Professor Wylie felt that ideas such as self-acceptance and self-esteem offer some promise. She reviewed over four hundred references in establishing this conclusion (12).

The Effect of Self-Esteem on the Learning Process in Vocational Teaching

A review of indexes published during the past ten years revealed no investigations relating to self-esteem and proficiency in Vocational Education, but there is a minimal number of studies relating to the self-concept (the same as self-esteem) on the various phases of Vocational Education.

The research referred to has indicated a positive relationship between self-esteem and achievement in typical classroom studies, the correlation between ahe self-picture and success in vocational subject seems more "tinuous" in effort.

> This tenuity, however, is probably due to the paucity of studies relating these variables, rather than to lack affinity between them. (7)

The Teacher

Blume found in a study that pupils are more likely to have high self-esteem if their teachers have high self-evaluation

and pupils tend to have high self-esteem in the classes of teacher who believe in democratic teaching. These attitudes are more likely to be found at the elementary rather than the secondary level. The purpose of this study was to examine the relationship between specific attitudes of teachers and self-esteem of pupils in their classes to determine the impact of teacher attitudes upon the development of self-concept of pupils (1).

The teacher's job is to evaluate the wholeness of the child and to become aware of his strengths and sensitivities. There are indications that learning takes place only when the pupil is at ease with himself. Therefore, the teacher must create and encourage experiences that will help the child to understand himself accurately. He must provide positive, constructive and specific information that will challenge and enrich the pupil's learning experiences. He must listen intelligently to each child and let the pupil be a partner in determining his activities and work load (7). For a presentation of the teacher role in the learning see Chapter V, Teacher Behavior.

The Student

Self-esteem in learning is defined as a possesion of a favorable opinion of the self, or a good self-concept. In the student self-evaluation is made in relation to situations, problems and tasks development. The self-concept represents and expects success in the student's attempt to meet situations, problems and tasks. The self-concept is complex, made up of

many external facets, with each facet differing in importance or reward value from the others. Self-esteem has been acquired and can be changed according to the principles of learning. Sears and Sherman write:

> Various aspect of self-concept have properties similar to drives: to protect a good self-concept, one will strive hard . . . or will select those behaviors which preserve or enhance it. (9: 10)

From all indication good self-esteem emerges when students are able to predict success in the learning set.

Perhaps if the first experiences in school were built around success, the cognitive deficiencies in his early childhood could be overcome in school. If teachers would refrain from asking for and expecting and getting only minimal-capacity performance from a child, self-esteem might be developed. Feeling inferior from the beginning, the student accepts a negative evaluation of himself. He responds either with hostility toward school and all who represent it, or exhibits hostility and depression. "In either case it is unlikely that he will be in a frame of mind to learn" unless this state of mind is changed (8: 165).

Positive Self-Esteem and Learning

The puril with positive self-esteem does not feel frustrated in the learning setting. He feels that the school is a safe and orderly place in which to live and function, and he is aware of his strengths and limitation in his attempt to learn. Frustration is a part of life, but when inner or physical conflicts occur a positive self-concept provides the learner

strength enough to face these conflicts objectively (11). With a positive self-concept in the pupil-teacher learning set, schools will become a haven for pupils and a pleasant work-place for teachers.

Negative Self-Esteem and Learning

When pupils enter the learning set with negative self-esteem concept, they may become delinquents to the total learning process and a burden to the school staff responsible for guiding learning. In Vocational Education this person may become a hinderance to as well as a disruptor of learning. In that research has indicated that low self-esteem deters learning and is of no value to the learning set. Pupils with negative self-esteem concept must be changed to positive ones if learning is to flourish.

Changing Self-Esteem in Learning

A pupil may change or improve his self-esteem concept through experiencing success, love acceptance and understanding from the total learning set. Woolner states:

> Major components, self-concept ideal self-concept, other concept all together called the global self-concept consist of traits, attributes and limitation the individual assigna to himself, the individual evaluation of himself, and how the individaal perceive what others think of him. (11)

The teacher can help to change or improve pupils' self-esteem by creating and encouraging experiences that help these pupils to understand themselves accurately. Wool lists ways in which this can be done:

a. Listen intelligently to each child; let him be a partner in determining his activities.

b. Give him opportunities to express himself through various media.

c. Record and encourage him to record his own stories using words or pictures.

d. Praise the child's achievements no matter how small they may be.

e. Trust him to take responsibility for certain jobs that match his capabilities.

f. Encourage him to contribute his knowledge to class and group discussions.

g. Respect his right to make and learn from mistakes.

h. Set realistic short and long term goals for him to reach himself rather than to others.

i. Study his characteristics and behaviors in relation to himself rather than to others.

j. Avoid labeling the child.

k. Allow him to maintain his integrity.

l. Encourage his interest and assets.

m. Reward and reinforce positive behavior; ignore negative behavior as much as possible. (11)

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ADDENDUM

As this seminar developed, many "approaches" were identified and discussed. Certainly other approaches exist, many of which should be researched, even though they were not identified or discussed by this group. However, it was decided to list some facets to the vocational-improvement effort which were discussed and not researched. The thought was that such a list might benefit others and possibly provide an impetus to other studies. The abridged list follows:

a. Staff development techniques for Vocational Education

b. Differentiated staffing for Vocational Education

c. Techniques to channel and structure out-of-school vocational learnings

d. Motivation through self reinforcement in Vocational Education

e. Motivation through peer reinforcement in Vocational Education

f. Modular scheduling of Vocational Education dlasses

g. Facility design for differentiated use

h. Interdiciplinary approaches consentrated on the employability objective

i. Interaction between vocational curricula

j. Families of occupations approach

k. The handling of emotional problems and accident proneness among vocational students

l. Ways and means of determining obsolescence in vocational school offerings and methods

m. Selection vs. election of a specific vocational education curriculum

n. Society's contrasted with the individual's manpower or person needs

o. Individual instructional benefits vs. the socialized study-recitation benefits.

p. Homogenius vs. heterogenius groupings for vocational training

VT 014 364
EMERGING TECHNOLOGIES...APPLICATION FOR TOMORROW.

AMERICAN TECHNICAL EDUCATION ASSOCIATION, INC., DELMAR, N.Y.
OFFICE OF EDUCATION (DHEW), WASHINGTON, D.C.
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PUB DATE - 71 149P.PROCEEDINGS OF THE NATIONAL CLINIC ON TECHNICAL EDUCATION (OKLAHOMA CITY, OKLA., 1971).

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IDENTIFIERS - AIR TRAFFIC CONTROL

ABSTRACT - OVER 300 TECHNICAL EDUCATORS FROM 45 STATES AND TWO FOREIGN COUNTRIES PARTICIPATED IN THIS CONFERENCE DESIGNED TO PRESENT RELEVANT INFORMATION ON TOPICS SUCH AS HEALTH TECHNOLOGIES, THE CONSTRUCTION INDUSTRY, TRANSPORTATION, OCEANOGRAPHY, COOPERATIVE EDUCATION, AGRICULTURAL TECHNOLOGIES AND WOMEN IN THE WORLD OF WORK. PRESENTATIONS PRINTED IN THIS DOCUMENT INCLUDE: (1) "EMERGING TECHNOLOGIES: THEIR EFFECT ON TRAINING AND JOB ADMINISTRATION FROM A MANAGER'S VIEWPOINT" BY J.H. HUNT, (2) "THE CHALLENGE OF EMERGING TECHNOLOGICAL CHANGES" BY PAUL STRASBAUGH, (3) "PROGRAMS FOR TECHNICIANS IN PHYSICAL SCIENCE AND ENGINEERING" BY AL PHILLIPS, (4) "PROGRAMS FOR TECHNICIANS IN AGRICULTURE AND NATURAL RESOURCES" BY HOWARD SIDNEY, (5) "TECHNICAL PROGRAMS IN ALLIED HEALTH" BY WILLIAM F. SANDS, (6) "THE THUNDER OF BARE FEET - THE COOPERATIVE EDUCATION PROGRAM OF THE TEXAS CONSTRUCTION INDUSTRY" BY WALTER KERR, (7) "CONSTRUCTION PROGRAMS IN TEXAS SECONDARY EDUCATION INSTITUTIONS" BY W.H. FITZ, (8) "POST SECONDARY TECHNICAL EDUCATION IN TEXAS: PROGRAMS, PROGRESS, AND PROBLEMS" BY JOSEPH D. GODSAY, (9) "TRANSPORTATION IN THE 21ST CENTURY" BY JAMES R. ROMUALDI, (10) "ALLIED HEALTH PROFESSIONS IN THE 21ST CENTURY" BY MILES ANDERSON, (11) "OCEANOGRAPHY IN THE 21ST CENTURY" BY TED KOSCHLER, (12) "WOMEN IN TECHNICAL EDUCATION" BY MARY L. ELLIS, (13) "AIR TRAFFIC CONTROLLER EDUCATION" BY FRED M. MARKS, AND (14) "THE U.S. OFFICE OF EDUCATION'S PROGRAMS FOR TECHNICAL EDUCATION" BY WALTER J. BROOKING. (GEB)

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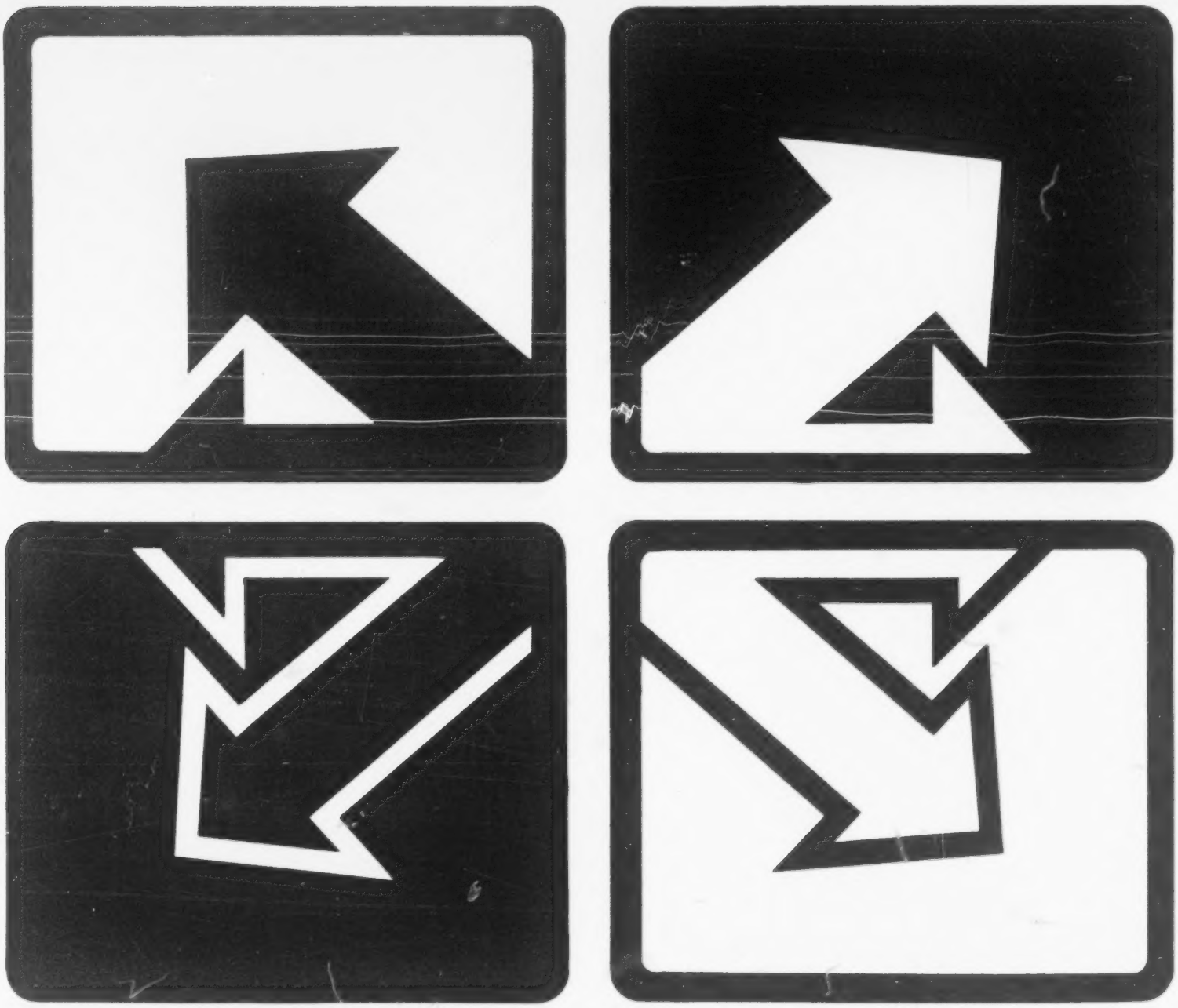

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EMERGING TECHNOLOGIES . . .

APPLICATION FOR TOMORROW

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3676

PREFACE

The 1971 combined National Clinic on Technical Education and Annual Convention of the American Technical Education Association was held in Oklahoma City. Over three-hundred technical educators from forty-five states and two foreign countries participated.

A highlight of the clinic/convention was the dedication of the new Administration-Classroom Building of the Oklahoma State University Technical Institute. It should also be noted that the 1971 meeting was the first time the annual meeting of the American Technical Education Association was held in conjunction with the National Clinic.

These proceedings are prepared as another service to members of the American Technical Education Association. The relevant information on such topics as health technologies, the construction industry, transportation, oceanography, cooperative education, agricultural technologies, and other new technologies will provide guidelines for technical educators planning for the years ahead and even into the twenty-first century. The role of women as technicians in the world of work was also an important area of emphasis at this meeting. It is hoped that the speeches contained in this document will serve a useful purpose as readings at the university level in the preparation of future leaders in technical education.

The National Clinic is offered through the cooperative efforts of the United States Office of Education and The American Technical Education Association. The sponsors are pleased with the work of the hosts, the Plains Region of ATEA and Oklahoma State University Technical Institute in Oklahoma City.

The thirty-seven exhibitors in attendance made significant contributions to the success of the Convention. The sponsors are also grateful for the services provided by the Oklahoma City Chamber of Commerce.

Ruth E. Midjaas

Ruth E. Midjaas
President, American Technical
Education Association

3677

CONTENTS

EMERGING TECHNOLOGIES: THEIR EFFECT ON TRAINING AND JOB ADMINISTRATION FROM A MANAGER'S VIEWPOINT - J. H. Hunt 1

THE CHALLENGE OF EMERGING TECHNOLOGICAL CHANGES - Paul Strasbaugh 17

PROGRAMS FOR TECHNICIANS IN PHYSICAL SCIENCE AND ENGINEERING - Al Philips 21

PROGRAMS FOR TECHNICIANS IN AGRICULTURE AND NATURAL RESOURCES - Howard Sidney 26

TECHNICAL PROGRAMS IN ALLIED HEALTH - William F. Sands 36

THE THUNDER OF BARE FEET - THE COOPERATIVE EDUCATION PROGRAM OF THE TEXAS CONSTRUCTION INDUSTRY - Walter Kerr 42

CONSTRUCTION INDUSTRY COOPERATIVE EDUCATION PROGRAMS IN TEXAS SECONDARY EDUCATION INSTITUTIONS - W. H. Fitz 48

POST SECONDARY TECHNICAL EDUCATION IN TEXAS: PROGRAMS, PROGRESS, AND PROBLEMS - Joseph D. Godsey 56

A LOOK BACK - AND A LOOK FORWARD - Arthur Lee Hardwick 62

DEDICATORY REMARKS - OSU Technical Institute - Governor David Hall . . 66

TRANSPORTATION IN THE 21ST CENTURY - James R. Romualdi 69

ALLIED HEALTH PROFESSIONS IN THE 21ST CENTURY - Miles Anderson 75

OCEANOGRAPHY IN THE 21ST CENTURY - Ted Koschler 81

WOMEN IN TECHNICAL EDUCATION - Mary L. Ellis 89

AIR TRAFFIC CONTROLLER EDUCATION - Fred M. Marks 96

THE U.S. OFFICE OF EDUCATION'S PROGRAMS FOR TECHNICAL EDUCATION - Walter J. Brooking 101

APPENDIX A - Minutes of ATEA Business Meeting 108

APPENDIX B - The Program 110

3678

CONTENTS (Continued)

APPENDIX C - Planning Committee 118

APPENDIX D - Attendance by States 120

APPENDIX E - Exhibitors 121

APPENDIX F - Conferees 124

EMERGING TECHNOLOGIES THEIR EFFECT ON TRAINING AND JOB ADMINISTRATION FROM A MANAGER'S VIEWPOINT

J. H. HUNT
Assistant Vice-President
American Telephone and
Telegraph Company

Good Morning, Gentlemen

Thank you for that very kind and generous introduction. As you may have already surmised from the introductory remarks, it's a real pleasure for me to be here with you today. Not only because it affords me with the opportunity to visit Oklahoma and my alma mater,--but, in addition, and much more importantly, this visit provides me with the opportunity to share with you professionals in the training and educational field some of my thoughts regarding the general subject of training. More specifically, it provides me with the opportunity to discuss with you the necessity, in my opinion, for managers to establish training methods and administrative procedures that are consistent and current with the technological developments which are so rapidly engulfing the business world today.

I'd like to say at the outset that my remarks are those of a manager, not a professional educator or trainer, so if I say anything which sounds a little unprofessional to you, please consider the source; and don't judge me too harshly. What I would like to do over the next few minutes is relate to you some of the things that we are doing in the Bell System in the training area as a result of recent technological developments, and then relate to you how certain technological developments have enabled us to utilize new operating techniques in our local Bell Telephone Companies.

First, let's take a look at training. Perhaps it would help you get a better feel for the importance of training in our business if I gave you some background information on the Plant Department, which is my area of responsibility in the Bell System.

The Plant Department, as some of you may know, is that group of people, line and staff, which is responsible for installing and maintaining the "physical hardware" which enables those we serve to communicate with each other, either by voice or data. This includes station equipment, that is, telephones and data sets, outside plant facilities, commonly thought of as telephone poles and cable, and central office switching machines, which interconnect the calling parties, frequently through the use of inter-city circuits.

To be more specific, at the present time the Plant Department of the Bell System has over 93 million telephones in service. These range from simple residence telephones to complex business telephone systems and data sets which use sophisticated electronic switching equipment that is located on customers' premises. In addition, we have over 14,500 central office switching systems of all types (some of which are electromechanical and others completely electronic), which are interconnected by literally millions of sheath miles of cable and serial wire. Our long-distance network is made up to a large extent of microwave, carrier, and co-axial cable facilities.

In order to maintain this vast array of complex equipment, there is a Plant Department for each operating area (usually a state) which involves over 320,000 employees nationwide. In addition, in 1969 and 1970, the Plant Department experienced a net growth of 20,000 craftsmen each year. But, to obtain a net growth of 20,000, it was necessary to hire 60,000 each year. Naturally, these newcomers must be adequately trained. Also, our existing work force must be constantly updated on new technologies since the rate of technological change has increased rapidly in the past two decades. It is this increasing complexity of technological equipment, coupled with other factors, such as large numbers of new employees and spiraling costs, that has forced us to take a hard look at our traditional training methods.

Consider, for a moment, the size of our existing training operation. At the present time, over 8000 craftsmen and foremen daily attend classroom sessions. Or, another way of looking at it, during a typical year, 166,000 craftsmen and foremen attend classes ranging in length from one day to six months. Average classroom training equated to 45 hours per employee for each of our 220,000 craftsmen, or 11.7 million hours overall.

In addition, our foremen received 1.2 million hours of training. There is only one educational program by a single university or industry in the United States which is larger than the Bell System's Plant training program.

I'm sure you will agree with me that such a sizeable training program speaks for itself as to why managers in the Plant Department of the Bell System are so vitally concerned about the efficiency of that training operation.

We know our traditional training methods have done a good job for us in the past, and we are not about to abandon them promiscuously where they will still do the job. But we also know that they can be improved.

I would like to take a moment now to give you an example of this traditional type of training that will continue to perform a vital function for us in the future.

I mentioned that our hiring rate in recent years was 60,000 men per year. What I'd like to do now is trace for you the typical training that one of these average new hires receives.

Generally speaking, a new craftsman is a young man who is just out of high school and has just completed military service. In most cases he is unfamiliar with telephone craft work and in many cases, particularly in the densely-populated, metropolitan areas, he is entirely unskilled in the use of hand tools. This typical new employee frequently will start as a lineman. This job entails the placing of poles and cable. To begin with, he will receive instruction in climbing poles of 5 days duration and then 10 days of basic construction skills. In addition to this training, he is given 3 days of background knowledge concerning his benefits as a Bell System employee. Such things as Sickness and Pension Plans, Hospitalization Benefits, Vacations, etc. are covered at this time. Then he is further oriented on secrecy of telephone communications, customer relations, vehicle driver training, and first aid training. After a total of 20 days of training he is ready to be assigned to a small construction crew, with personal on-the-job instruction by his foreman.

Following a typical lineman's career a little further, he next moves to a telephone installation assignment which basically consists of installing telephones on customers' premises. For this job he will receive 10 days of station installation training. After a year or two he will advance to installing complex telephone equipment on business customers' premises. At this time he will receive 15 additional days of training on the installation

of key telephones. He may also receive 8 days of relay adjustment and 5 days of circuit and blueprint reading. In many cases he will also receive 8 days of basic electricity training.

As our typical employee continues to advance in the business, he is assigned the responsibility for maintaining small, dial switching systems for larger businesses. In preparation for this assignment he will be given 15 days of training in step-by-step switching systems. Later he may receive 20 days of training in common control switching systems. Following this, he may receive 20 days of instruction in advanced electronic switching circuit systems which are located on customers' premises. This additional training will relate to the type of equipment in the locality where he works.

Some of our men at this point have still not reached the top of their potential and will be selected to become a central office switchman. If he is going to be working in one of our newer electronic central offices, he will receive 110 days (5 1/2 mos.) in electronic switching systems maintenance.

Perhaps this illustrative case gives you a better feel for the amount and type of training that a typical craftsman receives. And, incidentally, it by no means covers all of our craft jobs, each of which has its own training schedule. For example we have a number of other entry level jobs, such as installing residence telephones or running wires in central offices to connect outside cable facilities to switching machines, and these men receive training similar to that which I've just outlined for a lineman.

We have seen that over the years our traditional forms of training, such as that which I've just described, have done the job for us. And much of what I've just described would fall into the broad perimeters of traditional training; that is, a man receiving classroom instruction at a centralized, plant training center. And, as I have indicated, this approach has proven to be successful in the past.

However, new demands and circumstances have forced us to take a hard look at our training operations. This is due, in some measure, to a combination of factors; for example, the large numbers of young people we are hiring, the wide spectrum of talent and ability that is represented by our newer employees, and--most assuredly, increased technology.

Other factors which necessitate taking a hard look at training methods are:

a. Male plant labor costs have increased 54% in the last decade and have more than doubled in the last 15 years with no foreseeable relief in sight.

b. Our turnover rate is increasing. Last year, for example, over 29,000 men left the System through resignations, dismissals, retirement, death, etc.

c. The experience level is low. At the present time, 30% of the craft work force has less than two years experience and 25% has less than one year experience. This inexperience factor is even greater in some of our larger cities.

When adding all these factors together, we see that we have a large training job ahead of us, and while there is no doubt that our traditional methods have done the job for us in the past and have a place in the future, we certainly cannot afford the luxury of standing pat on past successes. Labor costs are increasing; force loss is increasing; inexperience levels are increasing; and the learning ability of our new hires has not always kept pace with increased technological requirements.

Therefore, as a manager, as I see it, we are at a training crossroads and have to employ a combination of several training approaches and administrative procedures, depending on the variables involved. These approaches would be the following:

a. Use the Traditional Method of Training Where Applicable. For example, basic installation, pole climbing, etc., but with more specific guidelines and new innovations. (Career planning, self-paced instruction, etc.)

b. Simplify Reference Material.

c. Simplify Training Methods When Covering Complex Technical Subjects.

d. Improve Use of "Hands On" Training Techniques.

e. Specialize and Concentrate Highly Technical and Low Volume Work Operations in Centralized Locations.

Now let's examine these approaches one by one.

First, the traditional classroom, lecture-oriented approach.

To begin with, we have found that there must be a balance between the traditional approaches of formal classroom training, on-the-job training, and self-development; and we as managers are attempting to strike the proper balance of these facets. We've found that a philosophy of total classroom training for all subjects weakens the initiative of craftsmen to develop themselves. On the other hand, the complexity of present day equipment eliminates the possibility of doing all training on the job, and, of course, the possibility of employees achieving technical and administrative competence through self-development activities alone is almost impossible. Therefore, our development now and in the future must be more closely geared toward representing a balance between

these traditional approaches, that is, classroom training, on-the-job training, and self-development. And we intend to accomplish this balance in a man's training through having a more individualized training approach for each craftsman.

Remember our typical new man of a few minutes ago. Please keep in mind that as we presently view it, the traditional progression described should not just automatically happen to all employees. The man's foreman now plays a bigger part than ever in determining who will receive this training and when. Each foreman, now more than ever before, must be responsible for the individual development of craft employees reporting to him based on his appraisal of their individual talents and ability. This development should fully prepare the craftsman for the skills required of his job and develop him to his full capability. Since variances in work content exist, as well as difference in indivduals, the foreman has a vital role in determining these differences and in planning an orderly development of those individuals reporting to him. We call this "Career Planning." In effect we are stressing to our foremen the importance of maintaining an individualized approach in their training of their work force, rather than a broad brush approach in which every person gets the same type of training in the same quality.

Our foremen accomplish this individualized training approach by preparing a "Career Planning" development portfolio for each employee. This portfolio documents the employee's present skills and job capabilities. For example, trade school training or experience with communications in the military service will be recorded. Our foremen compare job requirements and employee capabilities and determine the training and development which will be needed to expand his capabilities to fit the job requirements. Appropriate classroom training is then scheduled which is reinforced by appropriate, individualized, on-the-job training and self-development activity after the formal classroom session.

In connection with our classroom training, one of the important changes which is occurring here is the pacing of training classes to individual needs. Here we have tried to take a leaf from the page of professional educators, and successfully so, I believe.

For example, a recent revision of the station installation course recognizes individual differences in intelligence, background, etc., and allows students to self-pace themselves to completion of this course. Those who would be frustrated by a slow rate are permitted to move ahead faster than the rest of the class. On the other hand, those who are having difficulty with a particular point stick with it until they have mastered it before moving

on. Not so long ago this slow learner would have groped along, completing the training in the normally allotted time, but yet not have been fully trained, while the fast learner would have become bored and not have learned everything he should have. This, of course, would place a large burden on the field foreman for reinforcement and follow-up on the job training on subjects which should have been covered in class. Obviously, this approach carried cost inefficiencies which we find are eliminated with the individualized self-paced training approach.

Incidentally, an interesting type of on-the-job training is taking place in our offices that maintain television circuits. In these offices we have instituted a form of closed circuit "educational T.V." for our craftsmen during non-peak load periods. In this way craftsmen are taught about proper use of oscilliscopes, test sets, etc., via the closed circuit T.V. loop. This training, of course, is designed to augment formal classroom training and represents another innovation that is occurring in our traditional training programs, in this case, an on-the-job training program.

These examples of (a) individualized career planning portfolios, (b) self-paced training and (c) use of video circuits for on-the-job training will perhaps give you a feel for how we are modernizing our traditional training approaches.

Simplified Reference Material (TOPP-Task Oriented Plant Practices)

Now I'd like to take a moment to tell you about our newly developed simplified reference material, more commonly referred to, and please excuse the acronym, as "TOPP"--which stands for "Task Oriented Plant Practices."

In order to explain this to you, you will need a little background information, and please keep in mind the inexperience level of the force and this relationship to technological advance as this story unfolds. It goes like this.

We in the Plant Department in the Bell System have long relied on our BSP's, or Bell System Practices, for reference material to be used by field personnel when installing equipment or clearing trouble on existing telephone equipment. However, this traditional reference document is undergoing dramatic change in order to meet the changing times. In the past, these practices have gone into rather elaborate detail on equipment makeup, giving information in much detail, in fact, one might say minutia, on what happens, when it happens, and why, in connection with a certain equipment function. We have learned that such volumes of reference material tend to confuse, rather than assist more craftsman,

particularly when this style is applied to increasingly complex equipment. For instance, we listened to our craftsmen and heard them say things like this. (a) "Its difficult to find what is needed in the BSP's." (b) "I have to use several binders simultaneously." (c) "There is inadequate cross referencing to do the job." (d) "We waste excessive time searching for needed information and reading irrelevant data."

We examined the situation and found that our traditional Practices have in the past been designed, organized, and packaged to describe equipment, instead of supporting or guiding craft work operations.

Presently, we are engaged in producing BSP's that will eliminate comments of the foregoing type by developing Practices, or Instruction Manuals, which are designed, organized, and packaged to support craft tasks rather than describe equipment functions. This is a significant departure in our business from the standard reference manual.

By being task oriented, the practice is designed exclusively to tell a craftsman how to perform a task. He is given all the information he needs to do a job from start to finish and nothing more. Data irrelevant to the task has been eliminated, and all data relevant to the completion of the task is included.

Another major feature of TOPP is skill stratification. As indicated earlier, Bell System craftsmen cover a wide skill spectrum, ranging from a newly-hired high school graduate with no technical skill to a recently-discharged veteran who worked on SAC circuits or the hot line to Moscow. Now here is the second big feature about TOPP. It is designed to allow any skill level craftsman to go directly to only the information that he needs. A highly-skilled man can easily bypass all the information he already knows, where previously our BSP's required him to read many pages to locate the one sentence or paragraph he needed. The completely unskilled man using TOPP is led through a detailed step-by-step procedure covering all the necessary actions to complete a task. The moderately-skilled man is able to use a personally created combination of by-passes and step-by-step procedures to quickly obtain information at whatever level of detail he requires.

This type of TOPP structure and task orientation allows more effective trade-offs to be made between BSP's and training. Training course development in the future will be supplementary to TOPP, rather than the present situation where training has had to compensate for BSP deficiencies.

Other features of TOPP, in addition to task orientation and skill stratification, are:

- It is composed of short, imperative instructions covering a job from start to finish.
- It's packaged so that one book contains all the data required to do a complete job.
- It is complete with test set operating instructions, drawings and trouble shooting procedures--and--is logic sequence formated.
- It is mnemonic coded with simplified in-depth indexing.
- It's designed for eventual computer oriented retrieval techniques--and--structured so that each page contains a complete task.
- Finally, it is easily changed without replacing the entire document.

Our early efforts with this type of reference document showed that this approach will result in:

- higher productivity
- fewer errors
- reduced training time
- lower cost
- improved maintenance and
- improved customer service.

As an example of what I mean, with this new concept we have been able to produce a 30-page document to completely support all the activities that a craftsman will become involved in while working on V-4 telephone repeaters. In our previous BSP's, 314 pages were required to convey the same information.

We established three trial locations to evaluate the foregoing system (Long Lines offices in Columbus, Raleigh, and Anaheim), and we looked at the following performance characteristics:

- problem completion
- productivity
- error reduction.

Here is what we found:

Problem Completion

In regard to problem completion, thirty-six test cases were designed using traditional BSP's and thirty-six with our new prototype system. This chart summarizes the problem completion data.

Note that both the high and low service groups completed 83% of the test problems with the new prototype system. This data shows quite clearly that length of Bell System service ceases to be a factor in determining a craftsman's ability to complete V-4 repeater tasks when using the new type of practice. Conversely, there was a marked difference (56% vs. 39%) in problem completion for high and low service groups who used standard BSP's.

Productivity

Productivity improvements are summarized on this chart. As was the case in problem completion, the prototype system resulted in very little difference in time for the high and low service groups. This indicated that length of Bell System service tends to be eliminated as a factor determining the time it takes to do a job when the prototype is used.

In contrast there was a marked difference in time between the high and low service groups using BSP's. Length of service, therefore, appears to be a significant factor in determining the time required to do a job when BSP's are used.

Error Reduction

Evaluation anaylysis showed that errors were significantly reduced with the new technique. As you see on this chart, low service employees in particular were able to show marked improvement, reducing their errors by 50%.

In summary, this first attempt to document and totally support a task or complete work operation, rather than individual pieces of equipment, has shown substantial improvements in productivity, problem completion and error reduction can be achieved with this new system. In addition, this prototype system allows low service craftsmen to perform as efficiently as employees with longer service. As a result of our initial experience, we are actively moving ahead with the introduction of this technique on a System basis as rapidly as possible. At the present time our practices are being rewritten to cover phases of our operation (N-3 carrier, 756 PBX's, and TSPS call completion systems).

Simplifying Training Methods When Covering Complex Technical Subjects

Some of you may have heard of our most recent type of central office switching system, our Electronic Central Office. With the advent of these Electronic Switching Systems, and we presently have 120 in operation, we are coming to grips with training requirements of a nature never experienced before when training craftsmen to work on

the electromechanical switching systems used in the past. And with the amount of money we would invest in ESS training under present methods, $54 million in 1970 thru 1973, we cannot afford to stand pat on a traditional switching training method which would prove to be inadequate for today's needs. Therefore, we have already undertaken significant changes in our training approaches to meet the unusual requirements brought about by ESS switching. I'd like to briefly touch on a couple of these changes.

One is called the modular concept. In this approach each training course is broken into a series of units or modules. Each of these units is generally a complete entity unto itself and represents one significant phase of training. These modules are carefully designed to mesh in a number of ways. Using the modules in a building block fashion each Operating Company, or locality, can develop an individual in a number of ways depending on his capabilities and the particular job requirements. The modules can be taught separately or together, and each manager can tailor the training modules to meet his particular requirements. In some cases, training in all of the preliminary modules will not be necessary to achieve the desired development of a particular individual. For example, a semi-skilled man or a man who is going to work in an office, under the surveillance of a master organization, such as a technical assistance center (which I'll describe in a minute), need not have full training.

The use of training modules can also assist in developing the "slow learner" by permitting him to return to the job to better absorb his training before progressing to the next module. We are very much aware of the fact that if we are to effectively train and use this craftsman, we have to make our training adaptable to him. Generally speaking, we plan to have this modular-type training self paced as much as possible, similar to the installation courses we tried earlier. It will be highly learner oriented as opposed to our present-day instructor or lecture-oriented classes. In short, we're planning that the exact job that the craftsman must be trained on will be identified, and then he will be trained and tested for that job a bit at a time rather than receive overall training on all phases of the operation, as we did in the past, before allowing any one component to really sink in.

We feel this modular approach will be most helpful in our Electronic Switching Training. This approach also ties in nicely with and permits emphasis on the break out of "Hands on Modules" which permit "Hands on Training" which takes us into our next example, namely:

Improved Use of "Hands On" Training Techniques

Briefly speaking, "Hands On" training simply means training conducted using equipment installed solely for instructional purposes. We feel that although training exercises in a working office, whether lightly loaded or not, will provide valuable instruction to the student, they also may inadvertently adversely affect customer service. Therefore, we have installed a complete electronic central office in Columbus, Ohio, which is totally dedicated to training needs. This will permit a student to learn how to clear real trouble in a real office under heavy load conditions, while at the same time not penalizing the customer as one might if operational electronic central offices connected to subscriber lines were used for training purposes. Although cost prohibits establishing this type of training facility in each operating company, we do have plans in the mill to have similar training facilities on a regional basis in Chicago, Denver, Dallas, and Atlanta, in addition to the Columbus location.

I mentioned earlier that our estimated costs for ESS training alone in the period 1970-1973 were originally estimated to be 54 million. However, with the modular concept and "hands on" approach we can reduce the figure to $41 million. This economy will be the result of shortening the length of courses and the efficiencies brought about by making men more productive earlier in the game through the modular and "hands on" approaches.

Centralization of ESS Maintenance

Now a word about concentrating high level technical skills in centralized work locations. One of the interesting aspects of the Electronic Office is our ability to centralize our maintenance effort for a number of offices in one location.

We have found that when our electronic switching systems are performing as designed, the maintenance effort needed is extremely low, much less than that for any electromechanical machine of comparable size and features.

However, when the equipment is not performing as designed and is in need of repair, we found in our original installations that the maintenance force was sometimes slow to react to signs of trouble and needed help to find certain types of trouble.

One of the primary causes of this situation is the limited opportunity for ESS switchmen to obtain practical experience in complex trouble analysis because of the normal low incidence of trouble.

Therefore, we have established Technical Assistance Centers, more commonly known as TAC Centers to resolve this problem.

Under this concept higher skilled craft personnel are located in a centralized point and serve as a maintenance control center for several remotely located electronic central offices.

The TAC Center is a location at which all testing and analysis functions for ESS type switching machines are performed. It is manned by skilled craftsmen who in effect supervise the machines' call handling abilities and locate hard to find trouble. These personnel then direct the semi-skilled craftsmen located at the distant switching machines who in turn perform tasks requiring physical contact with the equipment.

This approach means that our training efforts are not scattered throughout the force, but concentrated in a relatively small group of craftsmen who become experts in the highly technical aspects of this new switching system. In this way significant increases in manpower utilization are achieved.

These highly skilled craftsmen in the TAC locations do complex trouble analysis for all ESS offices in their area of responsibility by means of a remote maintenance teletypewriter which is in operation 24 hours a day, 7 days a week.

Essentially, this TAC operation enables ESS offices to be operated with a minimum number of "semi-skilled" craftsmen under the direction of highly-skilled craftsmen who are centrally located.

We find that this approach allows for these improvements:

(a) Better use of skills.

(b) Improved service.

(c) Dollar savings.

By the end of this year we expect to have 20 of these centers in operation. This chart reviews the primary functions of a Technical Assistance Center.

And, by doing the foregoing functions, these are the advantages the TAC will provide us.

"Plug In" Circuitry

The advent of "Plug In" circuitry has helped to make it possible to maximize use of our TAC operations. With our "Plug In" circuitry it is possible for a semi-skilled craftsman at a remote location to replace defective equipment by removing the "slide" or "tray" containing the circuitry and replacing it with a new one. For example, let's say a circuit developed trouble. We formerly had, in our electromechanical offices, relays

and switches which were involved in the circuit, and when a change was necessary, the craftsman had to make an adjustment to the existing physical hardware. Now, with "Plug In" circuitry, if the trunk circuit in an electronic office becomes defective it can be "unplugged" and replaced by the semi-skilled craftsman under the direction of the TAC center.

Switching Control Centers

As helpful as they are, however, TAC offices do not permit complete unattendance of local offices. However, we are hard at work on this one and have Switching Control Centers presently being developed which will provide full remote maintenance capabilities. This will be done through the use of telemetry, teletype, and voice communications between our SCC and local office. This approach envisions the use of computer support for trouble analysis and other maintenance activities which will increase the SCC's ability to analyze large volumes of data generated by the local offices and will also facilitate quick response to troubles when they develop. We expect to have our first SCC in operation in Chicago.

ATMS - (Automatic-Transmission Measuring Systems)

I'd like to tell you now about another type of technological development that we feel is a tremendous help to us. And it also ties in with the centralization or consolidation of work operations approach. What I'm speaking of is a procedure that enables us to automatically test trunks between switching offices. Previously, when testing intertoll trunks between offices it was necessary for 2 men to be involved, one at each office, and trunks were tested manually. Perhaps this chart will clarify what I mean. In testing from toll center A to end office B, a man would be needed at each location. A signal would be manually transmitted and readings would be taken. First in one direction, then in the other (A to B, then B to A). Now, with ATMS, our Automatic Transmission Measuring System, this testing is done automatically at a preselected interval, every other day for example. Each trunk is tested both ways between offices A and B, then the trunks between A and C, A and D, A and E are likewise automatically tested.

You can see how this type of operation can save manpower and, because it increases the frequency of testing, it is a significant help in providing improved service by improving our ability to detect and clear trouble before it affects customers.

Another recent development along these same lines in our Centralized Automatic Reporting on Trunks or, and here again is the birth of another one of those acronyms, CAROT. CAROT is quite similar to ATMS.

In fact it is an extension of the ATMS concept. In my previous example the ATMS was located at office A as you will recall. With CAROT the testing is done outside of the office at a centralized point that has access to many offices such as office A. We estimate that 100,000 trunks can be tested with CAROT. This chart shows how CAROT works. CAROT can be staffed to a very large extent by clerical people who feed information to craftsmen as necessary. Our prototype of this device will be in operation this month in California. We can visualize one of these CAROT systems testing trunks for an entire state. What we have done with both of these approaches is to take a routine, time consuming, yet necessary and important work operation which was being performed manually at a high labor rate and, in effect, automate the operation. The result is to reduce cost, while at the same time provide better service through freeing the craftsman to work on trouble clearing operations, rather than performing routing tests. In addition, improved service is provided from the standpoint of reducing the testing interval and thereby detecting trouble conditions more quickly.

Plant Operations Training Center - Atlanta

Much of the foregoing has been related either to the training of craftsmen or some change in their job as a result of technological developments. But I feel I would be remiss if I did not convey to you some of our recent innovations in the area of Management Training. And what I'm speaking of here is not so much the technological end of management training, but the Job Administration aspect. But here again there is a tie-in with technological development, for as our business becomes more intricate and technically complex, our managers must become better administrators, and it is for this purpose of improved job administration that we have established our Bell System Plant Operations Training Center in Atlanta, Georgia. Basically, it is designed for instructing our District Managers on proper administrative techniques. A District Manager, in our business, will supervise approximately 200 craftsmen of the type we have just been discussing. On the average, he is responsible for an investment of about 5 million capital dollars and each year oversees the expenditure of about $3 million in maintenance money.

Courses taught at this school reflect the latest developments in communications technology, administrative technique, and personnel management. While here he is able to acquire "hand on" knowledge of equipment used daily by people he supervises. All

classrooms are equipped with the newest and most versatile training aids as well as special laboratory facilities. The laboratories are designed to simulate, as closely as possible, actual equipment found in the field locations.

Basically, courses taught at the center are designed to train middle management employees on the specifics of job administration. The curriculum is based on a series of six courses:

- General Plant Operations
- Installation Service Operations
- Repair Service Opeperations
- Central Office Maintenance Operations
- Toll Maintenance Operations

and - Outside Plant Operations.

The length of each course is one week and trainees are given precourse and post course assignments which are reviewed by the supervisor. I could go on at greater length about this operation, but I feel this brief description which I have given you serves to emphasize the point, namely, managers must be sure that their management training job administration also keeps pace with the changing needs of running the business brought about by the constantly changing variables such as increasing technology, high labor costs, higher inexperience levels, etc., which I touched on earlier.

Gentlemen, that just about concludes my remarks. I hope that during the course of this talk I have been able to give you a feel for some of the things that we as managers in the Plant Department of the Bell System are doing in the way of changing our training procedures and operating techniques so that we may obtain maximum benefit from today's new technology. This chart briefly summarizes the points I've covered.

As I mentioned earlier, it certainly has been a pleasure for me to be with you today.

If you have any questions on items I've discussed, I'd be pleased to answer them for you.

Thank you.

THE CHALLENGES OF EMERGING

TECHNOLOGICAL CHANGES

MR. PAUL STRASBAUGH
Executive Vice-President
Oklahoma City
Chamber of Commerce

When I was asked to speak at this Clinic on Technical Education, I was very reluctant to do so. For certainty, I am not an expert in this field. However, in my position, I am privileged to witness and to deal with the challenges of technological change as they affect the community and state I work in and serve.

With this in mind, perhaps you will not take my remarks too seriously. I hasten to remind you that someone has to "Sell the Skin." Even with all the advances of technology and the enormous benefits derived, the public at large has not and is not fully sold on the need for technical education. Hence, I feel there remains a great selling job to be done if we are going to develop the manpower resources to operate the emerging technologies and take full advantage of the challenges.

We have the enormous task of understanding the technologies of the present in terms of their impact on our lives. When you contemplate these technologies and the new ones to come, the imagination is taxed beyond comprehension. Few of us stop to realize what has happened in our own lifetime in terms of technological change. If you are like me, I can remember a time when --

1. A telephone was only for the very rich
2. Television was not known (DeForest)
3. Commercial air travel was a dream
4. Air conditioning wasn't a term
5. Electricity was only for lighting and industrial power
6. The Germans had not yet built the Auto Bon - from which comes the super highway system
7. WLW Cincinnati was the only radio station on the air.

During my brief time in Oklahoma, I have seen our State develop technologies--computer--electronic -nuclear--aerospace and others. Governor Hall announced a new technology for Oklahoma--coal gasification. All of us will agree we have come far in developing our technologies, and the future holds untold and incomprehensible opportunities. What then are the challenges? For most of my adult life, I have dealt with the users of technology--business, industry, and the professions. In the course of these years, I have come to realize the biggest challenge is the development of manpower resource to operate the technologies and maintain them. The basic problem is the motivation of our youth toward these disciplines as their life occupation and to become good at it. Here I think is where we are falling down on the challenge of technological change. One could point the finger at any one of the responsible groups--parents, counselors, school administrators, industry, etc. However, I feel that society, as a whole, is to blame. We have failed to give the technician proper recognition for his role in society. Why, for example, would a young man or lady prefer to be a college dropout rather than a health technician, electronic technician, marketing, business and office technician, agriculture technician, or a community service technician?

Perhaps it should be a requirement of society to be familiar with career opportunities for the technician so we can be in better position to motivate young people and, at the same time, give stronger support to technical education. I examined a number of career areas, but we have only enough time to examine two of them this morning.

AGRICULTURE

While farm employment is now less than 6,000,000, another 16 million Americans are employed in farm-related jobs--food processing, transporting, marketing, chemical and machinery. There is new technology at all stages, including super-sized railroad cars; unit

trains; bulk shipments; computerized operations; a whole new approach to storing, wholesaling and retailing, and improved packaging of the products of agriculture. So it is apparent that today "agriculture means more than farming." It means all the fields which make up the support force for production and distribution of food and fiber. The American farmer is still the key element in our society, but he needs an ever-increasing amount of support from the technical and scientific disciplines in order to maintain his high level of productivity. Growing numbers of technicians are finding employment in all phases of agriculture and more opportunities appear daily.

I am convinced that in the next three decades we can expect an enormous surge of growth in rural America--the economic potential for building the communities of tomorrow is there today. In addition, many Americans are finding the congestion and pollution of the cities incentives enough to revise centuries of rural to urban migration.

The time is right to initiate, through technical and scientific competence, a strategic use of the nation's land resources. The space, the raw materials, the health environment and the technology of planning and development are all present in today's countryside. This is the living, working and growing space for another 100 million Americans by the year 2000.

HEALTH TECHNICIANS

In 1900, for every physician there were less than two other health workers. Today, there are 12 and the ratio is increasing. The situation is less dramatic with dentists and nurses, but the trend is in the same direction.

Health technologists and technicians are the people who have the skills and who will be needed in greater numbers to meet the demand for services. They are allied health personnel who perform diagnostic lab tests, take x-rays, assist patients with therapeutic and rehabilitative activities, monitor life-preserving equipment and provide many other supportive services that contribute to the prevention of illness and care for those who are stricken with disease or other conditions which prevent them from functioning at their fullest capability.

Employment opportunities for health technicians are expanding at a phenomenal rate. Between 1950 and 1967, the number of workers in the allied health category almost

tripled and amounted to 19% of the labor force in all health occupations. By 1980 it is estimated that more than one million people will be working in allied health occupations. This will represent 63% more people in these occupations than there were in 1967. In spite of this anticipated increase in number of people employed, the shortage of people with adequate training in these categories is expected to persist. Therefore, the present plentiful opportunities for qualified people in the many health technician categories will continue for some time to come.

The great urgency for a significant increase in the number of qualified personnel to provide health care and environmental health services can be attributed to four principal socioeconomic reasons:

1. Rapid growth of population and the changes in its demographic characteristics.
2. Development of knowledge in the health sciences and technologies.
3. Changes in sources and methods of payment for health care.
4. Change in social values.

I chose these two career area illustrations because of their particular application to Oklahoma. You know of many more, and the list is growing along with the growth of technology. In summary, I would like to offer the following challenges.

1. Can the public develop a general knowledge and appreciation for the changes that are being made daily in their lives and the lives of their children by technological advance?
2. Can all concerned better motivate our young people to accept training in these vital career opportunities as a means of advancing their contribution to mankind and for their own personal advancement?
3. Are we willing to make the necessary investment in our technical institutes to meet the challenges of these emerging technological changes?

PROGRAMS

FOR TECHNICIANS IN PHYSICAL

SCIENCE AND ENGINEERING

DR. AL PHILIPS, President
Tulsa Junior College
Tulsa, Oklahoma

Whether programs for technicians are offered in the areas of physical science and engineering or in any other area requiring a high concentration of technical skills, the methods of program selection and program development are most important. If the selection process does not produce an accurate priority list of programs based on labor needs of industry within the service area of the institution offering the training, problems can be anticipated. Once programs are selected, the development process is equally important so each program produces a human product capable of functioning effectively at a high skill level.

While the following list of programs is not great, it does include a variety of industry-related technician programs in the physical science and engineering area at the two-year level.

1. Electro-mechanical
2. Mechanical
3. Electronics
4. Instrumentation

5. Drafting & Design
6. Architectural
7. Chemical
8. Radioactive Isotope
9. Civil
10. Undersea Technology
11. Computer Programmer

Numbers of others and often "hybrids" or variations of combinations offer possibilities since acquisition of more than one skill in a program often assures greater opportunity for employment.

Again, it cannot be overemphasized that proper program selection for a given area and school, and sound program development are essential for successful operation.

Let us now examine the matter of program selection. The objective is to determine a list of appropriate programs. A successful program in one place may be a "loser" in another, or it can be very successful if the need for skill-practitioner it can produce is present. Training a product for export to some place where he can apply his skills is a dubious practice, generally; and planning and generating a local market because the program exists is also highly questionable. Programs develop hand in hand with industry and the product market must be available.

In developing a priority list, the training institution must determine the local labor or skill shortages. Generally, there are two major sources of information: labor market studies available for the region or the local area, and first-hand information from industry itself. Both sources should be examined since study data may not be current and may not always be entirely accurate. An added informational source, if an urban area is concerned, is to evaluate on a continuing basis advertising in the employment section of metropolitan newspapers.

The use of an advisory committee system is a necessity to determine first-hand information from industry itself. There is a great value in using a two-level or split-level approach where persons with responsibility for employment or staffing and administrative personnel at different levels are brought together as a master advisory committee for matters of program selection and broad program development. Practitioners in the training area, then, form the nucleus of the program development committee.

The value of these groups extend beyond program selection and development, however, in that they form a bridge or line of direct communication between industry and education and also provide significant employment contact. The public relations aspect is excellent since industry knows what education is doing. In essence, education has made a partner of industry in this venture. It should be emphasized that the partnership is just what the name implies, and education does not relinquish its responsibility for operation in any way.

Of course, there are some other factors in program selection from the school's side. Feasibility of a program in terms of money, available space and facilities, and program philosophy is vital, too, since all programs operated must be held in equal esteem by the school.

Eventually, of course, the selection of every program must be evaluated in the light of meeting industry and student needs. Poor selections should be converted or dropped.

Moving along to the matter of program development, once selection has been made, it is imperative that every program really "produce" a person who can effectively perform at the skill level for which he is trained.

The program development advisory committee comes into action along with the master advisory committee, and the program structure is designed. A logical step-development would be as follows:

1. With the master advisory committee, examine the selected programs, if this has not been done earlier, and divide them into groups by like occupations or like industries.
2. With the program advisory committee, develop the curriculum through identification of job activities and necessary knowledge and skills to perform these activities. In addition, the amount of training necessary for job entry should be determined at this point.
3. Utilizing the advice of the committees, the school staff should develop a tentative curriculum.
4. The program advisory committee should evaluate this curriculum and a consensus of opinion should be attained.
5. Staff and both advisory committees should address themselves to instructor qualifications and recruitment of an instructor.
6. Hire instructor and implement the program.

As the program operates, it is imperative that constant evaluation take place. The instructor, staff, and committees must continually examine the pilot program and suggest revisions. This is normal and should not cause institutional concern. If more programs were constantly evaluated in terms of objectives to be achieved, accountability could be greatly enhanced.

At this point, examination of a specific program configuration is appropriate for illustration. Attached is a curriculum design pattern of the program in industrial technology conducted at Tulsa Junior College, in Tulsa, Oklahoma. The first year curriculum is made up of courses comprising skills common to an Electromechancial Technician, Electronics Technician, and an Instrumentation Technician. Following the first year, the student can elect one of the three option areas. Following the second year, he is ready for employment in his area of specialty in industry. The training "ladder" is further enhanced by the fact that a student may go from industry on to a baccalaureate degree in technology, or he may go directly on from his second year to his third and fourth years. Upon graduation, he may return (or go) to industry or teaching.

Such a program encourages students to reach their optimum in terms of interest, talents, and values in an integrated step process.

In summary, it would be appropriate to emphasize the following points:

1. In technician program development in the physical sciences and engineering, it is unwise to attempt to "out academize" traditional academic programs. The program objective is always to produce capable people able to obtain and hold jobs in their area of proficiency.
2. Emphasize a step approach to curriculum development:
   (1) Develop the basic core of applied skills to do the job.
   (2) Develop the support skills which relate the the applied skills (mathematics and basic physical sciences).
   (3) Develop general skills.
3. Do not overemphasize general skill development to the detriment of applied skills. The student must perform successfully at job entry or the entire program will founder.
4. Avoid over utilization of traditional academic courses. Teacher philosophy is most important, and general courses should not become "wash out" devices.

5. Wherever possible, develop a core curricula for skills common among several programs. The option of second year program choice can reduce attrition and build student morale.

6. Encourage the development of the "ladder" curricula so the doors to further professional achievement are not closed.

Society is often blessed with an overabundance of highly educated people who do not possess skills which society needs and is willing to pay for. Good technician training programs produce a product whose talents and skills are usually in great demand. It is important that these kinds of programs flourish.

PROGRAMS FOR TECHNICIANS

IN AGRICULTURE AND

NATURAL RESOURCES

HOWARD SIDNEY, Chairman
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The theme of this clinic, "Emerging Technologies, Applications for Tomorrow," is most appropriate in view of technological developments in the last decade and new programs needed in the 70's. We have:

. . . An affluent society with a high level of personal income

. . . Widespread use and acceptance of all kinds of mechanical gadgets and toys

. . . Relatively high unemployment, especially of unskilled and (in some cases) professional workers

. . . An awareness of the acute need for reclamation and wise use of water, air, land, and natural resources

. . . A shortage of workers with technical training to perform the necessary jobs to keep many of our services functioning smoothly and to the capacity required by our highly industrialized society which is growing in population but limited in natural resources.

The shortage of technicians and occupationally-oriented workers is the result of invalid attitudes and values on the part of many of our students, parents, and educators toward an education to prepare students for job entry and occupational competency. We must make every possible effort to implement and revise programs to train technicians with vision for future employment. Thus, graduates from technical programs will be able to apply their knowledge and skills in the emerging technologies.

THE AGRICULTURAL INDUSTRY

The agricultural industry--encompassing production, services required by the production segment, processing and distribution of agricultural products and related activities is, in total, the largest industry in the country--directly employing approximately 1/3 of the nation's work force and affecting the welfare of all Americans. Some understanding of the complex, interrelated business activities and changes in process is basic to the consideration of programs needed for technicians in agriculture and natural resources.

About 3.2 million persons were employed in farming in 1970. If projections of population growth materialize, farm employment in production will be about 3.6 million workers in 1980. Of this number, 2.6 million will be operators and families, and 1.0 million will be hired workers.

The overall need for farm labor will be somewhat less in years ahead, but farm operators and workers will need higher levels of training.

From 1960 to 1970 there was a 26% decline in farm numbers in the country, and at the same time, a 29% increase in the average size of farms. Some people erroneously interpret the decrease in the number of farms to mean a declining industry. Fortunately for us, the case is the opposite.

It is apparent that this trend will continue, with farms growing in size and decreasing in number. We will continue to need more operators and skilled workers, and there will be less demand for laborers.

Who will operate our food and fiber production plants and the farms of America? What education and training will the operators and managers need?

The average age of the farm operator and owner in the country today is in the 50's. Simple mathematics reveals that thousands of replacements will be needed in the immediate years ahead. The industry is characterized by increasing mechanization, more automation, sophistication of equipment, higher capitalization, and decreasing numbers

of jobs for the unskilled. A technical education is a necessity for a larger proportion of the work force in this business.

As the agricultural industry continues to shift from a labor intensive business, the image of the farmer is evolving from that of a laborer to that of a competent, technically trained manager. Even though the agricultural production segment is still composed largely of family-owned farm businesses, traditional operations have changed completely, requiring an increasing number of middle manpower employees. These are the owners, operators, and managers who have a technical training and who are management oriented. Usually this training is obtained in the post secondary institution. This will be even more true in the future.

PROCESSING AGRICULTURAL PRODUCTS

Today the agricultural processing and marketing industry is one of the fastest growing in the agri-industry complex. The number of workers engaged in the processing and distribution of farm-originated products grew from 10.1 million in 1950 to 10.7 million in 1964.

Some examples of growth are found in meat processing, in canning and packing plants, and in feed and grain handling and processing. The food business alone in this country in 1968 was a 90 billion dollar business with the farm value in sales of 30 billion.

ENVIRONMENT

Man is becoming increasingly concerned about his environment. Natural resources are limited and must be conserved and used wisely. Jobs related to air and water pollution, land use, public recreation, wildlife management, park beautification have become identified as essential services and are now accepted as necessities.

New programs for technicians in agriculture and natural resources must be developed, and existing programs expanded if we are to have knowledgeable, competent technicians to manage our lands, our food processing, and the new technologies which are emerging.

THE AGRICULTURAL TECHNICIAN

Advancement in technologies in agriculture necessitates the application of highly sophisticated techniques, as well as scientific and technological knowledge to the area of specialization.

Management plays an increasingly important role. The use of data processing with respect to new systems of farm records and accounts and the use of computers in animal breeding, plant breeding, and genetics are some examples of new developments in use in agriculture.

Agricultural enterprises control vast acreages of land, large machines, complicated equipment, and high investments in livestock and supplies totaling a larger capital investment per worker than in most other major enterprises. Many believe that technological development has only just begun in agriculture and that the whole industry in production, processing, and marketing will see many changes within the next decade. These factors all point to the imperative need for highly-skilled and technically-trained workers and supporting personnel to maintain the agricultural industry for a growing American population.

The agricultural technicians are found on contemporary farms and on new farms emerging from our fresh waters, oceans, and other than the traditional in processing, manufacturing, agricultural engineers, chemists--to develop and use our insecticides, pesticides, and the whole problem of disposal of waste, and as part of the research teams working with our scientists and teachers.

TYPES OF JOBS PERFORMED

There are jobs for agricultural technicians in the same types of activities you will find in other technologies. The technicians are needed to work with the scientists and professionals in research, in the development of new products, in engineering as applied to equipment, and in all problems associated with agriculture. Technicians are needed in production, in the business of farming, and in the processing of the agricultural products.

Today this goes beyond the production farmer, since we are much more aware of the conservation of our soils, forests, grasslands, waters, wildlife, and natural resources. The servicing of the machinery and equipment in the production of foods and fiber and the processing and sales requires many technicians. The sale of feeds, seeds, fertilizer, pesticides--all require competent personnel with technical know-how.

We find agricultural technicians working as members of our scientific teams--in research--in the production of our food and fiber--and in supervisory positions.

TRAINING AGRICULTURAL TECHNICIANS

It may be more difficult to discover the educational experiences needed for the technician in agriculture than for the technician in industrial production. We do have some large corporation farm operations where specific scientific and technical jobs are easily identified. Even though farms are increasing in size, the owner is usually the manager and operator of the business. This is true with livestock farms, orchards, forest and greenhouse businesses, nurseries and other production units. These operators and owners must be highly trained in technical competencies, as well as being capable business managers.

This level of responsibility requires a technical background in order that the individual have a complete understanding of scientific directions--how to use consultant services, how to secure and use the latest research available, and how to use marketing services.

The nature of the education needed for technicians for the emerging jobs in natural resources can be discovered by working with advisory committees made up of laymen who understand the tasks and the work the technicians will perform.

PROGRAMS FOR TECHNICIANS

Programs for technicians in agriculture have evolved in a few states over the past 50 years. These curricula had been developed earlier and were largely for production farming and were focused mostly on the livestock industry. Many post secondary institutions retain these curricula offerings and course names which have been used for many years. A review of the catalogs, however, would show that the content of the courses has been almost completely changed over the past few years to keep pace with the needs of the modern agricultural technician.

New curricula have been initiated in the last decade. Others are being planned, and there is an opportunity and a need for educators to develop programs for technicians in new areas of employment.

For the purpose of classification, programs for technicians in agriculture and natural resources will be grouped, in this paper, in the areas of:

Production

Services to Producers

Processing, Distribution, Agri-Business

Natural Resources.

The course content of some of the curricula will overlap these classifications. Many of our florist and greenhouse businesses are family owned and operated similar to stock and crop farms. In this type of an operational arrangement, the producer or florist frequently operates a florist shop and is in the business of processing and distribution of his product as well as in the production business.

CURRICULA FOR AGRICULTURAL PRODUCTION TECHNICIANS

1. Livestock Production Technician

   To prepare the individual who breeds, raises, manages, and markets beef cattle, sheep, and swine.

2. Dairy Production Technician

   The individual who operates a business to breed and raise dairy cattle for the production of milk and milk products. He is usually the operator and manager of a total farm operation in growing crops to support the dairy, as well as the dairy cattle.

3. Poultry Production Technician

   The individual who breeds and raises chickens, turkeys, geese, or ducks for the production of eggs and/or meat.

4. The Horse Industry Technician

   The individual who breeds and raises horses for riding, recreation, races, shows, and other purposes. He is usually in the business of marketing horses.

5. Farm Crop Production Technician

   The farmer who plants, cultivates, cares for, harvests, and markets field crops--such as grains, cotton, or forage crops.

6. Orchard and Vineyard Technicians

   Propagates, cultivates, prunes, cares for, harvests, and markets fruits, nuts, and berries.

7. Floriculture Technician

   Produces and markets flowers and related crops. May be employed by a nursery, greenhouse, garden center, or flower shop.

8. Nursery Operation Technician

   Propagates, raises, cares for and markets shrubs, bushes, hedges, plants.

9. Turfgrass Management Technician

   Selects, propagates, and cares for grasses--in lawns, shaded areas, golf courses, parks, and playgrounds.

10. Forestry Technician

    Cares for, protects, manages, harvests, and replants forests to provide both forest products and recreational resources.

11. Ocean Fishing Technician

    Discovers, catches, stores, preserves, processes and markets fish and other marine creatures.

12. Fish Culture Technician

    One who produces fish for game or food. May be in the business of hatching fish eggs to raise or stock fish supplies.

SERVICES TO PRODUCTION TECHNOLOGISTS

1. Laboratory Animal Care Technician

   Breeds, raises, cares for, and handles biological research animals. Assists in the care and treatment of pets and other animals.

2. Agricultural Business Technician

   The individual who provides farmers with financial credit, power, fuel, transportation services, and other farm supply services.

3. Agricultural Chemicals Technician

   Supplies farmers with agricultural chemicals such as fertilizers, pest and disease controllers, growth regulators.

4. Agricultural Equipment Technician

   Sells, assembles, operates, and maintains agricultural and farm equipment.

5. Grain, Feed, Seed, and Farm Supply Technician

   Buys grain to convert to feed. Supplies farmers with feed. Operates grain elevators and feed supply branches.

FOOD AND FIBER PROCESSING

1. Forest Products Technician

   Involved in the economical production of products derived from wood, such as lumber, pulp and paper, and specialized building materials.

2. Ocean Fishing Technician

   Frequently works in related on-shore jobs such as fish processing plants and fishing supply businesses.

3. Food Processing Technician

   Employed as laboratory assistants in research, testing laboratories, grading and inspection, affiliated with manufacturers of farm supplies, or in canning, freezing, and preserving foods..

NATURAL RESOURCES

1. Soil Reclamation and Conservation Technician

   Works to preserve soil. Develops and applies methods and techniques to prevent soil erosion and to improve quality of soil.

2. Arboriculture Technician

   Scientifically selects, plants, feeds, and cares for trees on private and public lands.

3. Landscape Development Technician

   Scientifically uses grass, trees, flowers, shrubs, stones and fences and other materials to beautify private and public lands.

4. Wildlife and Conservation Technician

   Studies, protects, controls, and manages and promotes the conservation and use of wild plant and animal life.

5. Park and Recreation Land Management Technician

   Supervises outdoor recreational areas and facilities in public and private parks, forests, range lands, and other natural resources.

6. Marine Life Technician

   Does research on ocean life, including fish and marine plants and seaweed.

7. Urban Planning Technician

   Is involved in the research and assists professional planners in the development of desirable urban growth patterns.

8. Water and Waste Water Technician

   Works to provide municipalities with large amounts of pure water and intelligent disposal of waste waters.

CRITERIA FOR TECHNICAL EDUCATION

The suggested guide for this purpose, published by the U.S. Office of Education in 1968, is recommended for your reading.

The basic principles for identification of a technology, administration of a technical program, qualifications of the instructional staff, administration, and the elements required to develop a curriculum for technicians is the same for all technologies and is followed in the same manner in agriculture and natural resources as in the other specializations.

RURAL AND URBAN AMERICA

America is a highly industrialized urbanized country--with large concentrations of population in a few major geographic areas. The largest numbers of potential students will be pursuing their secondary education in the urban areas. These young people should have equal opportunity for technical education, and jobs as technicians in one of the many specilizations in agriculture and natural resources.

Many of these young people can have a bright future working in an outdoor occupation--

. . . or being associated with plants and animals

. . . or assisting in the production of food

. . . or having a part in making America beautiful

. . . or securing a job in one of our parks, recreations centers,

. . . or working as a research assistant in discovering the "new" for America.

A broadening of programs for technicians in agriculture and natural resources can offer a greater diversity and an open door for many young people to make a satisfying and worthwhile contribution as successfully employed technicians in one of the many existing or emerging programs.

SUMMARY

A recent study, completed by the Department of Agricultural Education at Ohio State University, showed that as of November, 1970, there were 326 institutions in the country offering post secondary education programs in agriculture and natural resources. The following table shows the development of programs since 1966.

	66-67	67-68	68-69	Estimated 69-70
No. Institutions Offering	142	197	243	(290)
No. Curriculums Offered	385	500	608	(700)
No. Full-Time Faculty Teaching	393	527	716	(825)
No. Part-Time Faculty Teaching	444	579	743	(860)
No. Students Enrolled	10,290	13,786	18,434	(21,500)

The number of students enrolled in the programs has doubled in the last four years.

With changes in our farms and technologies, agriculture in its broader sense has taken on new meaning. Many new jobs have evolved in areas such as agri-business, food technology, wildlife, conservation, international agriculture, and environmental improvement and recreation.

Educators contemplating the addition of a Department of Agriculture and Natural Resources should take note of the many considerations involved. Even though there are many new curriculum possibilities, not every post secondary institution should attempt to assemble too wide a variety of programs. In some states or regions, it may be best to establish certain curriculums for particular schools and allow students to move freely from one area to another.

Post secondary, less than a baccalaureate level, occupationally and technically oriented--comprises the fastest growing segment of education in America today. Agriculture has shared in this development in terms of ecological, natural resource, and applied biological science programs and in the production related offerings.

In view of the millions of people employed in agriculture and natural resource occupations (or closely related areas) we are failing to meet the demands of the labor market. The future is already here as far as the need for graduates from technical programs in these specializations is concerned. We are aware of the many job opportunities in emerging technologies listed. In discussing the current job market with individuals heading these programs, it is apparent that there are going to be many more job openings in 1971 for technicians in agriculture and natural resources than we can fill.

A healthy business environment in this country is dependent upon having qualified, knowledgeable, trained workers for all occupations.

On behalf of the educators in the post secondary institutions in agriculture and natural resources, we are delighted to have been included in the National Clinic on Technical Education in 1971.

TECHNICAL PROGRAMS
IN ALLIED HEALTH

WILLIAM F. SANDS
Program Officer For
Allied Health, Vocational and Technical
Education, Program Officer
Region 6, Dallas, Texas

Presidents Nixon, Johnson and Kennedy have all declared that the good health of every individual citizen in this country is his inherent right. Mr. Nixon has recently stated flatly, "... the time has come in America when the same kind of concentrated effort that split the atom and took man to the moon should be turned toward conquering (cancer and other dread diseases)." He and the Congress have set a very high priority on the training of health manpower at all levels. Health manpower shortages are staggering now. With the advent of universal health care legislation, we will never catch up with the need until everyone in education recognizes his responsibility to produce the trained manpower we need. I am not going to give you figures of shortages because most of them are national and unreliable because of the rapid changes being made in health care and health care delivery systems. To determine the needs in your own state or local area, your advisory committees and State Supervisors of Health Occupations Education will work with you and are an excellent source of local information on needs.

The right of an individual to the best possible health care is as old as mankind. Somehow we got away from that concept in years past, but now the United States is one of the very last civilized nations not to have developed some kind of system to take care of the health of all of its citizens.

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1. The first known picture of a doctor was drawn over 20,000 years ago on the walls of a cave in southern France.
2. Trephining in Peru as it was performed several thousand years B.C. It was relatively common in many countries where there was a complex society. Supposedly to let out "evil spirits," medical anthropologists now feel that it was done to relieve the pressures of tumors and blood clots. These operations were quite successful. There is considerable evidence that many patients survived because their skulls had healed over. Note the specialized tools used by the physician.
3. Hippocrates, the father of modern medicine, believed that the doctor needed to see and feel the patient to diagnose his disease. Dreams, incantations, etc. were not enough. His rules and philosophy for the practice of medicine are still used by the modern doctor.
4. In Rome, medicine developed to a very high level, and trained medical assistants served in Ceasar's Legions. They are still known in the new European medical system as Feldschers. They worked independently of the physician and did everything that their skill and training permitted them to do. Only the most serious injuries were treated by the physician.
5. Among our own Indians, the medicine man was one of the most powerful members of the tribe; his healing powers were great and his knowledge of herbal and semi-scientific medicine was large. Medicine men and Curanderos--the Mexican Indian equivalent--are now being trained in scientific medicine by the Public Health Service.
6. Leonardo da Vinci and others, including the great anatomist Vesalius, began the real study of scientific medicine. Vesalius, who is shown here, did his greatest work around 1550. Scientific medicine is a relatively young profession, but it has led the way for many of the other sciences.
7. Until World War I, hospitals like the medieval hospitals in France, were places to die. Tender loving care would be given, but surgery and medicine, while sometimes good, had advanced very slowly until the great physicians of the late 19th and early 20th century began to study medicine scientifically and seriously.

8. But until our own lifetime, the medical relationship was still one of direct contact between physician and patient, with the nurse as his only helper.
9. The stimulus of World War II, the beginnings of the jet age, and the arrival of our scientific revolution saw the antibiotics developed, and new and complex relationships of all kinds between medicine and non-medical scientific fields. Physicians and engineers combined their knowledge to study blood hydraulics, the physics of muscular movement, and the invention of complex instruments to take care of patients. New sub-groups of trained specialists evolved. There are now about 300 recognized subspecialties in the health field, and each year because of technical necessity the need for new kinds of specialists grows.
10. In order to accomplish the new and near miraculous medical, surgical ways of curing and caring for people, today's world needs a highly technical back-up both in trained people to operate the complex instruments that are needed and to maintain them. For example, there is the heart that was transplanted several years ago at Southwestern Medical School in Dallas.
11. It was the instrument used to keep the blood oxygenated and circulating while the heart is out of the body. It is, in fact, an artificial heart.
12. Here is some of the support instrumentation.
13. At the operating table, any failure of these complex instruments will cause death.
14. And more electronic instruments outside the operating room.
15. This is the physician's personal laboratory, but he can't work alone.
16. His team consists of about 40 highly skilled and highly technically trained support personnel of all kinds.
17. Really sick patients are cared for in intensive care units, trauma rooms, recovery rooms, and coronary care units like this. The counters you see here in the Presbyterian Hospital Intensive Care Unit are all highly complex monitoring units.
18. Here the doctors and nurse can watch the patient carefully for even slight changes in vital signs that may be critical.
19. The patient is connected to sensors and automatic laboratory analyzers that are now being computerized so that diagnosis and treatment can be started as soon as anticipated changes take place.
20. Another type of intensive care unit.

21. There is the intensive care unit at Parkland Hospital in Dallas. It is one of the best in the nation. The teamwork of many different kinds of technicians is needed here for the patient's care.
22. Radiologic technicians are needed to operate x-ray units.
23. Medical laboratory technicians are also badly needed and in short supply.
24. Yet 40% of health industry dollars are spent for information handling tasks.
25. Maximum use is not being made of the specialized medical training of many health workers. Too much of their time is spent on information gathering chores rather than on patient care.
26. Hospital administration is increasing rapidly, and even the nurse must be trained as a technician in many fields including computer programming and data processing.
27. There is a laboratory technician doing automated analysis on an IBM technician.
28. They have heart models constructed by a computer for research and teaching purposes.
29. Computers today interrelate virtually every department in a modern hospital.
30. Patients' beds are mechanized. Draperies can be drawn, TV's controlled, beds made to conform to almost any position, and the nurse called automatically by the patient with this small bedside unit.
31. Hospital lighting has become a science.
32. And the equipment that surrounds the patient has become specialized and technical.
33. As new techniques are developed, hospitals must increase their functions as teaching centers, and technicians are needed to run and repair instruments as mundane but important as movie projectors, too.
34. In the dental field the same problem exists. Dental technicians and laboratory technicians are in very short supply.
35. Procedures are becoming more and more complex, and trained people are needed who know how to maintain and use these sometimes dangerous instruments.
36. If you as Technical Educators still feel that this is not part of your responsibility, let's look at some startling figures that have been receiving increasing publicity. Ralph Nader, among others, has taken up this crusade.

37. There aren't enough people right now who can either operate or maintain these complex instruments properly. Suppose one of these statistics had been your mother, or your daughter, or your wife--or yourself.

38. In civilian life, we are trying to prepare the kind of technicians we are so short of, but not nearly enough are being trained. Most operators today are inadequately prepared, and noted maintenance men are almost impossible to find. Let me show you part of the 25-week course the Air Force has put together to train their technicians. The following pictures are part of their biomedical technician training program. They are doing something about the shortage. Even a dental chair is a complex mechanism.

39. Here is a dental engine being repaired.

40. It is an integral part of this dental operating system.

41. The casting machine is used in the dental laboratory.

42. The x-ray unit in this system is tied with an image intensifier and closed-circuit television so that many people can see what the x-ray machine sees.

43. Here is a tissue processor.

44. An autoanalyzer for laboratory use.

45. A constant temperature device.

46. A spectrophotometer for analyzing gases.

47. A new, transistorized spectrophotometer.

48. A hydrotherapy unit for physical therapy.

49. An ultrasonic therapy unit for the treatment of deep muscles.

50. Incubators and isolettes for premature and ill infants.

51. A respirator unit. Incidentally, most of these instruments will be available to you for training purposes within the next few months, as soon as excess property becomes available to vocational programs. Don't ask for it yet, though. Final arrangements haven't been made, and there is no authority yet for processing it. Utilization of excess property, when it does become available, may be the key to setting up your programs.

52. Respirator and resuscitator repair department.

53. Anesthesia equipment repair and maintenance.

54. But hospitals aren't the only place technicians are needed.

55. Our waters are polluted to the point where it is dangerous to to eat fish. The oysters and fish at the mouths of our great rivers and in our industrialized bays are already inedible because of industrial waste poisoning and hepatitis that stems from raw human sewage disposal.

56. We need technicians to eradicate the breeding places of disease carriers.

57. Our great technology has spawned industrial and civic trash heaps that need trained technicians to solve and clean up for us before they kill us.

58. This is a fine breeding and feeding place for rats and other vermin--an eyesore and a safety hazard.

59. And we need them to clean up the air. There is a carbon black--a potential cancer-producing petrochemical--which is produced in an isolated area of Texas. This picture was taken in Oklahoma. Often the smoke drifts as far as Kansas.

60. The health of our children now and in the future is at stake. We're not nearly keeping up with our present problems. How are you going to cope with the violent upheaval of scientific change that will come with the space age and help deliver the President's promise to the nation to ensure that the increasingly complex instrumentation needed to prevent disease and maintain health are properly utilized and maintained so that the finest health care will be available to every citizen of the United States--wherever he may be.

THE THUNDER OF BARE FEET
"The Cooperative Education Program of the Texas Construction Industry"

DR. WALTER KERR
Executive Vice-President,
Construction Industry Council for Education, Manpower and Research
Tyler, Texas

The Marathon has become the symbol of the Olympics, and for good reason--a race of over twenty-six grueling miles. All events in the Olympics are difficult and most commendable, but those who participate in the Olympics themselves have designated the Marathon as the supreme test. It takes superb training for an entire lifetime--never breaking training for one day, and, then, during the race itself, it takes an endurance, a determination, that is unbelieveable. Those who know the Marathon say that it takes "heart" as no other event does. For this reason the winner of the gold medal in the Marathon is rightly considered a hero of the Olympics.

When the Olympics met in Rome, all of the boys lined up to make a trial run over part of the course. The judges noticed that one of the boys was without shoes. They determined that the entry was the captain of the Temple Guard in Ethiopia. They called the young man over to them, explained to him that probably running barefoot on the mud flats of Ethiopia would be possible, but that the track in Rome ran up the mountains and over rugged terrain where sharp pieces of flint rock stuck out of the path, sometimes

half-an-inch long. They told him they did not believe it was possible for anyone to run over the track even a few miles barefoot and then be able in a week's time to run the entire course of twenty-six miles.

The judges told the young man they had decided to bring all varieties of track shoes and let him pick out the pair that he would like best, and he could run with them.

The young man listened very courteously until they had finished, and then he said, "I thank you very much. This is the way I run."

As you know, oftentimes a human interest story will become the main thrust of any athletic event. This story became just that for the Rome Olympics. Everybody became quite interested in the young man who was going to run over this type of terrain barefoot, and in the Marathon, at that. By the time the day of the race came, the interest was at fever pitch. Those of you who have seen the Olympics know that in the Marathon they will run one or two laps inside of Olympic Stadium, and, then, run out of the stadium for twenty-six miles, run back in to finish the last two laps before the spectators.

After the runners had left the stadium, the first announcement came that the boy who was running barefoot was still even with the other runners, and the announcement was a matter of surprise. Later another announcement came that he was not only even with them, he seemed to be pulling ahead. With the following announcement, it was learned that he had definitely taken the lead in the race. Before long, the announcement came that the young man who was running barefoot was not only out in front of the other runners, he had a faster record at this stage of the race than any other runner had ever had. From then on the reports began to come in this manner. Not only was the young man running over the terrain, but he was running it faster than anyone had before. By the time he was ready to run into the stadium, everyone was on their feet in anticipation, and, the minute he entered the stadium, the massive crowd in one voice gave him a deafening cheer of appreciation. The spectators could hardly contain themselves. The young man ran the track as though he had been running only a few miles--not twenty-six. With a burst of energy that was amazing, he broke the tape for the world's record in the Marathon.

It goes without saying that he indeed became the hero of the Olympics and was given great credit for his incredible accomplishment. I had the privilege of serving as the chairman of the committee on Friendship and Understanding for the Tokyo Olympics. I was able to watch some of the athletes work out. One day, there were two young

men who sprang out on the track and started running it in a manner that made me hold my breath. Though still in sweat suits, there was such a rhythm, such a coordination, such a speed, such an unleashed power, that I actually stood transfixed until these two boys circled the track and headed back toward me. It was at that time that I noticed that one of the young men was the man who had won the Marathon in Rome. The boy with him was his pacing partner. It was the same young man, but two things were different. This time he was not the captain of the Temple Guard in Ethiopia, he was Minister of Health. This time he was not barefoot, he had on shoes.

I say that in order to say this--the most controlling sound in our world today is the thunder of bare feet.

Bare feet, of course, symbolize the people who have not done quite as well in our world as others. They are the people who, by one standard or another, are short on the material things of this world. Though this measurement would be a matter of degree, nevertheless, they are found in all countries and in all cities. The last thing we would wish to do would be to ignore them, but they could not be ignored even if we tried because the rising thunder of bare feet increasingly shapes every area of our lives. When the historians write the record of our day, it will basically be a review of the reactions and the interactions to the increasing thunder of bare feet.

The world has divided itself basically into two philosophies, and these two philosophies have made it two camps. The communistic, socialistic orientation is nothing more than an organized attempt to deal with the thunder of bare feet. The free world is simply another attempt of dealing with the thunder of bare feet in another way. The politics of this nation and the states of this nation are increasingly motivated by this basic sound.

For a comparison, let me speak of the big house on the hill. This I would like to have represent the people in our world who have done well. Again, who can say by what standards and to what degree? But, nevertheless, there are many who do not fall by any standards in the category of the "have nots." These are the people who basically brought America to where it is. These are the men and women who recognize that a standard of living required adequate production for its people. They are the ones who determine that production can be much greater with adequate tools and with skills to use them. These were the people who helped gather these tools, and, in bringing them together, recognized that it took capital to assemble them. And the great capitalistic system was

born. America does not respect the capitalistic system simply because it is America's. It is respected because it has produced for America as nothing else has. If something else produced better, you can be sure we would be using something else. These men began to point out that it was possible to provide for the necessities of life without keeping our noses to the grindstone, and so, over and above the work necessary to live, came the opportunity for art, for culture, for philosophy, for religion, for leisure and all of the other things that are a part of our American way of life.

Now we are ready to look carefully at our role as educators who have shaped the minds of more people than any other group. How successfully our day and age deals with the thunder of bare feet rests peculiarly in your hands.

Let us glance at history. What usually happens when the thunder of bare feet reaches this proportion? History teaches that it never dies down or goes away simply by being ignored. It also teaches that what usually happens is that the thunder of bare feet grows in intensity until it shakes down the big house on the hill. This lesson is taught over and over again. We are taught that history tends to repeat itself. It is not a certainty that the same outcome might not affect our world.

Let me state the problem simply. How do we quiet the thunder of bare feet and at the same time preserve the big house on the hill? How do we transform the lack of the "have nots" of this nation or this world and still preserve what is fine and worthwhile in our culture and our economy? My friends, let me answer as clearly and as emphatically as possible. The answer is technical-vocational-occupational education that is relevant to the world in which we live and make our living.

Each person must be skilled enough to render enough to receive enough to provide an adequate, respectable living for himself and his loved ones. Each person, employee or employer, must be skilled enough to produce in a manner that will give a profit margin for the enterprise. When these two things come about, the thunder of bare feet in this world will subside, and the standard of living for the big house on the hill will stabilize. In its simplest essence, this is the only way that it can be done, and in its clearest truth, you ladies and gentlemen must take the leadership in providing the skill.

A practical illustration of this is embodied in the cooperative education program of the Texas construction industry. For many years I have been speaking to the students in schools of character development and citizenship responsibility. I was sponsored in many

endeavors by members of the construction industry. Again and again these contractors would say to me, "Point out the opportunity in the construction industry for these young men and women." Finally, I asked the telling question: "If they were interested, do you have places for them?" I was actually shocked to realize that the construction industry was in difficulty because of the lack of qualified manpower. Here was a strange and unbelievable phenomenon. I personally knew hundreds of young men and young women who needed better jobs or even a job at all. And now I realized that I knew hundreds of contractors who would employ them if they were properly trained. After further careful investigation, I found that this was typical of practically every industry in this nation. What a strange impasse this was. What a great possibility for people and their enterprise and what a challenge it presented.

To verify these opinions, we brought together the Plumbing-Heating-Cooling Contractors, the Mechanical Contractors, the American Society of Air Conditioning-Refrigeration Engineers and other cooperating associations in order to make a research of the greatest credibility. We secured the services of A&M University and the University of Texas. The research was divided first into what the needs would be within the next ten year period of time, taking into consideration that we must build another America in the next thirty years. Then all contractors in the state were asked the question of what their working requirement would be in one year, in two, in three, in five and in ten. The results were surprising to them. They were far more in trouble with manpower now than they had assumed. In five years it would be practically impossible for them to proceed with the same pattern, and in ten years there was no chance. With this in mind, we pulled together all of these associations. We formed a special organization to find ways for training an entire industry.

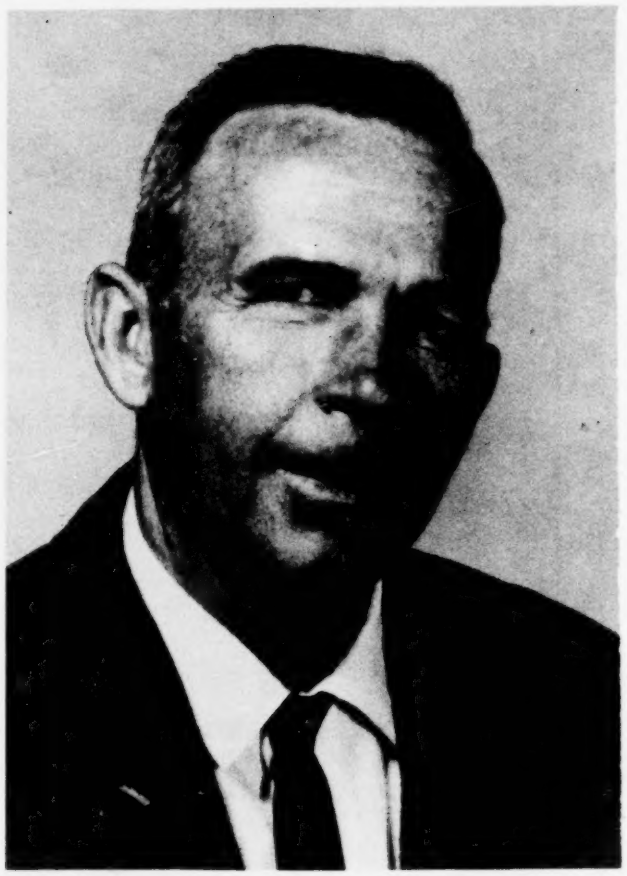
With this research and with this organization, we approached Dr. J. W. Edgar, our distinguished Commissioner of Education for Texas. Dr. Edgar quickly moved forward with the idea, and we found the program being carefully outlined by John R. Guemple, Associate Commissioner for Occupational Education and Technology. The unique thing about his program is that it puts together tried concepts in a new form. The really significant feature of this endeavor is the wide area of industry cooperation. Industry has overcome its fragmentation and set up a special organization to find ways to train an entire industry. Their ability to plan broadly and specifically for the number of employees,

types of employees, skills, guidance of students, part-time training of students and placement of students into employment gave a basis which justified the agency's proceeding on a comprehensive state-wide program.

The term most frequently applied to the endeavor is the "marriage" between industry and education.

Let me return again to our premise. The most important history that will be written in our time will be written by men and women who shape the technical know-how of this generation. It will make a great concept of life greater. It will return capability and dignity to the work of our people. It will make everyone a builder of a greater nation, more capable of sharing properly in what they build. I cannot think of a more challenging and meaningful profession. To me, your work has been elevated from a profession to a calling. I am sure you will accept the challenge! Yours is the privileged opportunity of providing adequacy for lives and greatness for our nation.

CONSTRUCTION INDUSTRY COOPERATIVE EDUCATION PROGRAMS IN TEXAS SECONDARY EDUCATIONAL INSTITUTIONS



W. H. FITZ, Consultant
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The manpower needs of future decades dictate a comprehensive program designed to prepare young people for useful careers in the construction industry. Called "environmental technology," this course includes general teaching of the management, distribution, and service jobs required for mechanical construction.

A shortage of trained manpower is the basic reason for the undertaking of this program. With the United States' population expanding each day, goods and services are growing in demand. Along with these two demands is the one for constructing buildings and other related structures to house these goods and services.

Environmental technology is a vocational-technical pilot program being introduced to a few specific high schools and junior high schools in Texas. If it succeeds, this course will be introduced into other high schools throughout Texas. Top officials in both industry and education have felt a need for a program of this kind for many years, what with industry needing more men and education needing a new vocational format to help students prepare for the specialization and progress being made in construction.

This program in all probability would help to reduce the number of dropouts which has become a major problem both to society as a whole and to the construction industry. A high school diploma or its equivalent is required by the construction industry before a youth can enter an apprentice program. Some statistics highlight the point that much of the potential manpower falls into the ranks of dropouts.

"Of those students currently in high school, only three out of ten will go on to academic college-level work. One-third of those will drop out before getting a baccalaureate degree. That means that eight out of ten present high school students should be getting occupational training of some sort. But only about two of those eight students are, in fact, getting such training. Consequently, half our high school students, a total of approximately 1,500,000 a year, are being offered what amounts to irrelevant, general educational pap."*

The Origination of the Program

Two elements may be said to have caused the evolution of this program:

1. Continuing efforts to attract more men into industry.
2. Shortage of skilled manpower.

In January 1968, the boards of the Association of Plumbing-Heating-Cooling Contractors of Texas and the Mechanical Contractors Association of Texas proposed that a Construction Industry Council for Education, Manpower, and Research be formed to investigate plans for the program.

In June 1968, the two organizations met with the Vocational Education Program Development Division of the Texas Education Agency to work on the project. A council committee was also chosen consisting of one man from the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE); three from the Mechanical Contractors Association of Texas (MCAT); three from the Association of Plumbing Heating Cooling Contractors of Texas (APHCCT); and one from the Wholesale Distributors Association (WDA).

*Career Education Now, An Address by Sidney P. Marland, Jr., U. S. Commissioner of Education, Department of Health, Education, and Welfare, at the 1971 Convention of the National Association of Secondary School Principals, Sam Houston Coliseum, Houston, Texas, Saturday, January 23, 1971.

The Construction Industry Council has been established to bring together the different groups related to the construction industry. The purpose of this council is to get these various interests working together on the development of trained manpower, or, as has been definitely stated in the council by-laws:

1. Its procedure will be to work with the schools to provide vocational and technical education utilized by the industry.

2. It will increase the attractiveness of the industry by improving its public image.

3. The Council will contact the students and their families to advise them of the values of the profession.

4. The Council will work with legislation and appropriation beneficial to the industry.

5. The Council will work to provide adequate trained manpower for industry and also help with character development and citizenship responsibility in the youth of the nation.

Before planning of the project, research was done with assistance from the Texas A&M Engineering School of Extension. Sponsored by the American Society of Heating, Refrigeration, and Air Conditioning Engineers; the Association of Plumbing-Heating-Cooling Contractors of Texas; and the Mechanical Contractors Association of Texas, a questionnaire was drawn up and distributed to state members of these three organizations, as well as to hundreds of independent contractors and suppliers. The responses were correlated, and the evidence showed that there is a definite shortage of manpower and the shortage is accelerating.

ADMINISTRATIVE PERSONNEL (receptionists, purchasing agents, secretaries, typists, bookkeepers, warehousemen, timekeepers, etc.)

1972	UP 15%
1975	UP 35% more
1979	UP 50% more

ENGINEERING PERSONNEL (sale/application engineers, sales/technical representatives, estimators, engineers, service dispatchers, etc.)

1972	UP 30%
1975	UP 50% more
1979	UP 50% more

3729

PRODUCTIVE PERSONNEL (field superintendents, foremen, journeymen plumbers and fitters, air-conditioning mechanics, welders, sheet metal mechanics, controlmen, equipment operators, etc.)

1972	UP 15%
1975	UP 40% more
1979	UP 65% more

The response rate was much greater than expected--being 10% or about ten times what researchers had expected.

School districts were also studied to determine where was the greatest need for plumbing and mechanical needs. From these areas, the pilot schools were chosen for the 1969-70 school year.

Basic Goals

From this program two basic goals have evolved which the various organizations hope will be accomplished. The first is the plan for a continuous program. After completion of high school and the technical-vocational requirements, the student has many choices from which he can choose. From a high school he can go straight into either employment, an apprentice program, a junior college where he can get an Associate Degree in Technical Management, or a four-year college where he can get a degree in engineering. The final three choices will also lead him back into employment. Throughout his life he can expand his knowledge by going into adult education programs.

The second goal is called industry cooperation. All the facets of the construction industry require basically the same skills and terminology. Educators have named these skills "clusters." The next logical step would be to introduce students to industry as a whole and let the individual choose where he or she should be. As stated a different way--until now the industry has been divided into different components, but with this new program, employees will become "environmental scientists and/or technicians." Also no one phase of industry dominates the education program.

The Program As It Is Today

As has been stated before, the cities and school districts for the first-year pilot program have already been chosen by industry and the Texas Education Agency.

The cities and school districts were chosen on a basis of two concepts. The first was the need for a labor market to absorb the people trained. The second was the concept of "bedroom communities." They are towns which feed manpower to larger cities. Irving is a good example, feeding to Dallas and Fort Worth. Finally, McAllen was chosen just to see if this program would appeal to the Mexican-American population--which it has so far.

These youths, after graduation, would hopefully go straight into employment or an apprentice program. In a few instances, they would be encouraged to attend a junior college.

The success of this program among the students is shown by the fact that 1,003 students were enrolled in Phase I the first year. In the next few years, the number of students is expected to increase rapidly.

The basic structure of the four-year curriculum was established by the Texas Education Agency Program Development team. Briefly, the plans are as follows:

1. In the ninth grade, interested students will get an overall view of the construction industry in the one-unit Environmental Technology course.

2. In the tenth and eleventh grades, the students will attend two- or three-hour lab classes where they will be exposed to plumbing/pipe-fitting, heating/cooling, and sheet metal.

3. In the senior year, the student will attend one-hour labs and work from three to five hours per day in on-the-job training. By this time, according to the State's educational setup, the student should have completed the required courses for graduation and will be free for his elective. At this time, the student will also decide in which route--construction, estimating, or distribution--he is most interested.

The ninth grade course divides the occupations into five headings and further subdivides these giving the students a description of each proposed activity. The division

is as follows:

Construction and Repair Occupations for Environmental Technology

1. Pipe Fitting
2. Plumbing
3. Welding
4. Air Conditioning
5. Heating
6. Climatic Controls
7. Sheet metal
8. Water Control

Distribution Occupations

1. Warehouseman
2. Stockman
3. Counter salesman
4. Outside salesman
5. Buyer
6. Transportation

Office Occupations

1. Secretary
2. Bookkeeper
3. Accountant
4. Timekeeper

Technical Occupations

1. Engineering Aid
2. Draftsman
3. Estimator
4. Technicians

Engineering Occupations

1. Mechanical Engineer
2. Civil Engineer
3. Electrical Engineer
4. Agricultural Engineer
5. Architect

Under each one of these subdivisions is a detailed outline of the occupation including the history, skills, physical requirements, employment opportunities, prevailing wage scales, opportunities for advancement, working conditions, training opportunities, types of equipment used, related physical sciences, related math, and related English.

In order to combat the persistent problem of decreasing interest in school, the method of instruction includes lectures, films, guest speakers, testing, student role playing, field trips, and student reports.

Advisory Committee

An advisory committee from industry has been created in each school district working directly with the school and instructors. This committee assists in providing instructional materials, field trips, lectures, and job placement of students in both the senior year and after graduation.

The Problems

Several problems have been encountered thus far in the program and the future should produce even more. At present, there are not enough adequately trained instructors. Some of the teachers--the more qualified--have come directly from the industrial world. However, this creates a new problem concerning the pay scale. Many individuals related directly with industry are reluctant to become instructors because the amount of money a teacher makes does not equate to the amount he is presently earning.

Another problem is that a change is needed concerning recruiting procedures. Different ideas for solutions have been discussed. One of the major ones is the fact that industry, like any profession today, is specializing. This means that men can be hired to do the jobs without having to take full college engineering courses. So one idea is to devise different, two-year courses in different areas of skilled technicians.

One last controversy arises over the pay scale of Environmental Technology high school graduates in relation to men who have been on the job for a few years. These students should be paid higher than beginning wages because they are trained to a higher level than beginning men who have had no training.

It was inevitable that a program of this sort would need to be introduced. In the State of Texas, labor and education have finally come together and planned a program they feel will help industry, society, and young people. For industry, this program could increase the trained manpower source which is needed at all levels of the construction industry. For society, it is a possible means of reducing the increasing number of dropouts, as well as improving the vocational education format. Finally, for the young people--the students--this program allows them to acquire an interest in a profession and hundreds of hours of paid on-the-job training through the four years of high school while fulfilling graduation requirements.

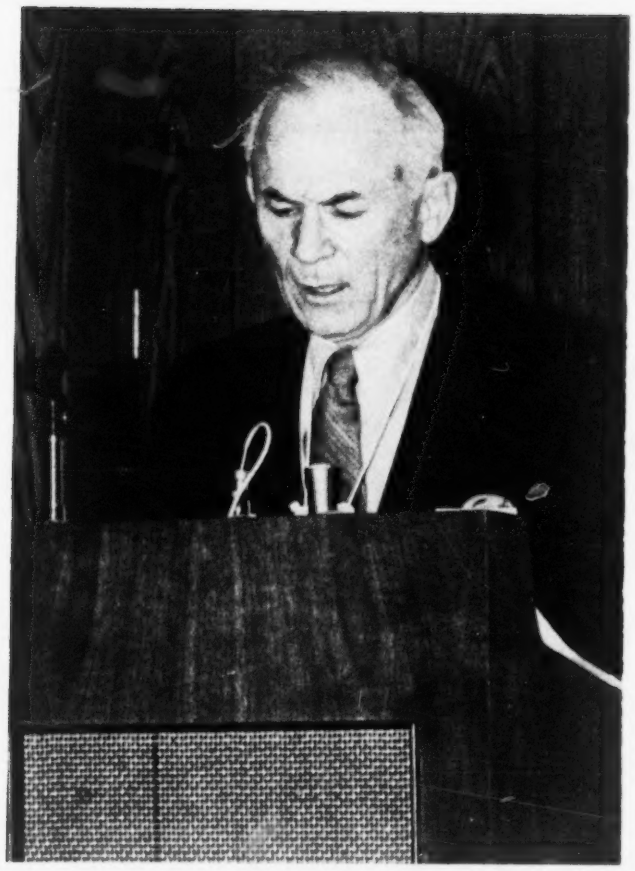
The Future

In Texas, plans have been integrated with Environmental Technology, particularly in the fields of air and water pollution control, air and water distribution, and air and water treatment.

Since the beginning of this program, many other organizations have requested information and assistance from the Texas Education Agency on this same type model for training future employees.

The total involvement of industry and education has created a need to reshape our system of education to meet the career demands of the complex technological society we live in.

POST SECONDARY TECHNICAL EDUCATION IN TEXAS: PROGRAMS, PROGRESS AND PROBLEMS



JOSEPH D. GODSEY, Director
Division of Post Secondary
Occupational Education
and Technology
Texas Education Agency

You have just heard excellent presentations on the manpower needs in the occupational-technical education areas with a detailed description of our secondary-level Environmental Technology program in Texas. This program was developed primarily to help relieve the manpower shortage facing the construction industry, but remember that graduates still have career choices other than going directly to work. One of the paths open is post secondary technical education. It is this facet that I will report on; technical education programs in Texas, their development to date, and where they might be going.

Six years ago, when I first entered the program in Texas--as a consultant in Technical Education--there was only one way to go-up. Technical programs, as we know them today, were practically non-existent. There were a few notable exceptions, of course, but lack of funding and lack of interest, prior to enactment of the Vocational Education Act of 1963, had prevented real development. This was true notwithstanding the fact business and industry were desperately in need of competent technicians.

Technician level jobs were, in many cases, filled by new engineering graduates working below their educational capability (in fact, the standard employment procedure for engineering graduates was to start them on the board-technician level draftsmen) and OJT products. In fact, most technicians were developed by on-the-job training. This had to be the case when you consider the number of post secondary technical programs offered in Texas in 1964.

Nineteen public junior colleges, (we didn't have a technical institute) offered twenty-six technical programs in only eight technical areas. There were, of course, hundreds of short courses offered not only by the junior colleges but by senior colleges such as Texas A&M. These short courses were primarily the "formal" education of OJT technicians.

This rather dismal picture of only half a dozen years ago has, I think, changed dramatically. This is not to suggest that we are out of the woods yet--far from it, as I will explain in a few minutes. As of today, we have two hundred and thirty-nine technical programs offered on forty-five campuses, in fifty technical areas. You may argue with what we consider technical areas but I am convinced technical education covers a wide spectrum.

These post secondary technical programs are, as they should be, representative of almost all areas of concentration. It is far too common, even today, to find vocational educators thinking of technical education only in terms of the various engineering technologies. Technical education is, of course, across the board. I want to give a few examples of technical programs developed by our post secondary institutions in the recent past.

In the general area of Agricultural Education, we have Animal Medical Technology, Agricultural Chemical Technology, Agri-Business Technology, Seed Processing Technology, and Irrigation Technology. In other areas we have Biomedical Equipment Technology, Water and Waste Water Technology, Construction Technology, Electro-Mechanical Technology, Laser Electro-Optics Technology, Thermo Plastics Technology, Dental Laboratory Technology, Dental Hygienist, Petroleum Technology, Oceanography and Marine Science Technician, Telecommunications Technology, and all of the well known programs such as Civil Engineering Technology, Chemical Technology, Electronics Technology, Drafting and Design Technology, etc.

These examples, and all occupational-technical programs in the post secondary institutions of Texas, were developed by known standards to fill specific needs.

Basically, technical programs are developed by extensive use of well-qualified advisory committees. The name and occupation of each advisory committee member must be listed on the program proposal submitted for review. This is checked rather closely. We insist that programs be worked out in conjunction with those people that have direct knowledge of qualifications required for graduates to be employed. Frequently advisory committee members will appear before the Joint Program Review Committee to explain questionable sections of a program proposal.

Advisory committees from industry are perhaps the strongest cooperative link we have with the world or work. Talent and energy that could not be obtained in any other way are available for the asking--asking in the right way, I might add.

I won't go into details of the entire review procedure, but I will touch on one important point. All programs must be occupationally oriented to the extent the graduate can expect to find a job in a specific area. We don't believe in "liberal arts" technical programs. Let me give you an actual example. We recently had a program proposal submitted for Control Tower Operator. If developed the graduate of this program would only be in a position to compete for a chance to attend the FAA training program, as would any individual off the street. The program was not approved. The letter of disapproval explained that if a co-op arrangement could be worked out with the FAA whereby the program graduate would be headed for a definite employment possibility, then approval by the Texas Education Agency would be assured. Technical Education is not general education and we try to keep this in mind.

Just a word about fund allocations.

We have developed a system of allocating available funds for post secondary occupational-technical education known as the "Contact Hour Method of Funding." In this system a school is allocated a definite line item amount based upon total contact hours produced during the immediate year in which appropriations are made by the Legislature. A contact hour is defined as one instructor hour spent with a student in the classroom, shop or laboratory. A teacher that lectures to twenty students for one classroom hour produces twenty contact hours, for funding purposes. A classroom hour is defined as 50 to 60 minutes. If you use this method of fund allocation, everything must be defined. We have published a loose-leaf set of rules, known as the "Guide for

Occupational and Technical Education in the Post Secondary Institutions of Texas," that defines everything--I hope. This guide is issued by numbered copies to specific positions in a college. When changes are necessary, new or replacement pages are sent to each numbered copy. In this way all numbered copies of the guide are always updated. That's the theory, anyway.

Now, back to the funding method. The actual line item amount for each school is determined by application of formula rates to the contact hours produced in various program areas. For example, a contact hour in Electronic Technology is currently set at $1.62, whereas an LVN hour (licensed vocational nurse) is $0.58.

Even after a line item amount is determined for a school, funding is not automatic. Each school must "earn" their line item allocation by producing actual contact hours during the current year. Because of increased enrollments practically all schools "earn" more than their predetermined line item amount. In this case we have a contingency fund, last biennium it was $4.7 million, to cover these additional contact hours. When participation in the contingency fund exceeds available appropriations, the amount to each school is prorated.

We like this system of fund allocation because the schools are paid according to the number of hours taught, since contact hours are a direct function of enrollments.

I have given you a brief overview of our technical education program in Texas and what I hope is progress. Let's take a quick look at where we might be going.

I mentioned a few minutes ago that although we have made considerable progress we still aren't out of the woods yet. We have basic problems. Notwithstanding the fact that eighty percent of all high school graduates in Texas will not continue their education through the baccalaureate degree, and desperately need post secondary technical education, we are still saddled with conventional academic administration in most of our comprehensive community colleges.

Although we have notable exceptions, a large majority of our junior college administrations are not capable of realizing what is necessary to effectively implement occupational-technical education on a scale essential to save the delivery system. Even with a Labor Department manpower bill almost a certainty sooner or later, our academically-oriented administrators press on with general education. If it develops that Federal Vocational Education funds are no longer available for less than dynamic junior college technical program efforts, it is entirely possible the junior colleges will return to

their former all-academic paradise. In this case it is also entirely possible a fully State-supported technical institute system would expand to fill the gap.

Not all leaders are unaware of the problem, however. The Senate Committee on Vocational-Technical Education, in their report to the 62nd Legislature, said: "The Committee believes much progress has been made in redirecting the State's educational priorities to meet the demands of an industrialized economy, but the magnitude of the need for occupational education has neither been fully realized nor adequately understood by the general public. The increasing demand for the occupationally-trained individual requires a greater effort to expand and develop our vocational-technical education programs."

In fairness to the junior college administrations I have mentioned, it must be pointed out that current legislative funding methods dictate much of their efforts. If junior colleges were directed by the Legislature, through funding actions, to meet the occupational-technical needs of their communities and Texas industry, I think they would produce. Even so, in my opinion, the junior college administrators should have recognized the requirement and worked toward a solution.

The other really basic problem confronting technical education in Texas is the dichotomy that has been produced by creating a fully State-supported technical institute system that is, in many ways, in direct competition with the public junior college system.

To appreciate this problem, it must be understood the public junior colleges are partially supported by local taxes from the junior college district that created them. In addition, bond issues must be authroized for initial facility construction with the almost certain knowledge that additional special funding will be necessary later on. Citizens in those areas served by a technical institute campus have no such tax and bond issue worries. As a result, tax-shy citizens in many areas have refused to authorize creation of a junior college district. Travis County, for example, where Austin, the State Capitol is located, has voted down a junior college on three successive occasions in the recent past. Harris County, containing Houston, has voted against the necessary taxes to start a junior college system.

Occupational Education: After Four Years...
The Report of the Senate Committee on Vocational-Technical Education to the 62nd Legislature, January, 1971.

Under current State law any local government can invite Texas State Technical Institute to set up shop in their locality providing it isn't served by a public junior college. This same law exempts Potter, McLennan and Cameron Counties from this last provision and Amarillo, Waco, and Harlingen. Each has a junior college and a technical institute in close proximity.

From my standpoint, as Director of post secondary occupational-technical programs at the State level, both systems are serving a real need and should be continued--from a programmatic assessment. The junior college people think otherwise.

Most of the presidents are bitter about TSTI, the System's ability to obtain appropriations, what they consider the proliferation of available funds and the possibility they will lose students to the System. As a result the Junior College Association is pulling out all stops in an effort to cut down appropriations to TSTI. The problem is now clear.

The public junior colleges and the multi-campus technical institute are on a collision course. Legislators, board of regents, and the general public are all taking a close look at technical education, its administration and the costs. From a purely selfish viewpoint, as an occupational-technical educator, I think the noise and resulting publicity will be highly beneficial to technical education. More people will know what it is and realize it is available.

Unfortunately, both systems cannot, in my opinion, survive as now constituted, i.e., locally-taxed units and State-supported units. In any event, the technical programs in both systems, regardless of the final form the systems assume, will continue to meet the needs of the communities they serve; and we at the State level will assist in every way possible to develop and maintain high-quality programs.

In summary, I have given you a very brief outline of our programs and also what we consider progress in developing technical education programs. Although we think we have made progress, we are well aware of some serious problems and I mentioned two of them.

By implication I might have indicated what I really think the major problem is, but it has been stated perfectly in his own inimitable way by Pogo when he said, "We has met the enemy and he is us."

A LOOK BACK -

AND A LOOK FORWARD

DR. ARTHUR LEE HARDWICK
Associate Commissioner for Adult,
Vocational and Technical Education
Washington, D.C.

I love this state. It is good to see this Oklahoma weather after being in Washington. I am not a Washington type at all I guess, but someone has to do the job. I saw this institution start about seven or eight years ago. I worked with Phil and Dale Delano, and we have seen it grow into a very fine institution. You should all be proud of this institution and its very fine programs for leadership and fine industrial relations.

I am constantly amazed at the number of Oklahomans that hold key positions in Technical Education around the country. You should be proud that Oklahoma is providing a good deal of the vocational and technical education leadership in the country. The Technical Institute and this type of post secondary institution is coming to the forefront of vocational and technical education, and it is going to be the main thrust in the future. This institution is a good example of how they can grow and how they can support the state and community. The industrial working relationship of this institution and many others in the state help to bring industry into the state. You should be proud and work with these types of institutions to draw in the industries. I know this has grown, in a very few years, to a fine institution. It has been a lot of hard work. It is a task to get the things you need at times. This institution has come a long way. You should be proud of it. Dr. Chandler and Dale Delano deserve a lot of credit for what they have done in this program.

One of the keys to the success of this institution is its flexibility; its ability to change with what industry needs, what the state needs, and what the local community needs. This is the key for all vocational and technical education at the post secondary level, and we are trying to make this change so it will be flexible at the secondary level as well. The post secondary vocational and technical education programs are the fastest growing part of vocational education. It is at the threshold of where we move in vocational and technical education. We have to really look at the post secondary institution as the outstanding institution that is being developed in this country, whether it be junior college, area vocational school, or technical institute. This is the coming institution.

When I was working on this speech back a couple of months ago, I picked up the Washington Star; and the headlines read, six percent unemployment. Yet I turned to the classified sections, and there were four solid pages of jobs for which qualified people could not be found. I wondered, what is the relation between six percent unemployment and four pages of jobs that nobody could fill. Our society is geared up to develop training programs in Seattle at the present time to retrain engineers. Yet, you can pick up the Seattle paper and find jobs for carpenters, plumbers, yet no one is doing anything about these programs. I know we have a long way to go, and I think that our society needs to change, our educational community has to change.

At the present time, of the number of students that are entering the junior high school, only about 20% will ever graduate from college. 20%! Yet in our educational system at the secondary level, only 18% are in some kind of occupational education programs; 38% are in college preparatory programs; and 44% are in general education. Now I wonder, is our society really geared to do the educational role that they have to do. I think we are going to have to examine our educational community.

Dr. Marland, Commissioner of Education, talks about moving career education. He is concerned about this 44%. We need to provide more career education for the 44% in general education. We are going to have to move! We have a great future, and the success of the post secondary institution is going to depend a great deal on the success of the secondary school programs.

We are looking at programs at the present time that are grades one through fourteen. I mean grade one! We have models being developed now where we are going to have an occupation orientation starting at grade one, exploratory programs all the way through,

and then the vocational programs and then the clustering of occupational programs at the high school level, and then feeding into one of four choices - the post secondary training programs, on-the-job training, a job, or to an institution of higher education. Now we are going to have to gear our system where we provide this for the youth of our country.

I am concerned because we now have in the labor market only 20% of the jobs requiring a college degree. 20%! Yet we have a majority of our young people trying to go on to college, trying to get a degree. We have vocational teacher shortages. We are trying to set up a program in Washington at the present time to retrain teachers. One of the biggest problems we have in occupational education is we do not have a sufficient number of qualified vocational and technical teachers. Yet, we have people in this country that have degrees in education, and they cannot find a job. There is something wrong with our educational system where this type of environment exists. Now we are trying to develop new programs in teacher education, and this is one of the major areas where we must improve our programs. I have always been impressed with the program that Oklahoma State University has. Maybe it was because I went to the University, but they had an exceptionally good program; and I am certain that they are continuing the program.

I really think that occupational education now stands at the threshold. We are presently training about 18% of the population, and we should be training a minimum of 60% of the population in some type of occupational education, whether at the high school or post secondary level. Now, we are going to have to gear our system to take care of these youth, and we are not doing it now. So the real challenge is with the people that sit in this room. We have to provide the flexible leadership and the flexible programs that can move with industry and make the changes. We are not doing this in many cases. The real challenge is with these people. You have to provide the programs that can do the job and meet the needs of industry. But are you doing it? Think in your own mind, are you trying to provide the types of programs that industry really needs? The State of Oklahoma is doing it in many of their programs. This institution is doing it, but they have to be able to make the changes when they are required.

I remember in RCA, when I was there, I had my degree from Oklahoma State; and I had some work at SMU past that, and I thought that I was through school. That is

the worst mistake in the world. I was a systems specialist for RCA in their computer division. I was in school one week out of every month upgrading my skills, and then I was getting behind. Then I moved to sales manager where I gradually dropped away from the technical subject area. You get very concerned in industry when you do not keep up to date. Our people, in the technical programs in this country, are not keeping up to date in many cases. You see some very fine examples where they are working with industry, and they are drawing them in to help them advise their programs. The key to the success of this program in the future is going to be working with industry and drawing them out to help us. Until we start working with these people, our programs are not going to be as successful as they need to be. As far as the Technical Education Clinic, I am very pleased to see it in Oklahoma City. Oklahoma City is one of my favorite places. But I look at the American Technical Education Association, and I become concerned. We have a membership of about 1500, where as the AVA has some 15,000. Yet post secondary, occupational education is the fastest growing segment of our business. It is the future of occupational education. Why is ATEA not taking the leadership role and developing an organization that will represent post secondary, occupational education in the manner it should be. Someone must take this leadership role to move post secondary, occupational education.

Now, we fight the battles in Washington all the time, and I think the people in the field work hard to improve their programs. But I think it really comes down to the local people and local progarams like this institution. If they can move, if they change, if they can develop new and innovative programs, we will survive and we will make an outstanding reputation for vocational and technical education. But we have to move, and we have to move as a unit working together, not just vocational education, but with industry and the administrators of all types of education.

So our challenge is here; our challenge is today; it is not two weeks from now; it is not two years from now. We have to move; we have to work hard for occupational education at the secondary level and at the post secondary level. So the burden of the challenge is on you. We move or we fail. So I am here to motivate the program, and I see movement and I see needed change. We are going forward. So I hope this institution and these people are ready to work for these changes. I thank you.

GOVERNOR DAVID HALL
State Of Oklahoma

DEDICATION CEREMONY
ADMINISTRATION BUILDING
OSU TECHNICAL INSTITUTE
OKLAHOMA CITY, OKLAHOMA

It is great to be with the Oklahoma City Chamber today to see the men from over the state who support vocational and technical education, and to have an opportunity to participate in the dedication of this building. Yesterday, in Durant, when the Le Tourneau Company announced their new facility, it was pleasing to know that one of the reasons they are in Oklahoma was the State's vocational and technical program. It was the major factor in their decision, and both Mr. Le Tourneau and Wayne Harden said they felt Oklahoma had the right attitude about providing those things that create the best environment for industry.

It is an honor to participate in the dedication of this building. You know, it is a funny thing, but when I was a student at Classen High here in Oklahoma City it seemed that vocational and technical education had a secondary emphasis. That was in the '40's, not the '30's. Today it is a magic name; it is the "in" thing; and that is the way it should be.

It does not matter which route you take, the liberal arts or vo-tech route, the destination happens to be the same. The revival of the emphasis on technical education and technology in our society is more important today than it has ever been.

Communities across the state are taxing themselves to support vocational and technical education activities. The new technical education building that we are in today is a symbol, in my opinion, of the importance and respect technicians, who prepare themselves for this work, now have. My budget request reflected this in the legislature with a request for an additional million dollars this year for vocational and technical education.

The growth of this campus from 92 students in 1961 to more than 1300 students today reflects the demand. This new building represents a milestone. This is the first time that adequate facilities have been available in Oklahoma City for college-level occupational education. The education available here is a wonderful interweaving of liberal arts, general subjects, and technical fields.

We are learning all the time. The students here are going to learn the why's and the how's, as well as the ways in which to make themselves prosperous, happy, and successful in the very complicated and sometimes frustrating society of the '70's.

As I reviewed the programs that the 100 teachers on this campus will offer, I saw the great needs of Oklahoma being met here. I want to recognize these fields individually, because each of them is important: Architectural Drafting, Civil Technology, Computer Programming, Electronics, Fire Protection, Industrial Drafting, Instrumentation and Process Control, Nurse Science, Police Science, and Technical Writing (this last one is one of the more difficult fields and is now more important than ever).

I am hopeful--I think we are all hopeful--that this building is just a start of the sophisticated development of a complete campus. I hope that additional buildings and mall arrangements can soon be a reality. I am enthused about the goal of 45 associate-degree programs eventually being offered here on this 60-acre campus, located so near to the great industries of Metropolitan Oklahoma City. The student will be able to draw from the experience and wisdom of the business community as well as from his day-to-day classroom activities.

I likewise urge industry to support this institution with all its fervor. Our administration, as Dr. Kamm so aptly stated, places education first. I believe that trained and informed people are the most important product of a good government; and that misery, ignorance, discrimination, and other things which plague our society can be overcome by education.

We seek support. Business and citizens should support their government with the same vigor that government pursues quality education and vital responsibilities. But it is more than that. Education is a natural resource that happens to affect every one of us.

It just so happens that someone ahead of you had to sacrifice to make it possible for you to be at the point you are today in dedicating this building. I accept that responsibility for the generations that follow us. I hope we all keep in mind that the real reason we are here today is not that brick and mortar make a nice edifice, but that educated young people make a brighter future for Oklahoma.

3747

TRANSPORTATION IN

THE 21ST CENTURY

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About 30 years ago (please, forgive this momentary look backward in what is to be otherwise a forward-looking report), our principal modes of transportation were automobile, bus, train and airplane. Transoceanic voyages for the most part were by ship, but the bulk of passenger miles of movement were by the first mentioned carriers. In the last thirty years or so, we have in actuality progressed little--if at all. The planes are faster and larger, but for most of our air trips the door-to-door travel time has increased (ground transportation congestion and departure delays have offset the shorter air time). Our automobiles are more powerful and have more gadgets, but they are essentially no different than the auto of the thirties. But our accident toll mounts, the pollution is more critical and the traffic tie-ups are longer in length--although our interstate highway system is certainly an improvement of sorts. Bus travel remains about the same, but the most luxurious and pleasant of the travel modes of thirty years ago, the express passenger train, has almost disappeared from view. The proud ocean liner has been relegated to the role of the seasonal cruise ship--a victim of the lower cost and higher speed of the intercontinental jet.

If we look at the 30-year change from 1940 to 1970, and extrapolate another 30 years to the first blushing appearance of the 21st century, we would predict an increase in the sophistication of each of these modes of travel, but little change in essential function (advanced autos with relatively clean engines and more elaborate comfort, control and entertainment devices, supersonic aircraft and more efficient air traffic control, but an overall deterioration in the total quality of travel). Before we make such a prediction, however, let us take an even longer look backward and consider a speaker in 1870 faced with the task of predicting transportation in the 20th century. He could look to the changes from 1840 to 1870 and wryly note that the carriage had improved only slightly, the steam railroad had made great strides in quality but did essentially the same job as the earlier version, and the steamboat had little impact on water transportation inasmuch as most vessels were still powered by sail and wind. But what an error he would have made! Because in just a short time he would live through one of the most inventive times in man's history. In a period of less than two decades, at the turn of the century, he would witness the revolutionary effect of the electric street railway, the birth of the automobile which, in a few more decades, would surpass even the electric street railway as America's mode of urban travel, the airplane, the diesel engine, the turbine, and a limitless list of ancillary transportation aids in control and communications. In that short period of time, spurred by the industrial revolution and a sudden upsurge in man's confidence in his mechanical creativity and a confidence in the future, a complete and total revolution in transportation was realized. Transportation would never be the same again.

With that look backward to provide perspective and direction, we can now look forward and ponder the inevitable question: will the historic cycle repeat itself and usher us into a new wave of invention and creativity in the next decade or so? Or will the overriding problem of uncontrolled population, coupled with a deteriorating quality of life and distorted priorities, stifle our spirit, and doom us to an endless series of patchwork solutions to our ever-increasing demand for mobility?

I emphasized the historical viewpoint to reveal that this is not an easy question to answer, and we cannot look at recent trends and extrapolate to the future. We must be more analytic in our approach and seek symptoms or signs that point the way.

3749

In this respect, I can identify two indications that point to an upsurge of inventiveness and community acceptance of new forms of transportation. If correct in my assumptions, we can look forward to a new era in transportation technology.

The first indication is the emergence of a sense of urgency on the part of government officials, both local and federal, regarding the need for new approaches in transportation. Not only has a federal Department of Transportation been formed, but within that department there has been established the Urban Mass Transportation Administration. In addition to these organizational changes, new efforts to finance urban transportation have met with moderate success. Recent legislation has provided over 3 billion dollars for urban transportation in the next 10 years. That amount will probably be increased in the future.

This new federal effort, coupled with parallel activities at state and local levels, is creating an atmosphere of optimism that will provide the necessary foundation for future development. To understand the significance of this first step forward, it is useful to remember that in the last few decades we have been obsessed with highway building and the enlargement of air travel. To suggest, ten or fifteen years ago, that federal support or subsidy should be provided for mass transit or high-speed rail travel would have been foolhardy. But now we hear every day of new support for studies or demonstrations of new forms of transport.

The second indicator is more subtle, and to appreciate its significance we must take one more look backward. In those incredible decades at the turn of the century, when almost every major form of transportation that we know today was developed, the separate activities that led to such progress were relatively small enterprises by a few people. A handful of dedicated persons with meager capital could start an airplane manufacturing empire. The same was true for engines, communications and automobile travel, or even a major improvement in existing modes, was beyond the dream of small enterprise. Who could compete with Detroit? Who could construct and sell a major innovation in air travel?

The element of change in this situation is the renewed emphasis on urban mass transportation and the realization that our burdening cities will have to be renewed by a network of systems that will not only provide high capacity line-haul service (as in a subway), but will depend on local, automated "people movers." These will vary in size

from moving sidewalks to automated vehicles on their own exclusive right-of-way. It is in this area that opportunities exist for the small enterpriser to come out with a new product and market it on a municipal level. The systems will depend upon clever innovation and they will have to be custom tailored in each application. These are exactly the ingredients needed for local or small scale initiative.

Evidence is ample that this is happening. Many relatively small or new firms have been established to construct and market completely new concepts in the movement of people and goods. I'll tell you about some of them in a moment, but let me emphasize that the combination of the optimism provided by federal support and the opportunities for individual initiative could recreate that exciting atmosphere that caused so many things to happen in the few decades after 1870. It appears that we might be on the verge of a parallel activity now, in 1971, one hundred years later.

Now, with respect to transportation in the 21st century, we can predict a substantial increment in the introduction of novel methods of propulsion, control, suspension and networks. Control will be one of the major innovations, because the mass and personal transport systems will have high levels of sophistication in automation and safety. Mass movement devices that stop to pick up and discharge passengers at fixed points along a given route will be fully automated without attendents or operators. Personal security and physical safety will be assured through total systems design backed up by electronic surveillance. Personal vehicles will be operable on local streets and remote areas, but will be automatically guided and controlled on numerous guideways that will accommodate, in one lane, the density presently required by four or five lanes of regular expressway. Furthermore, a decision to be relieved of the burden of parking a car in central areas would be solved by sending the vehicle back on the automatic track for automatic transfer to a storage area. This latter concept, commonly called dual-mode, will combine attractions of the current automobile with the advantages of mass transit. Indeed, the personal automobile will share the automatic guideway with various forms of mass transit vehicles that passengers board at fixed locations--much as we use rapid transit today.

Another vehicle that might be seen on the automatic guideway is a version of a demand activated bus. This concept, also referred to as dial-a-bus, is actually a near future development. In its present form, a request for a bus to a given destination is processed

3751

by a computer, the optimum rearrangement of the route of any appropriate bus is established, and the bus driver is notified to make a route adjustment to pick up the passenger. In the future, the local collection advantage of such a system will be combined with the high speed and volume capacity of the automated guideway to provide a total urban transport network.

With respect to the technology of suspension and propulsion, we shall probably see an increase in vehicles that ride upon thin air cushions or are magnetically levitated by powerful magnets economically operated with low current as a result of cryogenic advances. Propulsion will be by linear induction motor, which is really a rotary electric motor of infinite radius. One component of the motor is fastened flat to the guideway. The other part is on the vehicle. Excellent control over vehicle position, incidentally, will add to the attractiveness of this scheme.

There is one area of future technology that I find difficult to predict, and that is the relative shift in emphasis from air travel to high speed ground movement for the inter-city trips. Although we are still flabergasted at the advances we have made in the speed and convenience of transoceanic flights, we are still faced with the raw data that about 80 percent of all inter-city flights are for trips under 300 miles--and high speed jets are not appropriate for these trips. One of the principal causes of the current airport congestion in several of our airports is the needless use of airplanes for these relatively short trips. This is our own fault. Emphasis upon high speed, comfortable trains, or other forms of transport, has been completely lacking. If the government and industrial lobbies had spent a fraction of the effort exerted in defense of the SST upon demands for high speed ground travel we would go far toward solving some of our current travel crises with, incidentally, much less air pollution and noise discomfort.

One more prediction about future transport technology. We are steadily heading toward a continuing shortage (and hence, increased cost) of energy. The first signs of this are becoming apparent, but in the decades to come the energy efficiency of transport will be of utmost importance. (A fact completely ignored by proponents of the SST--one of the most energy inefficient forms of transport ever designed.) This restriction will hamper some modes (high speed air and personal vehicles), and favor ground supported, mass carriers.

3752

Although it is difficult to predict transportation in the 21st century, I can end with one positive note. Whatever our principal modes of travel will be in the future, they will be dictated by decisions we make today regarding national priorities and research and development efforts. Accordingly, I would like to encourage all of you to consider the various alternatives and make your opinions known to your representatives in Washington. That is where the decisions will be made, and you would be amazed at the effect letters from an informed electorate can have.

3753

THE ALLIED HEALTH PROFESSIONS IN THE 21ST CENTURY

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Discussing how our health care education and delivery system will work in the year 2002 is a very safe subject about which to make sage pronouncements; I can speculate about what may be happening thirty years from now and no matter how wrong I may be no one can prove it, and among the least of my worries is the possibility that some of you will catch me in March, 2002 and remind me of how poorly I predicted the future in Oklahoma City in March, 1971.

The conventional wisdom in a discussion of the future would advise concentrating on the vast changes of all kinds that will have taken place in the past thirty years. No doubt many changes will take place, but also many will not take place. For example, it is a fair bet that the normal temperature of people in 2002 will still be 98.6°F. While

people cannot do much to change their normal temperature, the fact is that we very seldom embrace changes exuberantly. I remember the ag. teacher in a school where I was teaching who was starting an evening extension class and visited farmers around his area to drum up business. He stopped to explain to one farmer how he would learn new methods that would enable him to double the yield per acre on his farm. The farmer said, "Hell, mister, I ain't farming half as well as I know how to now." Which leads me to speculate that maybe some of us aren't teaching half as well as we know how to now, and that thirty years from now there will be many who aren't teaching half as well as they know how to, either.

First, let's make a few general observations about health care as it may be in 2002, then we will take a look at how the allied health professions may fit into that pattern in terms of practice and the education needed to enter practice.

1. The health service field will probably be our largest single economic activity in 2002. Measured in dollars spent by the total population for health care, the amount we spend in 1950 was 13 billion, in 1960 - 27 billion, in 1970 - approximately 70+ billion, more than doubling every ten years. If we continue at this rate of increase,we will spend 480 billion dollars for health care in 2002. We may not continue at this rate, but it is not likely that any other activity will represent as much of the gross national product as health care in 2002. A major reason for this large expenditure will be universal health care insurance assuring every citizen pre-paid care through payroll deductions and direct subsidy for children, the aged and handicapped.

2. Because of this great increase in volume of service in the health care field, solo practice by physicians will be largely superseded by group practice ranging from small groups of five or six to large operations like the Kaiser Permanente organization. The ratio of physicians to population may not be much different than now, the increased output of medical schools probably being unable to overtake the increase in population. In California today there are approximately 33,000 physicians, but the increased output of all California medical schools last year was not enough to replace those

who retired or died during that year If we did not lure to California physicians trained in Oklahoma and other states, we would be losing ground rapidly. To take up the slack, physicians in 2002 will have turned over to allied health personnel the large percentage of human ailments that can be satisfactorily treated without requiring the services of a physician.

3. Routine tasks such as medical history taking and physical examinations will be handled almost entirely by allied health personnel operating equipment that performs most tests and measurements automatically. Blood samples will be taken and analyzed by machine, for example, as will vital signs such as temperature, pulse, respiration and blood pressure. All information will be analyzed and cross-checked by the machines and the results and implications printed out in a fraction of the time required now. However, a defective integrated circuit in a machine may result in readings indicating the patient is suffering from hepatitis instead of his actual problem which may be multiple sclerosis. This possibility will make it necessary to expand a field that is just now emerging, biomedical equipment technology. Biomedical equipment technicians will be responsible for testing and servicing the equipment at frequent intervals to be sure that the information yielded is accurate. There is a critical difference between the results of a malfunction in a computer processing data relevant to the commodity market and one processing data to determine the status of your personal metabolism. In the first instance someone may lose a few dollars, in the second case someone may lose his life, and it is doubtful that people will take life endangering matters any more lightly in 2002 than they do now.

4. The major emphasis in health care will be prevention rather than cure, with possible revival of the old Chinese custom of rewarding health care personnel when clients are well and penalizing them when they are ill.

Many other general observations could be made, but these are enough to give us some idea of what health care in general might be like in 2002.

Let me now turn our attention to the allied health professions as they may operate in 2002. The two basic kinds of occupations now found in hospitals most likely will be about the same in 2002:

1. Clinical or direct patient care--nursing, nutrition, physical therapy, inhalation therapy, etc.
2. Supportive--housekeeping, food service, administration and business office, medical records, maintenance engineering, laundry, etc.

First a few observations on clinical occupations.

1. Nursing. Nurses on the R.N. level will function as assistant physicians, screening patients and directing to the doctor only those with problems requiring the skills and knowledge of the doctor. The others will be handled by the nurse, or directed to another allied health professional such as a physical therapist. Nurses on this level will also direct nursing care of patients in the hospital, most of the actual work being done by aides and licensed practical nurses.
2. Physical Therapy, Occupational Therapy. Registered OT's and PT's will be largely occupied directing the activities of assistants and aides who will do the work the OT's and PT's used to do.
3. Prosthetics, orthotics. The fabrication and fitting of all mechanical body replacements and supports except vital organs and optics will be under the direction of rehabilitation engineers who will be competent in artificial limbs, braces, architectural barriers, wheel chairs, hearing aids, cosmetic restorations and similar matters related to the rehabilitation of the physically handicapped. Technicians will be trained to do the laboratory fabrication to specifications prepared by the rehabilitation engineer who will do the actual fitting of the device to the patient's body. The engineers will work closely with the surgeons in immediate post-surgical prosthetic fitting of artificial limbs while the patient is still under the anaesthetic. Some progress will have been made in developing a hormone that stimulates the regeneration of an amputated limb in the way the salamander grows a new leg when one is cut off.

4. X-Ray Technician. The x-ray technician will be responsible for screening x-rays for the radiologist in which he will do the initial interpretation.
5. Dental hygienist-dental assistant. The dental auxiliary personnel will perform many of the less complex tasks, such as simple plastic or amalgam fillings, formerly done only by the dentist.

The educational programs for the direct patient care allied health occupations will be somewhat changed from those prevalent in the early part of the last quarter of the 20th Century. Extensive continuing research and occupational analysis of these occupations will have revealed what these people actually do and what they have to know to do it, resulting in the discarding of many non-functional and irrelevant educational courses that had been on the required list for years. It will have been rediscovered that to learn how to take care of sick people sooner or later you have to be taught and practice on people who are sick; and since hospitals are about the only place where sick people are found in any significant numbers, the focal point for patient care occupations will have moved back to the hospitals. The chief criticisms of the old hospital diploma programs, exploitation of trainees as cheap labor and failure to give sufficient attention to the basic sciences, will be largely eliminated by shortening the training time to two years instead of three and organizing the program so no exploitation of cheap labor was possible. The hospitals will be reimbursed for their educational services and all staff patient care professionals will be trained to teach on the job on an individual instruction basis. The local colleges will give full credit for hospital experience and will give classes in the basic sciences. The trainee will receive degrees on completion of the program. Basic science taught in the colleges will be closely coordinated with the tasks being learned in the hospital so the trainees can see its practical application in the solution of problem situations. To accomplish this required, first, recognition of the idea that the mere possession of basic science knowledge was of little value in helping sick people to get well, it was what you could do with such knowledge that counted; second, that basic science was best taught by an instructor who knew how to apply it in his allied health profession and who could limit it to what was applicable in the profession; and third, that instruction in the basic sciences was best done on an individual and small group basis so it could be closely

coordinated with the individual progress of the trainees in the clinical part of their education. These developments ended most efforts to establish umbrella courses in the basic sciences in which the schools could expose at the same time all allied health occupation trainees to various subjects, such as anatomy and physiology.

Now let us take a brief look at the supportive allied health occupations. While good patient care in a hospital cannot take place unless the services provided by these groups are of high quality, most of them do not have the criticality of direct patient care as in nursing, for example. For this reason the need for extensive on-the-job experience is not as urgent in the supportive as in the clinical occupations. Clerical and secretarial work will be taught in the schools in 2002 with an intensive unit in medical terminology for those who will work in health care institutions. The same approach will be used in medical records librarian, medical laboratory technician, and pharmacist technician. Some occupations that do not require extensive technical knowledge and that can be taught readily on the job will continue in this manner. Housekeeper, laundry worker, and hospital maintenance engineer are typical. The latter are usually recruited from mechanical occupations and trained on the job in the peculiarities of hospital equipment.

The success of educational efforts for the allied health professions in 2002 will be the result of making the health care institutions education minded.

I suggest that one of our major goals will be to help hospital personnel to not only be education minded, but education conditioned as well. I have been in almost 250 hospitals in the past three years attempting to move in this direction by teaching supervisory personnel how to teach on the job. These people are very receptive to the idea of becoming more education minded and conditioned, but they need and want help, and perhaps those involved in technical education can lead the way to better health care in the present and near future as well as in 2002 by making this help available.

OCEANOGRAPHY IN THE 21ST CENTURY

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World population rose to 3,692,000,000 in 1971 and is estimated to increase at about 1.9 percent each year. By the year 2000 there may be serious concern over the ability of the world to feed and supply its inhabitants with facilities and food for existence. Man has mostly depended upon land to exist, however, the land area covers only 30 percent of the earth's surface. The great body of water broken here and there by islands identified as continents is called the World Ocean. Oceanography may shortly become a science of major concern if man is to survive and accommodate the presently anticipated world population predicted for the 21st Century.

To understand the magnitude of problems, civilization must cope with the enormous source of materials, power, and food in the oceans of the world, we need to know something of the general characteristics of the ocean. The highest peak above land is "Mt. Everest" at 6 miles, and the deepest part of the ocean is "Challenger Deep" at about 7 miles. The average terrain above sea level is 1/2 mile, and the average depth of the

ocean is 2 1/2 miles. There are many riches in the ocean and below the ocean floor. Salt in ocean water is known to exist by most, but do you know there are 120,000,000 tons of salt in each cubic mile of sea water? The quantity of potential oxygen in water for man's use may have to be available in future times to keep living beings alive. We need to learn more about how to secure oxygen from water. Sea water contains all the natural elements including millions of tons of gold and silver. Elements found in sea water consists of chloride 55.2%, sodium 30.4%, sulfate 7.7%, magnesium 3.7% and all others 3.0%. Man now gets a small amount of fresh water from the sea by removing the salt and may depend upon the ocean as a major source of future fresh water. In places like Key West, Florida, where fresh water is unavailable, large desaltinazation plants are now being constructed. There are many difficulties to overcome which require advanced technology and much effort and money, including the great pressures under the sea of 2,000 pounds per square inch per mile of depth. These pressures require the use of massive and strong equipment.

The ocean is man's mighty resource providing vast quantities of food. The liquid mine which man needs to find economical ways to capture includes the rare metals found on the ocean floor, fertilizer, mineral in seaweeds, sponges, pearls, and numerous other products of the sea that must be harvested for man's future existence. Currently, the sea is also man's vast dumping ground. This pollution along with air pollution must be stopped as the world population increases.

A $3 million program of the National Science Foundation has included the resources of a major university in Miami to study pollution of the world's oceans. This school's laboratories will be a focal point for samples gathered by U. S. ships probing the Atlantic, Pacific, Indian, and Antarctic oceans to detect the level and type of chemicals pouring into the oceans. Increasing use of the ocean as disposal areas for domestic, industrial and nuclear waste products are of the major concern to the U. S. Government and the various states. For example, a nuclear power plant in South Florida has run into difficulty because of contended thermal pollution of the bay waters.

The possibility of living under the sea is currently receiving serious study and we may have several underwater habitants by late 1900's. Designs have been submitted by educational institutions and industrial design students such as a "Modular Living Habitat" designed by students at the University of Kansas. The underwater habitat fulfills living and working requirements needed for a productive undersea system. The habitat can sustain

either a closed, one atmosphere pressure environment, or it can be pressurized in a saturated state to a prescribed depth. By modular expansion, the unit can accommodate the requirements of the personnel working and living within the surrounding ocean environment.

The basic habitat unit is composed of a torus segment and two attached spheres. The torus contains power supply and life support systems while the spheres provide living and working space. A complete habitat consists of twelve joined torus segments and the 24 spheres attached to the torus. Two large domes attached to the torus provide recreational and work areas.

A group of students at California State College proposed an "Underwater Recreational Habitat" to cope with man's future increased leisure time and disposable income. The system is designed to accommodate 1500 people with facilities for living, dining, scuba diving, combined with above water facilities for sun bathing, dining and sport activities.

Better underwater vehicles must be designed and serviced such as a "Deep Submergence Work Vehicle." The system consists of a mother vehicle powered by fuel cells containing the major power and life support system to extend the effectiveness of work pods. Work pods detach from the mother vehicle but get their support through an umbilical cord attached to the mother vehicle. Using manipulating arms, the pods are able to work together or separately as the need dictates.

Various other designs are proposed to enable man to work under the sea. When man works relatively close to the surface or at minimum pressure depths, life support systems have been designed to better furnish oxygen.

Several manufacturing firms are in the business of designing and producing special underwater tools. Samples of special tools include: Hydroturbine drill unit, underwater stud drives, underwater cable cutter, and special lighting system. Large equipment must include such devices as a "Concrete Pouring Vehicle" and the need for power will emphasize nuclear power stations for underwater continuous use.

Research will require many specialized vehicles such as those provided by the U. S. Navy and other manufacturers of underwater vehicles.

On land, man has intensified food production through research and the development of hybrid seeds. Production of food in greater quantities under the sea can take place by developing fish farms for breeding and harvesting the fish.

3762

We may not have to wait until the 21st Century to more fully explore the ocean's potential to serve man. There is a possibility we cannot afford to wait. If space technology has taught us anything, the amount of progress from the time Alan Sheppard made his first flight in space to his latest flight to the moon, provides the world with an example of just how fast technology may advance.

We must start now in our colleges and universities to develop programs that will provide the technical manpower to assist engineers and scientists to do their work. Miami-Dade Junior College established its Marine Science Technology Program in the fall of 1968. Dr. George Mehallis had the vision and energy to put together the elements of the program, obtain the facilities, establish the advisory groups and recruit the first group of students.

The present college facility in use while we wait for a new facility on Virginia Key is on the downtown Miami River. A number of different size boats are required, starting with small ones to teach seamanship. Boat handling is an important first requirement. Under water we must have air--compressed air or oxygen. The school uses compressed air and technicians must know how to fill the bottles with clean air. Testing of the air valves and connectors must be carefully done. A technician tests a special re-breather which used at shallow depths leaves no air bubbles. This was very useful for the Navy.

One of the most important facilities for marine science technician training is the diving tanks. Students may use the ocean for the training, however, tanks are much better and the training can proceed with much less cost. Underwater operation in the handling of special tools such as hydraulic drills and welding equipment may be mastered in these tanks.

A most important element in the training program is underwater photography. Cameras that do not need special enclosures and special lighting equipment are used by students.

Navigation at sea has been for centuries and still is an important skill to master. Charts must be carefully interpreted and courses plotted. The various types of navigational equipment such as LORAN need to be available for student training. There are many plotting instruments in use and students need to be able to interpret the output of these plotters. The proper sampling of water at great depths is a skill that is not easy to master. Acquaintance with an instrument such as a NISKEN bottle should be first accomplished in a laboratory situation.

This is just the start and those skills mastered at the base school must be practiced at sea.

Commandant Jacques-Yves Cousteau, inventor of the Aqualung, authority on undersea activities, and hero of millions of T.V. watchers, states that "Ocean science has not yet reached the state where scientists know what to look for." There needs to be much more money available for the exploration of the sea. He states that less than one-half of one percent of the U. S. budget is for marine science and only one-tenth of this for basic research. The oceans of the world are still relatively unknown and unexplored. The 21st Century will surely see extensive exploration and intensive use of the world's ocean areas.

3764

OCEANOGRAPHIC AGENCIES IN THE MIAMI AREA

A. NOAA - the National Oceanic and Atmospheric Administration

B. - Environmental Science Services Administration

1. Weather Bureau
2. Coast and Geodetic Survey
3. Environmental Data Service
4. National Environmental Satellite Center and Research Laboratories
5. Interior Department's Bureau of Commercial Fisheries
6. Marine Game Fish Research Program
7. Marine Minerals Technology Center
8. National Oceanographic Data Center and National Oceanographic Instrumentation Center
9. Coast Guard's National Data Buoy Development Project
10. National Science Foundation's National Sea Grant Program
11. Army Corps of Engineer's U. S. Lake Survey
12. Center for Environmental Sciences - Nova University

- VIRGINIA KEY CENTER -

MARINE SCIENCES AND ENGINEERING

1. Atlantic Oceanographical and Meteorological Laboratories
2. Environmental Science Services Administration
3. International Oceanographic Foundation
4. Miami-Dade Marine Science Center
5. Miami Seaquarium
6. Rosentiel School of Marine and Atmospheric Sciences
7. Tropical Atlantic Biological Laboratory

- TURKEY POINT -

Edward Ball Marine Laboratory

Florida Junior Colleges

Curriculums in Oceanography

Brevard	Miami-Dade	St. Petersburg
Palm Beach	Florida Keys	Gulf Coast
Broward	Manatee	

SPECIAL OCEANOGRAPHIC INSTRUMENTS BEING MANUFACTURED

1. Doppler Current Meter - designed to measure profiles of the current versus depth
2. Underwater cutting, welding, photography and controlled blasting
3. Particle counters - and particle size counters
4. Desalting systems
5. Digital Automatic Film Readers
6. Electronic Anit-shark devices
7. Ion physics measuring instruments
8. Underwater communication devices

3767

WOMEN IN TECHNICAL EDUCATION

DR. MARY L. ELLIS, Director
Technical Education Research Center
Washington, D.C.

Speaking to a group of mostly men about women in technical education makes me feel a little like a hen in a small chicken coop with a pack of foxes running loose. Whether this hen escapes today remains to be seen!

Changing values and attitudes are the hallmark of the day. The never-ending Vietnam conflict, student unrest, people popping pills, conflict between hard hats and young adults, the civil rights movement among minorities, and now the women's rights movement test the nation's social conscience.

Perhaps the most significant national challenge of the 70's will be the effect the women's rights movement will have on the nation's established institutions and the extent to which the nation responds to their call of the minorities in the 60's called for equal educational and employment opportunities, the women's rights movement of the 70's is calling for similar opportunities.

Surpassing any time in history, women through individual initiative and organized groups, are looking at their role in America's future development. Action groups such as the Women's Equity Action League (WEAL), Federally Employed Women (FEW), National Organization of Women (NOW), and the Female Liberation Movement, whose views, practices, and policies call for extreme change, are engaged in some measure in research and action programs directed toward greater options with respect to occupational choice and career advancement equal to their male counterparts.

Societal pressures and expectations have been, until recently, such that women simply have not opted for jobs traditionally viewed as solely the male domain. Career expectations are so subtly suggested and acquired that countless numbers of women rarely give serious consideration to preparing for occupations filled by a preponderance of males.

Sex discrimination with respect to initial employment and job advancement of women has been overtly and covertly practiced by both males and females. One leading educator even goes so far as to suggest that "sex prejudice is socially acceptable" in our society. In testifying before the Subcommittee on Constitutional Amendments of the U.S. Senate Judiciary Committee on May 6, 1970, Sandler stated:

> "Sex prejudice is so ingrained in our society that many who practice it are simply unaware that they are hurting women. It is the last socially acceptable prejudice. The Chairman of a (University) department sees nothing wrong in paying a woman less because 'she is married and therefore doesn't need as much,' or paying her less because 'she is not married and therefore doesn't need as much.'"

Tragically, the black woman suffers the greatest discrimination in today's society--one, because she is black; two because she is female. She is in fact, almost completely "disinherited by society" due to the accident of her birth. Narrow and rigid attitudes associated with race and sex discrimination are slowly but surely changing. The youth revolution, black revolution, and women's revolution manifest the need for continued examination of attitudes inherit in their root causes.

While these, and other problems and issues, will continue to confront the nation, it is our mission today to look at women in the world of work, particularly those in technical education. The picture, although bleak, holds some promise.

Workers Who Are Women

According to a 1970 Bureau of Census tabulation, out of more than 250 distinct occupations reviewed in 1969, half of all women workers were employed in only 21 of these occupations. Approximately 25 percent of all employed women were in five occupations--secretary-stenographer, elementary school teacher, bookkeeper, waitress, and household worker--most relatively low-paying and dead-end jobs. Male workers were widely dispersed in comparison to women--50 percent were in 65 occupations.

Let us look for a moment at the pattern of women in the labor force:

- Thirty million American women are gainfully employed, accounting for two out of every five workers
- It is estimated that women will be entering the labor force at the rate of one-half million a year during the decade of the 1970's
- The most startling increase in the labor force in the 1970's is expected among older women workers...the greatest population increase will be among women 45 and over
- The nation's highest unemployment rate is found in youthful Negro girls aged 16 and 17. This youthful group is confronted with an all-time high unemployment rate of 33.7 percent
- In early 1970, working women represented 42 percent of all women 16 years old and over in the population
- In mid 1970, women represented 11 percent of the country's science and engineering technicians
- Since 1960, married women have accounted for nearly half of the increase in the labor force
- In early 1970, over 18 million married women were working or looking for work, representing about 60 percent of the female labor force
- Historically, Negro wives have had a higher labor force participation than white wives
- Full-time jobs are held by 75 percent of all working women
- Nine out of ten women will work sometime during their lifetime
- In March, 1969, 5.4 million of the 50.5 million families in the United States were headed by women--half were working or looking for work

It is apparent from the foregoing statistics that the need for technical training and employment opportunities for women will expand in keeping with the changing nature of the labor force.

According to an article by Hedges in the June, 1970, Monthly Labor Review:

> "The nation requires the labor that women can provide. But those requirements are becoming more and more specific. Needs are in individual occupations, not in the labor market. And those needs are dynamic, for at any one time some occupations are growing very rapidly, others are growing slowly, if at all, and some are declining numerically. These conditions require a labor force that is responsive to changing opportunities. The continued concentration of women in a narrow range of occupations runs counter to that concept."

Whether women will work from economic necessity or to supplement the family income, demands for education and employment will sharply increase in this decade. Providing such opportunities for five million women entrants in the labor force during the 70's is no small challenge.

Stereotyped Attitudes Restrict Options for Women and Men

A major problem with respect to women in technical education is the failure to opt for educational opportunities which are available. For example, of the eight million persons enrolled in federally supported vocational and technical education programs in Fiscal Year 1969, women in technical education accounted for only .6 percent of all enrollees. Stereotyped attitudes have no doubt contributed to outmoded notions that women should pursue only those occupations traditionally viewed as "appropriate for women."

Thousands of young women may yearn to enroll in such technology programs as drafting and design, water pollution control, electronics, plus numerous other technology programs. Societal pressures and rigid attitudes, however, cause them to seek out training opportunites which have traditionally been considered "appropriate for women," but for which they may have little aptitude or interest. Conversely, the same attitudes are operative among young men. Such attitudes continue to prevail in spite of the results of the 1958

aptitude study performed by the U.S. Department of Labor which negated erroneous assumptions of wide differences in the aptitudes of men and women. It was found, for example, that the particular combination of aptitudes (form and space perception, eye-hand coordination, finger and hand dexterity) required for technical and trade occupations are found as frequently among female as male students. It is interesting to note, for instance, that aptitudes required for engineering are found in two-thirds as many women as men. In 1968, however, engineers in all fields totaled 1.1 million, of whom only about 8,000 or less than one percent were women.

Although the National Advisory Council on Vocational Education recently adopted the position that "girls need to be admitted to many industrial programs," no organized effort is yet underway to meet this objective.

Proportion of Women in Technical and Professional Occupations Shrinking

A major effort is needed to direct women into non-stereotyped educational and employment opportunities. According to the Women's Bureau, U.S. Department of Labor, women account for a smaller proportion of all technical and professional workers today than prior to World War II. This is in spite of the fact that the number of women in technical and professional occupations has nearly tripled since 1940. For example, women represented 37 percent of all technical and professional workers in 1969, as compared with 45 percent in 1940. In contrast, the proportion of women in the labor force rose from 26 to 37 percent over the same period of time.

Although some effort is being made to encourage women to opt for technical occupations, the proportion of women in these fields is shrinking while the proportion of women in less skilled and lower paid occupations is increasing.

Disparity Between Earnings of Men and Women

Salary differentials between men and women pose another real problem. Although federal laws require equal pay for equal work, the 1970 census revealed that a male with an eighth-grade education earned an average of $7,140 a year, while a female with the same education earned $3,970. The average for high school graduates was $9,100 and $5,280, and for college graduates, $13,320 and $7,930. Perhaps this is one reason so few women are enrolled in technical education programs.

Changing Expectations of Women

The life styles, roles, and expectations of women, as well as men, are shifting largely in response to technological achievements, economic considerations, and changing social values. Dynamic labor force requirements during the 70's appear to expand the probabilities of women working outside the home and in a greater number of occupations.

Since it is now a clearly established fact that nine out of ten women work sometime during their lifetime, the need to develop expanded technical training and employment opportunities seems apparent. Projections by experts that half of the labor force will consist of women by 1980 amplify the challenge which lies ahead for technical educators.

Developing open attitudes with respect to education and employment opportunities for both men and women is imperative. Members of both sexes should be encouraged to seek educational and employment opportunites purely on the basis of interests, aptitudes, and abilities, without regard to traditional attitudes and outmoded stereotypes.

Underutilization of half of the nation's peoplepower is an economic waste and potential social suicide. We should, and can, do better.

Emerging Technologies Hold Promise for Both Sexes

Newly emerging technologies such as electro-mechanical technology, bio-medical equipment technology, laser and electro-optical technology, nuclear medical technology, noise control and abatement technology, etc., offer promise for both men and women. This is particularly true since most emerging fields have not been stereotyped as educational and employment opportunities "appropriate for men" and/or "appropriate for women."

Phenomenal Growth of Technical Education

Technical education programs expanded at the fantastic rate of nearly 20 percent per year during the 60's. Similar growth may be expected during the 70's. Hence, it appears imperative that administrators, supervisors, teacher educators, guidance counselors, teachers, business and industry advisory groups, and others in policy making and program positions be made aware of and understand issues and problems inherent in the full utilization of womanpower.

In light of changing social, economic, and political realities, it appears that technical education must meet the challenge to prepare both men and women to function effectively in the techtronic age of the 70's.

Today's meeting is one small step in that direction.

Thank you.

3774

AIR TRAFFIC CONTROLLER EDUCATION

FRED M. MARKS
Chief of Training Branch
Air Traffic Control
Federal Aviation Agency
Oklahoma City, Oklahoma

The Air Traffic Training Branch at the Academy here in Oklahoma City provides training to the air traffic control personnel of the Federal Aviation Administration. The FAA furnishes air traffic service along the nation's quarter million miles of airways and at terminal airports throughout the fifty states. There are 24,000 air traffic controllers in the system nationwide, so we have an ongoing problem of providing properly qualified and trained personnel to the 711 locations from which air traffic control service is provided.

I plan to present my talk on Air Traffic Controller Education in three main sections:

the students ... who eventually become the controllers

the instructors

and the courses.

I plan under the portion titled "students" to tell you what the qualifications are of a person coming into air traffic service--what the raw materials, the untrained person is that we are training. Under this portion I would like also to refresh your memory on what it is that an air traffic controller does because you should know what we are training these students to do.

Under the second title, the "instructors," let me explain the air traffic instructors' background, the philosophy behind the concept of centralized (taught at the FAA Academy) air traffic training.

And, in the latter part of this talk, under the subtitle, the "course," we'll be discussing the size of the school, the classrooms and laboratories, the variety of air traffic control courses and specifics about the terminal program and the enroute program.

Students

The qualifications of persons coming into air traffic service--21 years of age--no maximum age--difficult if over 40--male or female--aptitude test--spatial visualization--physical--phychological (high anxiety)--personal interview--qualifying experience.

So, we are teaching people with this background to become air traffic controllers.

Air traffic controllers work at one of three types of locations: centers, towers, or flight service stations.

Number of air traffic control centers.

Number of center controllers--12,000.

Duties--general--enroute separation service--specifics:

communicate directly--look at radar

display--provide separation.

Number of towers--350.

Number of tower controllers--8,000.

Duties--communicate directly--provide service--155 ASR's.

Job titles--flight data--local control--ground control--approach

control--radar approach control.

Number of Flight Service Stations--334.

Number of FSS Specialists--4,000.

Duties--communicate directly--handle flight plans--NOTAM

service--weather reporting. Job titles--teletype

broadcast--inflight--preflight--and flight data.

In general terms, air traffic trainees must learn: Aircraft flight characteristics--flight speeds, rates of climb, rates of descent, and other flight characteristics.

Air traffic rules, the rules of the air which dictate what action pilots will take under a multitude of different circumstances.

The rules to be applied by the air traffic controller in providing the service called air traffic control. These are procedural rules. This includes separation minima, approach control procedures, enroute procedures, and departure procedures. Thick book--controllers' Bible.

Pilot/controller radio techniques and procedures, together with the standardized phraseologies required by National and International standards and agreements.

He must develop the skill of using the foregoing knowledge areas to provide air traffic control service to flights operating throughout the system. Visualize objects in space. Not be disturbed by several simultaneous activities.

Instructors

Let's talk now about air traffic instructors. The FAA has adopted the philosophy that to teach people to become air traffic controllers we should use air traffic controllers as instructors. So we use air traffic controllers turned educator rather than educators turned air traffic controller. All instructors in the Air Traffic Training Branch, all 310 of us, are ex-air traffic controllers, with the exception of the clerical people. All of us have attended instructor training courses before teaching. But it is important that when one of our instructors stands in front of a class or teaches in the laboratory that (etc.)

Rotational policy.

Training officers (EPDO's in centers and towers).

Staff experience

Courses

And now, the last part of my talk, the "courses," in which we'll discuss the size of the school, the classrooms and laboratories, the variety of air traffic control courses and specifics about terminal and enroute courses.

The Air Traffic Training Branch is part of the FAA Academy and the Academy is part of the FAA Aeronautical Center. In Aeronautical Center--about 4,000 FAA people. In Academy--900, 310 in the Air Traffic Training Branch. Other disciplines taught--electronics maintenance and flight standards. We teach a variety of courses:

Enroute Training--purpose--94 instructors--1500/year more details later.

FSS--14 instructors--220 students per year--14-week course--FSS lab--teletype lab.

Terminal Training Program--40 students each 5 weeks attending 9-week course. Teach flight data, local, ground, non-radar and radar approach control. How to teach local and

ground control. 4 TV monitors/classroom--lab. Headsets and foot-actuated mike switches. Scenes from Will Rogers Tower. Radar labs. Experience with Huntley-Brinkley TV show.

Computer Training--NAS Stage A

ARTS III

Hardware courses

Writing--Course development.

Examination and Certification.

Project 150--10 instructors

6-month course--Comm. skills--writing, speaking

Math

Human relations--look at self--

how to get along with fellow man

History aviation--FAA

What makes airplane fly

Basic aviation weather

100 students per year

5 instructors exception to rule of being ex-air traffic controllers.

Special Projects--Short Courses

Internationals

Teach 29 courses. 576 students on board daily population. 3400 per year. Most classes have 20 students, 1 instructor. In labs, ratio changes. In classroom 5 days per week, 8 hours per day. Homework assigned. Specifics of one course--National Enroute Course

4 parts: Indoctrination - Civil Service

FAA

DOT

ATS

Phase I Flight Data - Interphone

II Non-radar

III Radar training

Indoctrination, Phase I - taught at facility. Phase II and III taught at Academy. 14 weeks. Programmed lesson plans illustrated or personalized with experience of instructor.

Customized--by facility--mostly lab.

After attainment of full proficiency level TPAP (Technical Performance Appraisal Program) semi-annual written--over the shoulder evaluation--weaknesses--refresher units, remedial training.

School at Lawton - Management Training School. Starting next month.

Improve supervisory and management skills of agency. Taught first year by Oklahoma University, then handed off to FAA.

That is a quick look at how the air traffic controller is educated. There are many truly significant advances just over the horizon in the field of air traffic control. Computers have been installed in all centers and many towers are being made optional. When these are commissioned, they will talk with one another, print flight progress strips, track radar targets and make radar handoffs--and, later on, do conflict prediction and conflict resolution. These advances will place additional requirements on training the air traffic controller.

It has been a pleasure talking with you and telling you something about the world's best organization, the Air Traffic Service of the Federal Aviation Administration.

3779

"THE U.S. OFFICE OF EDUCATION'S

PROGRAM FOR

TECHNICAL EDUCATION"

DR. WALTER BROOKING
Technical Educ. Program Officer
U.S. Office of Education
Washington, D.C.

Thank you, Chairman Tuttle, ladies and gentlemen. I bring regrets from Dr. Rumpf that he cannot be here, and I wish greatly that he could be because I am sure that he would bring to you another facet of our organization and our strength. He is doing as many of us do from time to time; he is minding the store. And in times such as these when there are so many things we need to get done, keeping the store is mighty important. As a matter of fact, as I look at the results of this clinic, which for many years, as many of you know, has been a featured part of the program of the U.S. Office of Education, Division of Vocational and Technical Education, I am particularly delighted with this year's turnout, especially in view of financial limitations which prevent some from traveling. I am inspired by the way the conferees stay through to the end of these clinics. We feel gratified about this and hope it is an indication of the value that is placed on these programs.

Certainly with the problems many states are having this year, to have had representatives from 45 states, the District of Columbia, and American Samoa is a very

interesting and exciting evidence of the awareness and interest in this particular clinic. We believe that the fact that it has been a jointly-sponsored program reflecting the common interests, programs, and aspirations of both ATEA and the Office of Education strengthens the promise for the future of all our efforts.

We want to express our special appreciation for the efforts of our host institution, the Oklahoma State University Technical Institute, for the success of this clinic. Everyone clearly has done everything that they were expected or planned to do. They even had an "in" with the weatherman, which I think is magnificent. Three or four weeks ago, I called down here and they were like Eskimos under a snow bank. They said, "We're going to get this cleared away before the clinic," and they did.

We think the clinic is an extremely important yearly event and one of growing importance each year. We have always struggled to make a good selection for the next year's clinic location. In the past the decision has always been delayed until a few months before the clinic thus placing an unreasonable burden on ourselves and particularly on the ATEA and host institution. Their magnificent performance has been a real indication of their effort, devotion, and capabilities. We believe, however, that it is unreasonable to do it that way. Therefore, the ATEA has spent a lot of hours and time in the past few weeks, and we have been working with them to arrive at a plan and a place for the program next year. This will give us six or eight months to plan and do advanced work which is still not enough, but is so much better than before.

This is the reason that Jimmie Styles, vice chancellor of Tarrant County Junior College, is here at the head table. The 1972 national clinic will be at his institution in Fort Worth, Texas, under the sponsorship of the Southeastern and Southwestern regions of the ATEA. The 1973 annual meeting will obviously be held at a location some distance from there the following year. This is the plan and for that reason I would like for Phil Chandler and Jimmie Styles to step to the rostrum for just a moment and go through a little ceremony of "passing the almanac." This almanac is a documentation of steps to take in the planning and conduct of next year's clinic. It has become an assurance of quality.

Dr. Phil Chandler: Thank you, Walter. I do want to take just a minute to thank all the conferees for being with us for the past three days. There have been many compliments about this conference; and if there has been any success at all, it is because we have an almanac. We call it the ATEA Almanac. I am holding it here in my hands,

and I have been holding it at various times during the past six months. About six months ago, George Mehallis, who had an extremely successful clinic in Miami, gave me this rather varied assortment of information on how to have a successful clinic. I followed it right down the line. Apparently, it was a good outline and now I want to pass it on to the vice chancellor, and I hope to add a supplement which will be forthcoming in a few weeks.

Jimmie Styles: Thank you, Phil. I know that most organizations at certain periods of time pass the gavel from one leader to the other, and I am assuming that this is consistent with that transfer. I do not know how many of you have had the opportunity to participate in the development of a regional conference, but it is an experience.

I want to give you all a personal invitation to come to Fort Worth next year. Bring a friend or a fellow worker. We are striking for 1,000 in attendance, and you know in Texas we have to do it up right. We have approximately 1,000 ATEA members, but it seems that we don't bring our friends and co-workers. If you will come down to Texas, we will show you a good time and show you what we call an instant junior college.

Tarrant County Junior College is about three and a half years old. It has a plant and equipment layout of approximately $32 million in operation. We went from 0 students to 4,300 students overnight. This coming fall we will probably enroll in excess of 13,000 credit students and about 11,000 non-credit students. We would like for you to come down to see us.

A while ago I told Phil that we would match Texans one for one for every Okie that he could bring down. As you know there is some competition between these two states every once in a while, so to do it right we will match him two for one. So, Phil, instead of getting one bus you had better get two or three. You all come.

Dr. Brooking: Now we have collectively placed a burden on Jimmie Styles, and we will be working very closely with him and will be looking forward to next year.

Now to the subject on your program. Bearing in mind that we have heard excellent speakers who have pointed out some important problems of the day, the growth of technology, and all of the things we need to be aware of, I think we all agree that there is a gigantic job to be done. It is almost as if one of these most complicated miracles of technology has come to the point where you have a nuclear system that is turning critical. I think this is where we stand in vocational-technical education. We believe this to imply the size of the job that we have ahead of us.

When we speak of the USOE, I think we have a number of things that we are doing which should be brought to your attention. Not just us, but you as well. We, in Washington, have a very special function to perform in the change in technology, population growth, and the need for a quality of life to be maintained and bettered. There are pressures and changes that are constantly bringing about rearrangements. This is a preoccupation of our national leaders, both in the legislative and the executive branch. We, of course, are in the executive branch, and it is our business to help shape the tasks that come from headquarters in the form of carrying out legislation to help those who will be changing it to the things that continue to make sense where the action really counts - in local institutions.

Practically everybody who seems to be interested in the well being of the nation in a constructive fashion is talking about technical, career, or vocational education. Practically everyone feels that they know something about it. I think the reason that it is becoming somewhat a critical situation is because there has been a tremendous realization of the importance as to what technical education is all about and a tremendous desire to do something about it. Hence, in the U.S. Office we have a program which starts with new leadership. As you all are aware, Dr. Hardwick, our Associate Commissioner and head of our bureau, and our leader, is one of the hardest working men I have ever seen and known. Fortunately, he is a man who completely understands technical education in the way that few people do.

We also have a new commissioner with whom Dr. Hardwick has been working. The new commissioner, as you all would know, comes to a very complicated and large task. He has been on the scene for some time, and Dr. Hardwick has been working with him and others of his staff. A part of the big job to be done by us at the national office is to relate everything we can get from all of you in the places where education really happens to Dr. Hardwick so that he can carry the story of what you see as the things that need to be done. In this way Dr. Hardwick can help the commissioner and those beyond him in our national leadership to "put it all together" in the best possible programs.

As we have said, practically everybody is offering advice on technical education. It is like a nationwide informal advisory committee. And as Dr. Al Philips, President of the Tulsa Jr. College, so very convincingly told us earlier this week, an advisory committee's assistance is absolutely essential. Fortunately the citizens of this nation are in a high state

of readiness to be advisory. The real task at the moment is the step that Dr. Philips emphasized as most important: that there be someone who is technically or professionally competent to put all this advice in a workable perspective.

We recall the description of a camel as something made by a committee which turned out to be a very unattractive device or structure. So what we are trying to do and what Dr. Hardwick is trying to do night and day is to provide a mechanism which puts policies and resources in perspective and reflects optimum program effectiveness from the U. S. Office headquarters through our regional offices to you in the field where things really happen.

If Dr. Browning had been here, he would have been at the head table as chief representative of the region in which we are meeting. Unfortunately, he had a personal commitment which took him back to Dallas. His staff is a vital part of the organization and the programs of the USOE. The regional staffs are providing more and more service and assistance in this two-way operation of putting things together and making all our efforts more efficient, whether in Washington, D.C. or working with your state director or with you in your own institutions.

The new organization which we have in the Division of Vocational and Technical Education provides a special staff position for industrial or employer relationships, and another one for intergovernment and other organization relationships. These professional personnel serve the need to assist and inform the new people in the administrative structure wherever they may be in the organization.

This is one of the greatest tasks and challenges that we have as technical educators and administrators. It is the constant re-education and infusion of contact with the reality of the objectives we serve. We believe the ultimate reality is the employer and the student. We have two customers. We must serve both. Our new organization provides ample and considerable potential to serve the ultimate needs of both.

Then we have a post-secondary branch in which the technical education section is involved with high school, post high school, and adult students. Those of you who listened to Dr. Hardwick yesterday heard of the concerns that we have and what we are doing about them. The introduction of our young people in grade school and high school to the tremendous smorgasbord of opportunities for careers is the idea of career education. The great majority of our elementary and secondary school youth never hear about vocational and technical careers or occupations until they get out of high school. This

must be changed, and a special emphasis on career education will be the organizational structure which will provide the impetus.

Our cooperative efforts with EPD to strengthen teacher-preparation programs will concentrate on developing appropriate programs to teach new kinds of teachers for the new and emerging population's concerns of vocational and technical education. These are teachers for new technologies and specialities and for persons with the special needs, as well as specially-trained teachers, to introduce vocational and technical career choices to elementary and secondary school youth.

There is a new area which I think we should mention. It is environmental and ecological education which is included in the new organization as a part of the occupations group.

We at the headquarter offices and at the regional offices are equipped and ready and anxious to do our part to serve you and to receive from you the information necessary to make substantial progress toward providing increasingly better assistance to you.

Where does the ATEA fit into this structure? We believe it is a nucleus from which we are growing. After all, we in technical education have always been in a pioneering business. We are pleased that this particular kind of education has been strengthened and brought before the public by the national advertising campaign on technical careers supported by our office and sponsored by the National Industrial Conference Board. It will be continued for another year. It prompted more than a million people to write letters of inquiry. This is only one evidence of the relevance of and need for technical education. There are many others.

We believe real progress is being made, and it seems to us that we must redouble our efforts and use our total collective capabilities. In the light of all the advice and all the assistance and all the potentially constructive forces that are operative toward accelerated progress and growth in technical education, we believe that the ATEA and us working together are well on our way toward greater success and service.

So much for our program. We are busy about it. We think it is so important that we cannot neglect any part of it, and we know that you feel the same way. So we look forward to seeing you next year in Fort Worth and we hope many, many more of our colleagues across the nation can be there. In the interim, we will continue to serve you unhesitatingly. Thank you.

APPENDICES

AMERICAN TECHNICAL EDUCATION ASSOCIATION, INC.

Minutes of Business Meeting

Thursday, March 25, 1971
Oklahoma City, Oklahoma

Dr. Ruth Midjaas, President, called the business meeting to order at 10:35 a.m., Thursday, March 25, 1971, at the Holiday Inn West, Oklahoma City, Oklahoma. President Midjaas indicated that this was the first annual business meeting to be held during the National Clinic. Previously ATEA business meetings have been held during the AVA Convention.

The Executive Secretary, Mr. William Fenninger, read the minutes of the 1970 business meeting. The minutes were approved as read. Mr. Fenniger presented the ATEA financial report. The balance on hand on March 1, 1971, was $13,143.33. He reported that there were 1315 individual members and 300 institutional members as of November 30, 1970.

Mr. Hubert Reid reported the following nominations for regional representatives:

Atlantic Region--George W. Ellison
Southeastern Region--Robert Ferguson
Southwestern Region--Jack Tompkins
Plains Region--J. Barry Ballard

Jerry Dobrovolny moved that the nominations be closed and the secretary be instructed to cast a unanimous ballot in behalf of the nominees. The motion was seconded and passed unanimously.

Officers elected for a one year term beginning November 1, 1971 were introduced:

George Mehallis--President
Lloyd Phipps--President Elect
Frank Sheehan--Vice-President
William Fenninger--Executive Secretary
Lucian Lombardi--Treasurer

Trustees elected for a three year term were also introduced:

Jerry Dobrovolny
James Horton
Charles Bowen

NOTE: Due to unexpected assignment for the coming year, Mr. Bowen requested that his term as a trustee begin November 1, 1972.

Mr. Ralph Kuhli was elected by a mailed ballot since the December meeting. He will represent the health technologies.

Jerry Dobrovolny reported for the dues and editorial committees. For two years ATEA has engaged CCM Professional Magazines, Inc. to publish on a trial basis a Technical Education supplement to Industrial Arts and Vocational Education five times a year. CCM Professional Magazines has proposed to print a section on technical education in all 9 issues of IAVE and mail the entire magazine to all members of ATEA. ATEA would pay $3.50 per audited member. This would provide service to all members on a more regular basis and enable the publisher to work more conveniently in terms of layout. This coverage will cost an additional $1.50 per member. Because of this increase and the increase in postage and other expenses, a $2.50 increase in the dues structure was recommended. It was further noted that the technical education articles would be bound together and available to libraries and teacher training institutions.

It was moved and seconded that dues for individual members be increased to $7.50 beginning November 1, 1971. Motion carried unanimously.

Announcements were made of upcoming regional and state technical meetings.

Dr. Midjaas reported that changes in the ATEA bylaws proposed by the Oklahoma members were discussed at the trustees' meeting. There was agreement among the trustees that the bylaws needed some changes. A committee to rewrite the bylaws was appointed: Dr. George Parkinson, Chairman, Dr. Lloyd Phipps, Barry Ballard, and Dr. Mary Ellis. The committee was instructed to receive input from all members and report at the trustees meeting in December.

Mr. Reid suggested having a travel account is very important to effectiveness as a member of a committee. Dr. Phipps indicated that this could eliminate some very good people and suggested telephone conferences be used to include some of these people in the deliberations.

The meeting adjourned at 11:30 a.m.

Appendix B

The Program

NATIONAL CLINIC ON TECHNICAL EDUCATION

sponsored by

United States Office of Education
and
American Technical Education Association

Hosted by

Plains Region of
American Technical Education Association

April 24, 25, 26, 1971

Holiday Inn - West
Oklahoma City, Oklahoma

3789

Theme: "Emerging Technologies - Application For Tomorrow"

Wednesday, March 24, 1971

8:00 a.m. - 10:00 a.m.	Registration
10:00 a.m. - 12:00 noon	FIRST GENERAL SESSION
Presiding:	Dr. Ruth Midjaas, President ATEA
Recorder:	Mr. Joe Ables, Director Department of Technology Northeastern Oklahoma A&M College Miami, Oklahoma
Welcome	Dr. Bruce Carter Administrative Assistant to the Governor of Oklahoma for Health, Education, and Welfare
Address:	"Emerging Technologies" Mr. Joe Hunt, Vice-President Bell Telephone System New York, New York
Address:	"The Challenges of Emerging Technological Changes" Mr. Paul Strasbaugh Executive Vice-President Oklahoma City Chamber of Commerce
12:00 noon - 1:30 p.m.	LUNCH ON YOUR OWN
1:30 p.m. - 3:00 p.m.	SECOND GENERAL SESSION
Presiding:	Dr. George Mehallis Vice-President of the American Technical Education Association
Recorder:	Dr. Paul Braden, Chairman School of Adult and Occupational Education Oklahoma State University Stillwater, Oklahoma

SUBJECT I

Address: "Programs for Technicians in Physical Science and Engineering"
Dr. Al Philips, President
Tulsa Junior College
Tulsa, Oklahoma

SUBJECT II

Address: "Programs for Technicians in Agriculture and Natural Resources"
Howard Sidney, Chairman
Department of Agriculture and Natural Resources
SUNY, Agricultural and Technical College
Cobleskill, New York

SUBJECT III

Address: "Technical Programs in Allied Health"
William F. Sands, Program Officer
Allied Health, Vocational, and Technical Education
Program Office
Region 6
Dallas, Texas

3:00 p.m. - 3:15 p.m. COFFEE BREAK

3:00 p.m. - 3:15 p.m. DISCUSSION GROUP

	Chairman	Recorder
SUBJECT I	A. Philips	Jim Moshier
SUBJECT II	H. Sidney	Hallard Randell
SUBJECT III	W. Sands	Clara Brentlinger

5:00 p.m. - 8:30 p.m. VISIT EXHIBITS

Open Evening Tickets and transportation will be available for attending such evening events as:

3791

Oklahoma City Mummers Theatre
Dinner Theatre
India Shrine Circus
Jewel Box Theatre
Others to be selected

Thursday, March 25, 1971

9:00 a.m. - 10:30 a.m. THIRD GENERAL SESSION

Presiding: Dr. Walter Brooking
Division of Vocational and Technical Education
USOE
Washington, D.C.

Recorder: Dean Gail J. Phares
Metropolitan State College
Denver, Colorado

SUBJECT IV

Address: "The Cooperative Education Program of the Texas Construction Industry"
Dr. Walter Kerr
Executive Vice-President
Construction Industry Council for Education, Manpower, and Research
Tyler, Texas

SUBJECT V

Address: "Construction Industry Cooperative Education Programs in Texas Secondary Educational Institutions"
Mr. W. A. Fitz
Texas Education Agency
Austin, Texas

Address: "Construction Industry Cooperative Education Programs in Texas Secondary Educational Institutions"

	Mr. Joe Godsey, Director Post Secondary Vocational Education Development Texas Education Agency Austin, Texas
10:30 a.m.	ATEA Business Meeting
10:30 a.m. - 12:00 noon	Visit Exhibits
12:00 noon - 1:15 p.m.	DEDICATION OF NEW TECHNOLOGY BUILDING, OKLAHOMA STATE UNIVERSITY TECHNICAL INSTITUTE, OKLAHOMA CITY
Invocation:	Mr. Arch Alexander, Assistant Director State Office of Vocational and Technical Education
Welcome & Introductions	Mr. John Parsons, President Oklahoma City Chamber of Commerce
Introduction of Speaker	Dr. Francis Tuttle, Director State Office of Vocational and Technical Education
Speaker:	Dr. Lee Hardwick Associate Commissioner Adult, Vocational, and Technical Education U.S. Office of Education
Introduction of Dedicatory Speaker	Dr. Robert B. Kamm, President Oklahoma State University
Dedication of Building	Honorable David Hall, Governor State of Oklahoma
Benediction	Dr. Dolphus Whitten, President Oklahoma City University

1:45 p.m. - 3:15 p.m. FOURTH GENERAL SESSION

Presiding

Frank J. Sheehan, Member
Board of Trustees
American Technical Education Association
Windsor, Ontario, Canada

Recorder:

Helen Powers, Program Officer
Health Occupations
USOE
Washington, D.C.

SUBJECT VI

Address:

"Transportation in the 21st Century"
Dr. James R. Romualdi, Director
Transportation Research Institute
Carnegie Mellon University
Pittsburgh, Pennsylvania

SUBJECT VII

Address:

"Allied Health in the 21st Century"
Dr. Miles Anderson
University of California
Los Angeles, California

SUBJECT VIII

Address:

"Ocean World of the 21st Century"
Mr. Ted Koschler, Vice-President
Miami-Dade Junior College
Miami, Florida

3:15 p.m. - 3:30 p.m. COFFEE BREAK

3734

3:30 p.m. - 4:45 p.m. DISCUSSION GROUPS

	Chairman	Recorder
SUBJECT VI	J. Romualdi	Mr. Miller Tiger
SUBJECT VII	M. Anderson	Herman Reisenberg
SUBJECT VIII	T. Koschler	Dr. Gail Capstick

5:00 p.m. - 8:30 p.m. VISIT EXHIBITS

Friday, March 26, 1971

9:00 a.m. - 12:00 noon EXHIBITS OPEN

9:00 a.m. - 10:30 a.m. FIFTH GENERAL SESSION

Presiding: Dr. Roy Dugger, President
Texas State Technical Institute
Waco, Texas

Recorder: Mr. John Talbott, State Supervisor
Technical Education
State Department of Vocational and Technical Education
Stillwater, Oklahoma

SUBJECT IX

Address: "Women in Technical Education"
Dr. Mary Ellis
Technical Education Research Center, Inc.
Washington, D.C.

SUBJECT X

Address: "Air Traffic Controller Education"
Mr. Fred M. Marks
Chief of Training Branch
Air Traffic Control
Federal Aviation Agency
Oklahoma City, Oklahoma

0003795

10:30 a.m. - 12:00 noon	COFFEE BREAK - EXHIBIT OPEN
12:00 noon - 1:45 p.m.	SIXTH GENERAL SESSION LUNCHEON
Presiding	Dr. Francis Tuttle, Director Oklahoma State Department of Vocational and Technical Education Stillwater, Oklahoma
Recorder:	Dean Wayne Miller, Director Oklahoma State Tech Okmulgee, Oklahoma
Address:	"The U.S. Office of Education's Program for Technical Education" Dr. Edwin L. Rumpf, Acting Director Division of Vocational and Technical Education Washington, D.C.
2:00 p.m. - 4:00 p.m.	TOURS (1) Cowboy Hall of Fame (2) Mummers Theatre (3) Federal Aviation Agency Academy

*Presented by Dr. Walter J. Brooking

3756

Appendix C

PLANNING COMMITTEE

Program Co-Chairmen

Dr. Walter Brooking
Division of Vocational & Technical Educ.
U.S. Office of Education
Washington, D.C.

Dr. Philip P. Chandler, Director
Oklahoma State University
Technical Institute
Oklahoma City, Oklahoma

REGIONAL COUNCIL

ARIZONA

Mr. R. Dean Frey, State Supervisor
Technical Education
State Dept. of Vocational Education
Phoenix, Arizona

COLORADO

Dr. Gail J. Phares, Dean
Metropolitan State College
Denver, Colorado

IOWA

Mr. Bill E. Walker
Department Head
Western Iowa Tech
Sioux City, Iowa

KANSAS

Mr. W. George Koon, Director
Industrial Education
Hutchinson Community Junior College
Hutchinson, Kansas

NEBRASKA

Mr. James Dutcher
Division Chairman
Central Nebraksa Technical College
Hastings, Nebraska

NEW MEXICO

Mr. Bill Jackson, State Supvr.
Technical Education
Dept. of Educ. Voc. & Tech
Santa Fe, New Mexico

NORTH DAKOTA

Mr. Sam L. Schimelfenig, Dean
Technical Division
North Dakota School of Science
Wahpeton, North Dakota

OKLAHOMA

Mr. Dale Delano, Assoc. Dir.
Oklahoma State University
Technical Institute
Oklahoma City, Oklahoma

SOUTH DAKOTA

Professor Marion R. Heusinkveld
Dept. Head of Electronics
Southern State College
Springfield, South Dakota

LOCAL PLANNING COMMITTEE

(TOURS)
Mr. Roy Black, Assistant Director
Community Affairs
Oklahoma State University
Technical Institute
Oklahoma City, Oklahoma

(FACILITIES & HOUSING)
Mrs. Ruth Crumley, Exec. Sec.
Oklahoma State University
Technical Institute
Oklahoma City, Oklahoma

(FINANCIAL)
Mr. John Talbott, State Supervisor
Technical Education
State Dept. of Voc. & Tech. Ed.
Stillwater, Oklahoma

(REGISTRATION)
Mr. Barry Ballard, Asst. Supvr.
Technical Education
State Dept. of Voc. & Tech. Ed.
Stillwater, Oklahoma

(COMM. & AUDIOVISUAL)
Mr. Dale Delano, Assoc. Dir.
Oklahoma State University
Technical Institute
Oklahoma City, Oklahoma

(EXHIBITS)
Mr. Marvin Wittrock, Dept. Head
Electronics & Bio-Medical
Electronics
Oklahoma State University
Technical Institute
Oklahoma City, Oklahoma

3798

Appendix D

ATTENDANCE BY STATES

Alabama	1	Missouri	4
Alaska	0	Montana	2
Arizona	9	Nebraska	3
Arkansas	3	Nevada	6
California	3	New Hampshire	1
Colorado	5	New Jersey	1
Connecticut	2	New Mexico	8
Delaware	2	New York	9
D.C.	10	North Carolina	9
Florida	10	North Dakota	2
Georgia	2	Ohio	8
Hawaii	1	Oklahoma	75
Idaho	0	Oregon	1
Illinois	15	Pennsylvania	3
Indiana	2	Rhode Island	0
Iowa	6	South Carolina	3
Kansas	12	South Dakota	1
Kentucky	2	Tennessee	3
Louisiana	0	Texas	36
Maine	1	Utah	2
Maryland	6	Vermont	0
Massachusetts	4	Virginia	1
Michigan	15	Washington	2
Minnesota	4	West Virginia	1
Mississippi	7	Wisconsin	11
		Wyoming	1

American Samoa	2
Canada	2

TOTALS

320 Conferees

34 Vendor Representatives

354 Total Participants

3799
0080

Appendix E

EXHIBITORS

NAME AND ADDRESS	REPRESENTATIVE
AMERICAN TECHNICAL SOCIETY 7337 S. Shore Drive Chicago, Illinois 60649	Harry W. Sears
CANTERBURY SALES COMPANY 4350 N. Central Expressway Dallas, Texas	Louis Cantor
COMPUTER CONGENERICS CORPORATION 2501 S. W. 68 Oklahoma City, Oklahoma	George Teague
DELMAR PUBLISHERS 116 Larkspur Richardson, Texas	Richard Camp
DELMAR PUBLISHERS P.O. Box 5087 Albany, New York 12205	Walter F. Ossenport
DORSETT EDUCATIONAL SYSTEMS 612 Berry Road Norman, Oklahoma 73069	Loyd G. Dorsett
612 C South Crawford Norman, Oklahoma 73069	Verner M. Howard
1512 Homeland Norman, Oklahoma 73069	Steve L. Kastl
DEVRY INDUSTRIES 3956 W. Belmont Chicago, Illinois 60641	Richard E. Gibbons William W. Moore
DIAGIAC CORPORATION Ames Court Plainview, New York 11803	Vince Randazzo
3113 West Avenue R Temple, Texas 76501	Coy R. Wallace

DOWLINGS 839 Maus Lane Wichita, Kansas 67212	James M. Alden
ECONOMY COMPANY 1901 N. Walnut Oklahoma City, Oklahoma	Lawarence DeBell Ike W. McCarley
FABRI-TEK EDUCATION SYSTEMS, INC. 1261 S. Boyle Avenue Los Angeles, California 90054	Gordon W. Carpenter
FEEDBACK INCORPORATION 438 Springfield Avenue Berkeley Heights New Jersey 97922	G. Thorpe J. M. Lawson
HEWLETT-PACKARD 2919 United Founders Blvd. Oklahoma City, Oklahoma 73112	Charles R. Carpenter Glen Stotts
HICKOK TEACHING SYSTEMS INC. Wheeling Avenue Woburn, Massachusetts 01801	Bruce Boal Jerry Webb
7132 Stefani Dallas, Texas 75225	Bill Butz
4321 Creekbend Houston, Texas 77035	Owen Savage
Hickok Teaching Systems Woburn, Massachusetts 01801	Sky Taylor
MCGRAW-HILL Manchester Road Manchester, Missouri 63011	Bill Hickman
PHILCO-FORD 4700 Wissabickon Philadelphia, Pennsylvania	Hugh Anderson
6401 Tinker Expressway Midwest City, Oklahoma 73110	H. Haas
PRENTICE-HALL Englewood Cliff New Jersey 07632	Weldon Rackley
SONY CORPORATION OF AMERICA 9630 Clanton Houston, Texas 77055	Bill Harlow

7737 LaCasa Dallas, Texas 75240	H. T. McAdams
TECH TRAINER CORPORATION 2001 Elmerdorf St. Chattanooga, Tennessee 37406	S. N. Rosen
TEKTRONIX, INC. P.O. Box 500 Beaverton, Oregon 97005	Jon Mutton
901 Office Park Oklahoma City, Oklahoma 73105	Gene Sams

Appendix F

CONFEREES

ALABAMA

Stephens, George T. (Dr.), Associate Professor, University of Alabama, P.O. Box 6243, University, Alabama 35486, 205 348-6058.

ARIZONA

Alderman, Holton L. (Dr.), Director, Cooperative Education, Douglas, Arizona 85607, 602 364-3451.

Ditzler, Walter E. (Dr.), Dean of Vocational Education, Pima Com. College, Tucson, Arizona 85700, 602 623-8552.

Erickson, Marvin A. Department Chairman of Technical Education, Eastern Arizona College, Thatcher, Arizona 85552, 602 428-1133.

Frey, Dean, State Supervisor of Technical and Post Secondary Education, State Department of Vocational Education, 1333 W. Camelback Road, Phoenix, Arizona 85013, 602 271-5356.

Hiserodt, Don D., Project Director, Maricopa County Junior College District, 106 East Washington, Phoenix, Arizona 85002, 602 252-2661 ext. 310.

Hughes Loyd R. (Dr.), Associate Dean of Occupational Education, Yavapai College, 1100 East Sheldon Street, Prescott, Arizona 86301, 602 445-7300 ext. 201.

James Calvin E. (Dr.), Chairman of Industrial Education, Northern Arizona University, Box 6015, Flagstaff, Arizona 86001, 602 523-4741.

McClanahan, Don E., Dean of Occupational Education, Cochise College, Douglas, Arizona 85607, 602 364-3451.

Sorensen, Edwin R., Dean of Occupational Education, Eastern Arizona College, Thatcher, Arizona 85552, 602 428-1133.

ARKANSAS

Green, Winfred H., Vocational Instructor, Hot Springs Rehabilitation Center, Hot Springs, Arkansas 71901.

Mann, Hoyle, Director of Instruction, Southwest Technical Institute, Box 45, East Camden, Arkansas 71701, 501 574-0741.

Taylor, Curtis W., Director of Student Services, Southwest Technical Institute, Box 45, East Camden, Arkansas 71701, 501 574-0741.

CALIFORNIA

Anderson, Miles H., Director of Clinical Institute Training, Allied Health Professors, U.C.L.A., 1003 Wilshire Boulevard, Santa Monica, California 90401, 213 393-9281.

Barlow, Melvin (Dr.), U.C.L.A., 1003 Wilshire Boulevard, Santa Monica, California 90401, 213 393-9281.

Bennion, Kent C., Director AVTE, Region IX HEW-OE, 760 Market Street, San Francisco, California.

COLORADO

Johnson, Charles B., State Supervisor of Technical Education, State Board Community Colleges and Occupational Education, 1525 Sherman Street, Denver, Colorado 80203.

Lacey, John W., Program Officer, Vocational-Technical Education, USOE, 19th and Stout Street, Denver, Colorado 80202, 303 837-4295.

Larson, Milton E. (Dr.), Professor of Vocational Education, Colorado State University, Vocational Education Building, Ft. Collins, Colorado 80521.

Oppenheimer, Frank, President, Gramercy Guild Group, Inc., 1145A West Custer Place, Denver, Colorado 80223, 303 534-4251.

Phares, Gail J. (Dr.), Dean, Metropolitan State College, Denver, Colorado 80204, 303 292-5190.

CONNECTICUT

Fellows, Douglas M., Consultant for Educational Program Developments, University of Hartford, 200 Bloomfield Avenue, West Hartford, Connecticut 06231.

Smith, Bud S., Managing Editor, IAVE Magazine, 22 West Putnam Avenue, Greenwich, Connecticut 06830.

DELAWARE

Humphreys, Lloyd R.,R.,Assistant to the President, Delaware Technical and Community College, P.O. Box 897, Dover, Delaware 19901, 302 678-4621.

Rathfom, Robert L., Supervisor, Vocational-Technical Education, Delaware Department of Public Instruction, Townsend Building, Dover, Delaware 19901, 302 678-4634.

DISTRICT OF COLUMBIA

Briggs, Lloyd D., Chief, Vocational Educational Personnel, U.S. Office of Education, 7th & D Street Southwest, Washington D.C. 20202, 202 962-7394.

Brooking, Walter J. (Dr.), Program Officer, Secondary, Post Secondary, and Technical Education, U.S. Office of Education, ROB 5608, Washington, D.C. 20202, 202 962-5230.

Ellis, Mary L. (Dr.), Director, Technical Education Research Center, 2401 Virginia Avenue, Northwest, Suite 301, Washington, D.C. 20037, 202 965-9590.

Hardwick, Lee (Dr.), Associate Commissioner for Adult, Vocational, and Technical Education, Washington, D.C.

Lawrence, Frank B., Acting Assistant Superintendent, D.C. Public Schools, Department of Vocational Education, 415 12th Street, Northwest, Washington, D.C. 20202, 202 737-5298.

Nisos, Michael J., Managing Director, Aerospace Education Foundation, 1750 Penn Avenue, Northwest, Washington, D.C. 20034, 202 298-9123.

Powers, Helen K. (Miss), Program Officer, Health Occupations, DUTE, U.S. Office of Education, ROB Room 5122, Washington, D.C. 20202, 202 963-7607(8).

Pratt, Arden L., Director of New Institutions Project, American Association of Junior Colleges, L Dupont Circle, Washington, D.C. 20036, 202 293-7050.

Rumpf, Edwin L. (Dr.), Acting Director, Division of Vocational and Technical Education, Washington, D.C.

Tangman, Edward P., Assistant Director of Trade and Industrial Education, D.C. Public Schools, Vocational Department, 415 12th Street #1001, Washington, D.C. 20004, 202 347-1665.

FLORIDA

Abell, Norm E., Associate Professor of Mechanical Engineering Technology, Brevard Community College, Cocoa, Florida 32922, 305 632-7010.

Bennett, Mary L., (Mrs.), Faculty Affiliate, Allied Health Tech, Broward Community College, 3501 Davie Boulevard, Fort Lauderdale, Florida 33300.

Cohen, Nathan L., Associate Dean of Instruction, Miami-Dade Junior College, Miami, Florida 33132, 305 358-3801.

Koschler, Theodore A., Vice-President for Occupational Education and Administration Services, Miami-Dade Junior College, 11011 Southwest 104th Street, Miami, Florida 33156, 305 274-1345.

Mehallis, George (Dr.), Director Technical Vocational Studies, Miami-Dade Junior College, 11380 Northwest 27th Avenue, Miami, Florida 33167, 305 685-4301.

Ray, Richard D., Assistant Administrator for Technical and Health Occupations Education, Florida Department of Education, Knott Building, St. Augustine Street, Tallahassee, Florida 32304, 904 599-5767.

Strickland, Thomas W. (Dr.), Director, Technical and Health Education, Florida Department of Education, Tallahassee, Florida 32304, 904 599-5767.

Tinsley, Burnette R., Director of Technical and Occupational Education, Manatee Junior College, Bradenton, Florida 33505, 904 755-1511.

Williams, Rudy V., Director, Division of Career Programs, Miami-Dade Junior College, South Campus, 11011 Southwest 104th Street, Miami, Florida 33156, 305 274-1158.

Zabsky, Harold J., Staff Associate, Division of Allied Health Studies, Miami-Dade Junio. College, 11380 Northwest 27th Avenue, Miami, Florida 33167, 305 685-4486.

GEORGIA

Hicks, Harry E., (Dr.), Director Vocational-Technical Education, Atlanta Public Schools, 2930 Forrest Hills Drive, Atlanta, Georgia 30315, 404 761-5411.

Wallace, George E., Director of Adult, Vocational, and Technical Education, U.S. Office of Education, Region IV, 50 Seventh Street Northeast, Room 550, Atlanta, Georgia 30323.

HAWAII

Inaba, Lawrence A. (Dr.), Specialist, Industrial-Technical Education, Department of Education, P.O. Box 2360, Honolulu, Hawaii 96804, 531-6918.

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VT 014 376
WOODIN, RALPH J.
USE OF RECRUITMENT MATERIALS BY OHIO TEACHERS OF VOCATIONAL AGRICULTURE.

OHIO STATE UNIV., COLUMBUS. DEPT. OF AGRICULTURAL EDUCATION.
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ABSTRACT - THE OHIO RECRUITMENT COMMISSION FOR AGRICULTURAL EDUCATION RECOMMENDED IN 1971 THAT A KIT OF MATERIALS BE PROVIDED TEACHERS TO AID THEM IN RECRUITING FUTURE VOCATIONAL AGRICULTURE TEACHERS. THIS DOCUMENT IS A REPORT OF A FOLLOW-UP STUDY CONDUCTED TO DETERMINE THE USE OF THESE MATERIALS BY TEACHERS. THE DATA ARE BASED ON RETURNS FROM 112 TEACHERS. IT WAS FOUND THAT 37 PERCENT OF THE TEACHERS USED THE MATERIALS TO TEACH A UNIT ON AGRICULTURAL CAREERS, DURING MARCH OR APRIL, 39 PERCENT HAD PREVIOUSLY TAUGHT SUCH A COURSE OR WERE PLANNING TO, AND 25 PERCENT HAD NO PLANS TO DO SO. THE RATINGS OF MATERIALS IN THE PACKET SHOWED THAT TEACHERS FOUND THE TEACHING GUIDE MOST USEFUL; HOWEVER, ALL OF THE INFORMATION WAS RATED AS IMPORTANT AND DESIRABLE. IN RATING THE IMPORTANCE THEY ATTACHED TORECRUITING HIGH SCHOOL STUDENTS, MERELY TWO THIRDS OF THE TEACHERS POLLED INDICATED IT WAS "VERY IMPORTANT." COMMENTS FROM TEACHERS ON HOW RECRUITING WOULD BE MORE EFFECTIVE ARE CLASSIFIED UNDER 11 DIFFERENT HEADINGS. IT WAS NOTED THAT ONLY ABOUT ONE IN FOUR GRADUATES IN VOCATIONAL AGRICULTURE ENROLLED IN ANY TYPE OF POST HIGH SCHOOL EDUCATIONAL INSTITUTION. (GEB)

VT 014 376

USE OF RECRUITMENT MATERIALS
BY
OHIO TEACHERS OF VOCATIONAL AGRICULTURE

A Staff Study
by
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The Ohio State University

Issued by
The Department of Agricultural Education
College of Agriculture and Home Economics
The Ohio State University
Columbus, Ohio 43210

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USE OF RECRUITMENT MATERIALS
BY
OHIO TEACHERS OF VOCATIONAL AGRICULTURE

The Ohio Recruitment Commission for Agricultural Education recommended in 1971 that a kit of materials be provided teachers to aid them in recruiting future vocational agriculture teachers. This kit was to include publications for students, information on entering The College of Agriculture, a plan for teaching "Careers in Agriculture," and selected overhead transparencies to be used in teaching the unit. Each teacher was provided a kit of materials at a district teachers meeting early in March of 1971.

The Recruitment Commission asked that a follow-up study be made to determine the use of these materials by teachers. A survey was made in April of 1971 at which time 134 teachers of vocational agriculture was randomly selected and asked to complete the one page inquiry which is included. Returns were received from 112 teachers. These returns were tabulated and are reported in the tables which follow.

Use of Recruitment Materials

The Recruitment Commission wished to know how many teachers made use of the materials which were furnished them. 37% of the teachers said they used these materials to teach a unit on agricultural careers during March or April. An additional 39% said they had already taught such a unit or planned to teach it later in the year. Only 25% said they had no plans for teaching such a unit.

This table shows that more than three fourths of all teachers taught a unit or career selection which included the teaching of vocational agriculture some time during the year, and that they used or planned to use the materials furnished by the Recruitment Commission. The table also

suggests that 25% of the teachers need further encouragement in their recruitment efforts. Apparently these teachers made no effort to acquaint their students with opportunities in teaching vocational agriculture.

TABLE 1

TEACHERS WHO TAUGHT UNITS ON CAREERS IN AGRICULTURE
USING RECRUITMENT MATERIALS PROVIDED

	Number	%
Taught a unit during March or April	42	37.5
Planned to teach a unit later	44	39.3
Had no plans for teaching a unit	25	22.3
No response	1	.9
Total	112	100%

Time of Teaching Career Selection Units

The Recruitment Commission were interested in the time at which most teachers taught information on careers in agriculture as a basis for planning future activities.

Table 2 shows that the largest number of teachers taught such units in March and April while the next most popular time was September and October. The teaching of a unit on careers in agriculture, which includes a general overview of all agricultural careers is apparently commonly done early in the year. It appears, however, that units on career selection dealing with higher education were more likely to be taught by teachers during the second semester even though this may be too late in the year to be of maximum assistance.

TABLE 2

MONTHS WHEN TEACHERS TAUGHT OR PLANNED TO TEACH
UNITS ON CAREERS IN AGRICULTURE

	Number	%
March and April	42	48.3
May and June	15	17.2
September and October	16	18.4
November, December, January and February	14	16.1
Total	87	100%

Note: 25 did not plan to teach this unit

Teachers' Appraisal of Recruitment Materials

As a basis for preparing future recruitment items for teachers it was believed desirable to get an appraisal of the teachers of each of the six different materials which had been provided in the Recruitment Kit in 1971. Teachers were asked to rate each of the six types of materials which had been included, ranking them on the basis of 1 through 6. In order to arrive at an average rating their ranking was reversed. In other words, the highest ranking item was assigned a value of 6, the second highest a value of 5, etc. The average rating was calculated by multiplying the number of teachers, assigning a certain ranking times the assigned value for the ranking, and dividing between number of teachers who ranked the item.

The average ratings of teachers is shown in Table 3. Although the highest rating was given the "Teaching Guide," and the accompanying "Overhead Transparencies," teachers apparently considered all of the materials to be useful indicating that in future mailings materials of this nature should be provided teachers.

TABLE 3

TEACHERS RATINGS OF MATERIALS PROVIDED IN THE RECRUITMENT KIT IN 1971

Item	Number of Teachers Rating Item	Average Rating
1. Teaching Guide	41	4.7
2. Overhead Transparencies	42	4.6
3. Kit of Student Materials	42	4.6
4. Facts on Teaching Vo Ag	43	4.3
5. Bulletin Board Posters	43	3.7
6. College Bulletins	43	3.2

Importance of Recruitment -

Teachers were asked to indicate the importance which they attached to recruiting high school students for teaching vocational agriculture. Of the 112 teachers nearly two thirds indicated recruitment to be "very important" and an additional 29.5% considered it to be "of some importance." It is interesting to note that only 6.2% felt recruitment to be "of little importance." These figures seem to indicate that over a period of years that the Recruitment Commission has made teachers aware of the need for recruitment as a part of their job.

Table 4

TEACHERS RATINGS OF IMPORTANCE OF RECRUITMENT ACTIVITIES

Rating	Number	%
Very Important	69	61.6
Of Some Importance	33	29.5
Of Little Importance	7	6.2
No Comment	3	2.7
Total	112	100%

A Comparison of Selected Teachers

This group of teachers were divided into two groups depending upon whether or not they had vocational agriculture students who had graduated in agricultural education at O.S.U. Of the 112 for whom information was available, 49 had no majors in agricultural education during the past five years and 50 had one or more majors. Certain comparisons were made as to the recruitment activities of these two groups of teachers. There was much similarity in the number of seniors graduating per school, the number of teachers who considered recruitment to be "very important", and the number of teachers who taught a unit on careers in agriculture. Teachers without majors had one third less of their graduates entering institutions of higher learning. The greatest difference occurred, however, in terms of the number of students entering The College of Agriculture. Teachers with one or more majors had four times as many graduates, averaging nearly one per year entering The College of Agriculture. It would appear that the attitude and actions of the teachers regarding recruitment must have had considerable influence on the number of students entering The College of Agriculture and that further efforts at recruitment should be directed toward increasing the number of teachers who encourage their students to enter agricultural colleges.

TABLE 5

A COMPARISON OF RECRUITMENT ACTIVITIES OF TEACHERS OF VOCATIONAL AGRICULTURE WITH AND WITHOUT GRADUATES IN AGRICULTURAL EDUCATION AT THE OHIO STATE UNIVERSITY

Items	Teachers With	
	No Graduates	One or more Graduates
Number of teachers	49	50
Number of graduating seniors/school	10.2	10.3
Number of graduates/school entering post high school institutions	2.1	3.1
Number of graduates/school entering College of Agr.	.2	.8
Teachers considering recruitment "Very Important"	30	32
Teachers who taught a unit on Careers in Agriculture	39	39

Teachers' Suggestions on Recruitment

Teachers were asked the question "What can teachers do that would be most effective in interesting selected students in vo ag teaching?" Thirty-eight different comments were received. The responses are listed in the teachers' words, but classified in terms of such major categories as (a) Discussion with Classes, (b) Student Selection, (c) Serving as an Example, etc. These comments offer some useful guidance for recruitment activities which go beyond the other data.

Many comments had to do with serving as a good example, being enthusiastic about your job, and being a leader. Another group of comments had to do with organizing some group presentation regarding recruitment. There were comments regarding discussion with classes, regarding explaining advantages to students, as well as discussion on an individual basis. Other comments dealth with the use of specific activities to aid in recruitment, such as Career Days, field days, and other opportunities to become acquainted with the post high school institutions.

Another interesting group of comments were received from teachers in the area of vocational schools. Many of the teachers needed in the next few years will be needed to serve as replacements in specialized programs in the area vocational centers. It would appear that teachers in the area schools, at this time, feel less responsibility for recruiting teachers to fill their places than do teachers of production agriculture. It would appear that these specialized teachers need additional suggestions on how they can perform recruitment responsibilities in their schools.

TABLE 6

WHAT CAN TEACHERS DO THAT WOULD BE MOST EFFECTIVE IN INTERESTING SELECTED STUDENTS IN VO-AG TEACHING?

Discuss With Classes

1. Point out the fact that agriculture teaching is very close to farming and farm work. Not all students will be able to return to the farm, but this would be a close second.

2. Give more and more specific information to juniors in terms such as preparing their future.

3. Provide training and skills that will be useful to the individual who is planning a career in teaching vocational agriculture.

4. Answer his questions about teaching and college. The rest must be up to the student.

Student Selection

1. Get the better prospects in vo-ag to begin with.

2. Attempt to obtain students that are interested in teaching and that have the ability.

3. Encourage them to take vo-ag and of the need for them. The opportunity in other fields.

4. Convince the administration that vocational agriculture deserves a better quality student. Our college counselor just talked some of my best (4) students (soph.) into leaving the program for College Prep curriculum. You cannot succeed with below average student ability. We must reach students other than our own!

Be a Good Example

1. Be one hell of a good teacher. Call the shots and talk them.

2. Perhaps being a better example for them to follow in day to day activities.

3. Do a good job of teaching and relating to the student all through high school.

4. Be good teachers.

5. I personally feel that setting a good example as an effective teacher is the best recruitment tool we have.

6. Set an example by keeping up-to-date on new products, etc. Our students at Four County seldom go on to college.

Be Enthusiastic About Your Job

1. Tend to give a positive attitude toward teaching vo-ag.

2. Show the boys what a good occupation it is by enjoying your work. I feel that most students make up their mind on the teaching after they are in college about one year.

3. Be positive about your job. If not, get out!

4. Refrain from painting only the poor side of teaching to the students who would be the successful teachers of the future.

Become a Leader of Local Teachers

1. Become a leader among teachers on the local school staff.

Explain Advantages to the Students

1. Explain salaries in various areas, outdoors a lot, year-around employment.

2. Point out the opportunities in agricultural education. Tour the O.S.U. campus with prospective students.

3. Explain the work thoroughly.

Career Days and Field Trips

1. Career Days and Field Trips to Institutions.

2. Trip to O.S.U. in Freshman Year.

3. Tour the O.S.U. campus with prospective students.

4. I cannot offer any suggestions as I do not have any students teaching agriculture.

Discuss Teaching on an Individual Basis

1. Encourage, counsel and work closely with certain identified and selected students that have ability and show interest in a career of teaching vocational agriculture.

2. Discuss the teaching career in agriculture on an individual basis.

3. Encourage qualified students and build up their self confidence.

Discuss with Parents

1. Discuss this with student's parents.

Area Vocational Schools Are Different

1. Our students have already chosen their vocation. A few students may go to technical schools.

2. Teachers in a vocational school are limited in their opportunity and responsibility to recruit from their classroom enrollment. We receive a large number of our students as seniors. They have evidently made a choice for their vocation such as Ag. Business, Management, Mechanics, Horticulture, etc. I believe that teachers on a Freshman, Sophomore, and Junior level should encourage, by classroom presentations of the Opportunities for Teachers, and give examples of the opportunities by living them. This would encourage some along these lines.

3. Students enrolling at a vocational school have already selected a specific area of interest. Therefore, recruitment activities should be on a very selective basis rather than a classroom approach.

Unclassified

1. Unless some students in conference or in other teacher-student confrontation, on a one to one basis, show desires or interests to be changed into other fields; then justification for further presentation is not warranted.

2. Make all students aware of opportunities early in their high school career.

3. Teach Vo-Ag and not A.W.E.

4. Provide general, national and state outlook for farming. Remove "Farmers" from the FFA name.

5. Any recruiting should come before the senior year to acquaint the student with agriculture and the opportunities available.

The remaining three tables present additional information which was reported by the respondents regarding the post high school educational activities of their students. This information provides further insights and implications for recruitment activities on the part of Ohio vocational agriculture teachers.

Students Entering Post High School
Educational Programs

Table 7 shows that the number of vocational agriculture graduates enrolled in post high school institutions was low in comparison to the state average. Only about 78% of the schools had any graduates enrolling

in post high school institutions. It was interesting to note that only about one in four graduates in vocational agriculture enrolled in any type of post high school institution.

TABLE 7

NUMBER OF 1970 GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO ENROLLED IN POST HIGH SCHOOL EDUCATIONAL INSTITUTIONS IN 1971

	Number	%
Number of Schools	112	XXXXXX
Schools with Graduates Enrolled in Post High School Education	87	77.7
Average Number of Graduates per School	10.2	XXXXXX
Average Number Enrolling in Higher Education per School	2.6	24.7

Institutions Enrolling Graduates

The type of educational institutions enrolling the 1970 graduates are shown in Table 8. About 62% of the graduates entered universities or colleges, while 38.7% entered technical institutes or private trade schools. Only 53, or 18%, entered The College of Agriculture at The Ohio State University, although an equal number entered a university branch or community college and might later be expected to transfer to a College of Agriculture where they could complete a major in Agricultural Education. Since these 112 schools represented about one third of the schools in the state, this would indicate a total of only 153 students a year entering The College of Agriculture who would have completed four years of vocational agriculture.

The number of students entering out-of-state institutions was quite small, representing only 10% of the total. It is interesting to note that the number entering non-agricultural colleges was about equal to those entering The College of Agriculture at Ohio State University.

TABLE 8

POST HIGH SCHOOL EDUCATIONAL INSTITUTIONS ENROLLING
1970 GRADUATES OF VOCATIONAL AGRICULTURE IN OHIO

Educational Activity	Number	%
Entered technical institutes or private trade schools	110	38.7
Entered the College of Agriculture and Home Economics at Ohio State University	53	18.7
Entered a University Branch or Community College	44	15.5
Enrolled in out-of-state institutions	30	10.6
Entered non-agricultural colleges	47	16.5
Total	284	100%

Students Studying Agriculture

Table 9 provides some information on the plans of students who were interested in agriculture. Having completed four years of vocational agriculture it would be expected that a sizable number would continue their formal education in this field. The largest number of these students enrolled in another college or university branch, but expected to complete their work in a College of Agriculture. Twenty-six of those enrolling in The College of Agriculture and Home Economics at The Ohio State University planned to become teachers of vocational agriculture. This speaks well for the influence of their teachers on their career choice, but in terms of the total state enrollment this would indicate only 75 per year entering the program of agricultural education which with normal attrition would result in about the same number of majors in agricultural education as are now enrolled.

TABLE 9

ENROLLMENT OF STUDENTS WHO PLANNED POST HIGH SCHOOL EDUCATIONAL PROGRAMS IN AGRICULTURE

	Number	%
Enrolled in another college but expected to finish in a College of Agriculture	83	42.3
Enrolled in two year technical programs in agriculture	60	30.4
Enrolled in The College of Agriculture and Home Economics at Ohio State University	53	27.3
Total	196	100

Selected Findings

1. More than three fourths of the respondents either had taught or planned to teach a unit on careers in agriculture including opportunities for teaching vocational agriculture.

2. Approximately half of the respondents taught units on careers in agriculture during March and April.

3. The second most popular time for teaching this unit was in September or October representing the plans of about one fifth of the respondents.

4. Teachers believed the most useful components of the recruitment kit to be the teaching guide, the overhead transparencies and the student materials.

5. Nearly two thirds of the respondents believed their recruitment activities to be very important.

6. Teachers who had former students preparing to become teachers of vocational agriculture were similar to teachers with none except that they had four times as many students entering The College of Agriculture at The Ohio State University.

RJW:zp

Appendix 1 (Survey Form)

Return to Dr. Ralph J. Woodin, Professor
Department of Agricultural Education
Room 203, Agricultural Administration Building
The Ohio State University
Columbus, Ohio 43210
by April 30, 1971

RECRUITMENT ACTIVITIES

Name _____ Department _____

Please complete this information for the 1970 graduates of your department.

Total number graduating _____.
Number enrolled in colleges or other post high school educational institutions _____.
Number who entered:
University branches or community colleges _____.
Four year colleges _____. Universities _____.
Private trade schools or technical institutes _____.
College of Agriculture at The Ohio State University _____.
Of those entering university branches and other colleges how many expect to complete their work in a College of Agriculture? _____
Of those enrolled in 2-year technical programs how many were in agriculture? ____
How many enrolled in out-of-state institutions? _____
How many plan to become vo-ag teachers? _____

1. Did you teach a unit on Careers in Agriculture based on teaching materials provided at the February Evaluation Meeting? Yes_____ No _____ If yes, give month taught _____.

2. Do you plan to teach such a unit later? Yes _____ No _____ If yes, give month planned _____.

3. If you used the recruitment kit in teaching, rank each of these materials in terms of their value--1 through 6--with 1 representing the highest rating.

Teaching guide _____
Overhead transparencies _____
Bulletin board posters _____
"Facts on Teaching Vo-Ag" _____
Kit of student materials _____
College bulletins _____

How important do you believe it to be for teachers to recruit high school students for teaching vo-ag? Very important? _____ Of some importance? _____ Of little importance? _____

What can teachers do that would be most effective in interesting selected students in vo-ag teaching? _____

_____

_____

_____

_____

Use the other side if needed.

VT 014 377
THOMPSON, ORVILLE E., AND OTHERS
EDUCATION IN AGRICULTURE IN CALIFORNIA (OCCUPATIONAL NEEDS AND FUTURE DEMANDS). A RESEARCH REPORT.

CALIFORNIA UNIV., DAVIS. DEPT. OF APPLIED BEHAVIORAL SCIENCES.
OFFICE OF EDUCATION (DHEW), WASHINGTON, D.C.
CALIFORNIA STATE DEPT. OF EDUCATION, SACRAMENTO. VOCATIONAL EDUCATION SERVICES
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IDENTIFIERS - CALIFORNIA

ABSTRACT - BASED ON INTERVIEW AND QUESTIONNAIRE DATA COLLECTED FROM BOTH EMPLOYEES AND EMPLOYERS, THIS STUDY SOUGHT TO IDENTIFY MANPOWER NEEDS AND EMPLOYMENT QUALIFICATIONS FOR AGRIBUSINESS OCCUPATIONS. ADDITIONAL OBJECTIVES OF THE STUDY WERE TO DEVELOP GUIDELINES FOR DETERMINING CURRENT, EMERGING, AND FUTURE EDUCATIONAL CURRICULA NEEDED TO PREPARE WORKERS FOR AGRICULTURE, AND CRITERIA TO DETERMINE WHERE PUBLIC INSTRUCTION IN AGRICULTURE SHOULD BE LOCATED, WHEN IT SHOULD BE AVAILABLE, AND WHAT IS NEEDED. THIS DOCUMENT, HOWEVER, IS LIMITED TO A PRESENTATION OF THE FINDINGS AND CONCLUSIONS WHICH WERE DRAWN FROM MORE THAN 7200 INPUTS. AMONG THE 24 MAJOR FINDINGS IT WAS NOTED THAT: (1) THERE IS A LACK OF QUALIFIED WORKERS, (2) UPWARD JOB MOBILITY IS LIMITED IN THAT MANY EMPLOYEES SAW NO OPPORTUNITY FOR ADVANCEMENT, AND (3) THE NUMBER OF JOBS FOR WHICH AGRICULTURAL COMPETENCIES ARE REQUIRED IS GOING TO INCREASE IN THE NEXT FIVE YEARS. THE CONCLUSIONS ARE DISCUSSED IN TERMS OF THE HIGH SCHOOL AGRICULTURAL COURSES, COMMUNITY COLLEGE AGRICULTURAL CURRICULA, STATE COLLEGE AND UNIVERSITY AGRICULTURE, AND ORGANIZATIONAL AFFILIATIONS. A RELATED DOCUMENT IS AVAILABLE IN THIS ISSUE AS VT 014 378. (JS)

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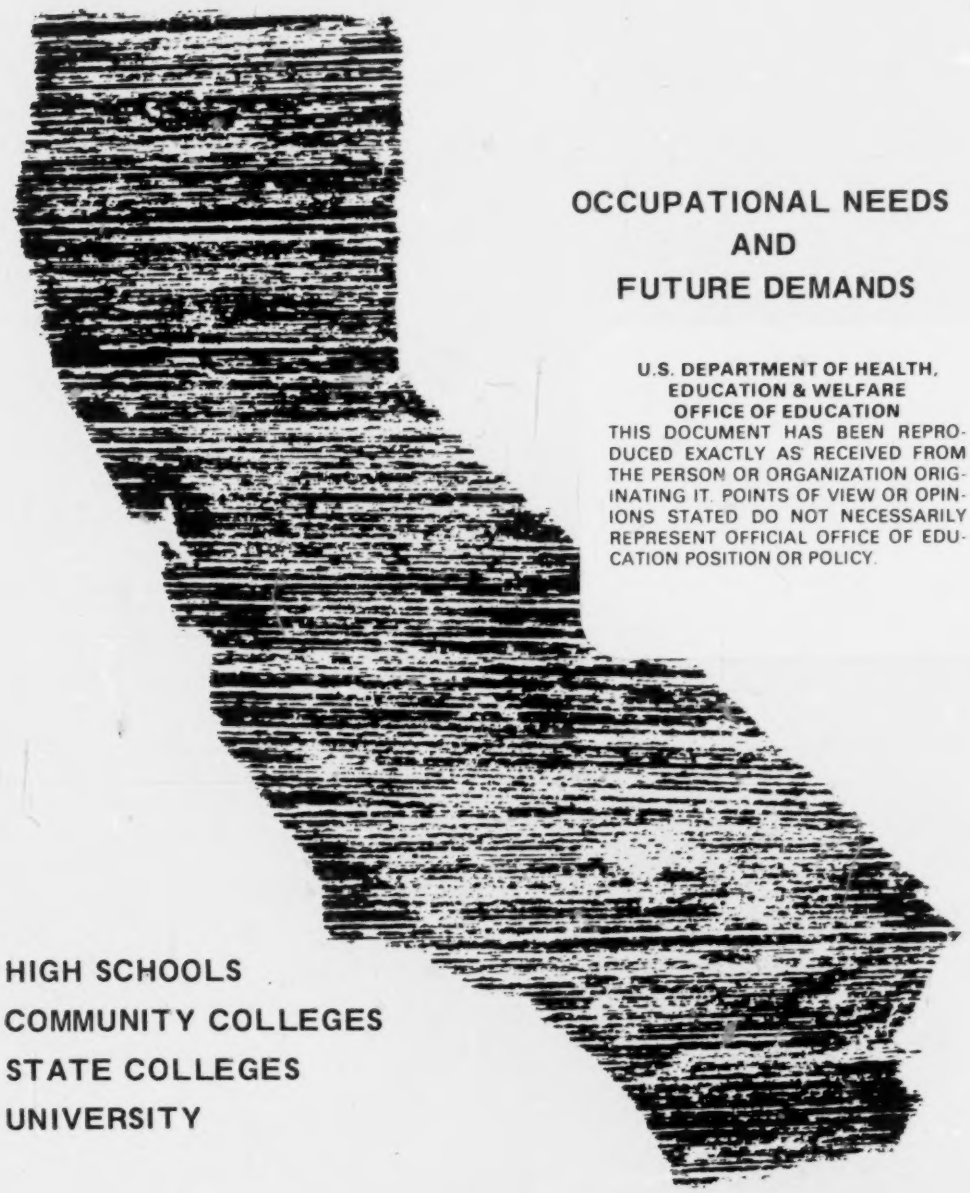
EDUCATION IN AGRICULTURE IN CALIFORNIA



OCCUPATIONAL NEEDS AND FUTURE DEMANDS

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3840

A RESEARCH REPORT

EDUCATION IN AGRICULTURE IN CALIFORNIA
(occupational needs and future demands)

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3841

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NOTE: The principal investigator and director were constant throughout the progress of the study. All other personnel rotated with the exception of James W. Becket, who served for a majority of the time as research coordinator.

INTRODUCTION

Changes in the agricultural industry in the last few years have been so dynamic that many have questioned our present educational system's ability to meet the industry's needs. Can, in fact, our agricultural education system meet these needs, both current and future? If not, what must be done? The present study attempts to answer those questions.

This study was designed to:

- determine the present status of education in agriculture
- evaluate current needs for employees in agriculture
- develop estimates of future needs for employees in agriculture
- identify current, emerging, and future competencies (skills abilities) needed by agricultural workers
- develop guidelines to determine current, emerging, and future educational curricula needed to prepare workers for agriculture
- develop criteria to determine where public instruction in agriculture should be located, when it should be available, and what is needed.

It was hoped that the end product of the study would be a plan for agricultural education in California. Future implementation of the findings has been built into the study through close collaboration with the statewide Liaison Committee for Agriculture. That group, which has representation from high schools, community colleges, state colleges, and universities offering agricultural courses, had already started a study of a like nature but later joined efforts with this study.

During this study, other worthwhile objectives were recognized, and the abundant data gathered will be the foundation of future reports on various educational facets of agricultural occupations. Another report planned will deal with identification of the functions and activities of each individual job title which required agricultural competencies. By using that report, the educator could quickly recognize common denominators of various jobs, and so concentrate on the teaching of skills common to all.

It has been said that there is great need for a continuing study to strengthen and expand communication between education and agriculture and to keep continuously updated the data on the ever-changing educational needs of agriculture. If such a project can be funded in the near future, perhaps such communication will become one of the significant objectives to be achieved by the study.

METHOD OF THE STUDY

Data Collection

This study was designed to include the agri-industry complex to determine what types of businesses need employees with agricultural competencies. Data were gathered by interview in Butte, Fresno, Humboldt, Imperial, Kern, Los Angeles, Monterey, Stanislaus, Tulare, and Ventura counties. The firms contacted by questionnaire were selected from some 45,000 declaring agricultural employees in the California Disability and Unemployment Insurance Report of the third quarter, 1967.

Data collection was conducted in three phases:

Phase I was directed at obtaining data from employers on job titles in agriculture and the number of employees in each job title.

Phase II included interviews with employees regarding age, educational level attained, educational requirements of job, likes and dislikes of job, and functions and activities performed in each job title.

Phase III data gathering consisted of a questionnaire mailed statewide to some 4,000 additional firms.

Additional confirmation of findings was obtained by convening panels involving some sixty leaders in agriculture production and agri-industry. Spot checking confirmed that little significant change had occurred in the industry after data collection was started. Thus information in this report is the compilation and analysis of inputs by over 7,200 individuals plus data from numerous other sources.

TABLE 1

Summary of Data Collection

Phase I	– Interview of agricultural firms (10-county area):		
	Number of firms interviewed		1,181
	Number of standard industrial classification groups represented		47
	Number of job titles described		540
Phase II	– Interview of agricultural employees (10-county area):		
	Number of employees interviewed		4,593
	Number of job titles represented		340
	Seasonal	161	
	Year-around	339	
	Functions and activities of 340 job titles described by 4,593 employees		

Phase III	– Statewide sampling of firms by mail:	
	Questionnaires returned	1,454
	Post cards returned	1,878

FINDINGS AND DISCUSSION

All findings are in terms of the sample outlined in Table 1. While these data are believed to be representative of the entire agricultural industry, the reader is reminded that statewide generalizations are to be made with caution.

1. The lack of qualified workers is regarded by employers as their major personnel problem. Thirty per cent of the employers interviewed listed this as a serious problem, while another 34 per cent labeled it as somewhat of a problem. Farm and nonfarm businesses responded about the same on this topic.

2. The need to train or retrain present employees was ranked next-most serious among personnel problems. These two problems are further magnified by the fact that over 57 per cent of production agriculture and 35 per cent of agribusiness firms do not provide in-service education programs. Oddly enough, though, only two per cent of all firms reporting indicated that they need public-education programs to upgrade the performance of their personnel. It is hoped that California educators will meet this challenge with much-needed new adult education or continuing education programs.

3. The percentages above become even more disturbing when viewed in light of the fact that over 80 per cent of the employees believe that on-the-job experience and training is essential to job entry and improving their value as employees. Appropriate job experience in conjunction with classroom study is essential to adequate training of an employee, and it is desirable to augment the teacher-student relationship with the employer-employee relationship as early as practicable. This is a time-honored precept of vocational education, and has been the heart of some college programs as well. Work-experience education obviously deserves renewed emphasis.

4. Educators are interested in whether employers consider their institution a direct source of employees. Since there are more agricultural job openings every year than there are graduates to fill them, large numbers of jobs are filled by nongraduates. As to unskilled workers, 43 per cent come from "informal" (non-school-graduate) sources, 21 per cent from high schools, and 13 per cent from government employment agencies. With sales personnel, 30 per cent come from within the company, 17 per cent from informal sources, 24 per cent from college, and 13 per cent from community colleges. A high percentage—49—of managerial personnel come from within the company, 21 per cent from college, and 10 per cent from high school. In general, schools are not listed frequently enough to please educators.

The main problem seems to be that employers offering jobs have insufficient communication with schools having graduates qualified to fill them.

5. Most agricultural employers, agricultural educators, industry, and agricultural extension people interviewed felt that improvement in communicating the personnel requirements of employers to educational institutions is sorely needed. Also, employers rate agricultural schools behind trade publications, agricultural extension, trade fieldmen, trade organizations, and radio or TV as their major source of up-to-date agricultural information. Inadequate communication is one of the major factors contributing to the major problem of the industry—lack of qualified personnel. Qualified people are not finding jobs, and unemployed people go jobless because they haven't the proper training for available jobs. Schools must know of the latest needs of agricultural industry, and industry must know of the most reliable source of qualified personnel. While the lack of adequate communication is not a one-sided problem, it may well be the responsibility of the school to take the lead in initiating corrective action.

6. Upward job mobility—the opportunity for individual advancement—is limited in agriculture (especially in on-the-farm jobs), and many employees felt that their job presented no opportunity for such advancement. Apparently, the major factor contributing to this is the *lack of job-title specificity*. Agricultural job titles are not accurately defined in terms of what the job actually demands of the individual. This is a critical deficiency in developing training programs. There is some vertical job progression in agriculture, and agricultural firms must make this known so that schools can better prepare employees for advancement.

7. Job preparation at the high-school level must be more specific. For example, there is evidence that too little thought is given to whether the program is designed to meet the needs of a tractor driver or to meet the needs of the farm hand. Far too often the supposition is that production agriculture is production agriculture, regardless of what job titles are involved. The needs are more specific than that, however, even though job titles are not mutually exclusive. On the other hand, it must be recognized that student goals and industry needs both change. This makes it imperative that programs should not be directed toward one job title. The logical compromise is development of curricula to meet present and future needs of a group of closely related existent jobs.

8. The most difficult jobs to fill, according to employers, were those of tractor operators, harvest hands in fruit operations, foremen, irrigators, mechanics, crew foremen, and equipment operators. The reason employers usually gave for this shortage was the lack of individuals possessing the necessary knowledge and experience. Firms having the greatest difficulty in obtaining critical employees were

003846

fruit and nut growers, cotton farmers, and general farming operations. This is an obvious challenge to high schools and community colleges having agricultural programs, since most of these areas are served by either or both of these institutions.

9. Employee interviewees in almost all job titles are predominantly male, except in office occupations, where the majority were female. Over 80 per cent of the processing-plant workers, landscape and nursery workers, and technicians and quality-control personnel are male. In all groups other than office workers, over 90 per cent of job occupants were male.

10. Employees holding technical or professional job titles tend to stay with the same employer longer than do employees doing only manual labor. Most employees interviewed had worked 6 to 10 years for the same employer.

11. A complete job description was obtained during the employee interview. Questions asked were: What were the main functions of the job? What activities were involved in performing each of these functions? What areas of comparability were there between functions and activities of one job-title group and that of another group? What level of decision making was required of each job title?

It was found that few employees were required to make decisions, even of an operational nature, except in jobs of mid- to high-level management (usually in the technical or professional job groups). Data on job functions and activities are too detailed and extensive to be included in this abstract. This information will be included in a separate report since it is critical for the development of curriculum and course content.

12. Agricultural education should give priority to curricula for job titles which require knowledge or skill in one or more of the primary areas of plant science, soil science, animal science, agricultural business management and marketing, and agricultural mechanization.

13. Of the 340 employee job titles identified in this study as requiring agricultural competency, only 57 were classified as major titles—that is, as jobs in which 50 or more people were employed year-around. These 57 major job titles encompass 77.6 per cent of all present year-around jobs, and 77 per cent of all new year-around jobs forecast for the next five years. Educational programs should focus on year-around rather than seasonal jobs.

14. Two areas of academic preparation warrant special consideration: labor management and business management. The study of labor management is felt to be highly necessary by the majority of respondents in nearly every job title. Yet is is seldom even mentioned in most agricultural education programs, even though supervision of others was listed as a major function of their jobs by most employees. Business management also was rated a necessary part of future edu-

cational programs. Although courses in business management appear in many curricula, this area of study has not yet been given the level of attention it deserves.

TABLE 2

EXPECTED 5-YEAR FUTURE DEMAND FOR YEAR-AROUND EMPLOYEES HAVING AGRICULTURAL COMPETENCE

(683 firms, statewide)

Major job-title groups	Job titles	Increase (+) or decrease (–)
Laborers, production agriculture	19	–1,637
Equipment operator, maintenance, repair	16	+ 551
Processing-plant workers	14	+ 38
Landscape & nursery workers	14	+ 260
Livestock workers	2	+ 97
Sales personnel	6	+ 206
Technicians & quality control	9	+ 42
Forestry & timber workers	–	–
Office personnel	9	+ 164
Managerial-supervisory	15	+ 581
Professional	16	+ 103
Owner-operators	4	+ 6
Miscellaneous	5	+ 8

15. All evidence gathered during the study indicates that the number of jobs for which agricultural competencies are required is going to increase in the next five years (Table 2). The factors affecting these increases most are: increased mechanization; increased importance of cost-accounting and efficient business procedures; and increased demand for agricultural products. Only 5 per cent of agri-business firms anticipate a reduction in numbers of employees. The percentage of those expecting no change was 57 per cent for agri-business. The area in which the largest increase in total jobs (as well as the largest number of year-around jobs) is expected in the managerial and supervisory job-title group. This is true of both production agriculture and agri-business firms. There is too little emphasis on this type of educational curriculum today, especially in terms of the requirements for specific jobs. Present emphasis is too much a carry-over from times when such programs were designed to give training for owner-operators.

3848

16. The second-largest group of year-around jobs (and second-largest group of predicted new jobs) is in equipment operation and maintenance. Some of the job titles presently hardest to fill are in this group, and increased mechanization is expected to create even more demand in this field. Therefore, increased emphasis is recommended on agricultural mechanics curricula throughout the state. High-school programs can provide training in equipment operation, maintenance, and minor repairs, while major repairs and equipment construction courses can be handled best by community colleges.

17. Agricultural sales jobs will have a growth rate almost twice that of jobs in equipment-maintenance areas in the next 5 years, although the total number of people involved will be smaller. Most employees in sales (75 per cent) will need preparation beyond that available in secondary schools. About one-third will need a four-year college degree.

18. The fastest-growing category of jobs is in the landscape and nursery group, with an increase of almost 30 per cent forecast over the next five years. Curricula in this area have increased rapidly, and it is suggested that future program growth should not slow down. Many of these employees (70 per cent) can gain entry preparation at the secondary school. Some twenty per cent need courses at the community-college level. Ten per cent will come from four-year colleges.

19. There is little evidence to support widespread expansion of curricula to prepare for jobs in forestry, timber, and lumber. The lack of such evidence may be due in part to the sampling procedure used, and to the fact that interviews were conducted in relatively small geographical areas. Even so, subsequent interviews with state agencies and correspondence with several of the largest lumber companies in the West did not alter this conclusion. Most companies stated that they expected increases of only 5 per cent in professional job titles and 10 per cent in technician job titles, with unskilled and semi-skilled jobs remaining steady. Equipment-operation jobs would possibly increase the most.

Some highly necessary job titles, such as saw filer, are becoming increasingly harder to fill because the skills they require are fast becoming a lost art. New job titles are expected to emerge in areas of timber management, forest-land recreation and conservation, forest engineering, forest-fire control, and lumber milling and sales.

20. Farm and agribusiness firms are becoming increasingly aware of the desirability of having office personnel who possess some degree of agricultural competency. An agricultural curriculum for office personnel is not indicated, but in highly agricultural areas an introductory course might be desirable for business graduates employed by agricultural firms.

3849

21. No curricular expansion is recommended to provide increased numbers of technicians and quality-control personnel. Program expansion should take place only in areas where increased need is definitely established.

22. Jobs involved with livestock and small animals compose a fairly small category, and with only a moderate increase expected. Yet, livestock production courses are and will remain popular in school at all grade levels. Any drastic alteration of current programs is probably inappropriate for at least two reasons:

- Some animal production exists almost everywhere; and in some cities the production of small animals for profit is becoming big business.
- Animal curricula are popular with students and remain of interest even when the students move on to studies having greater employment potential.

Here it must be emphasized that job opportunities are not plentiful that require knowledge beyond that learned in basic animal-production courses.

23. Handling and processing-plant jobs will not increase to any extent in the next 5 years. This estimate, coupled with the low degree of agricultural competency they require, makes this group of jobs of minor interest to agricultural educators.

24. Unskilled laborer jobs in all sectors of the agricultural industry will continue to decline in numbers because of increased mechanization. Affected most seriously will be those presently employed on cotton, vegetable, citrus, and fruit and nut farms. The vast majority of these jobs are seasonal and have not been of major concern to educators. Even the year-around jobs require agricultural competency of such a low level that some employers failed to report them as agricultural jobs. Nevertheless, because of increasing public awareness of and concern for the rapidly increasing numbers of unemployed people on welfare roles, educators will be forced to contribute more and more effort to the retraining of people for possible job entry higher on the skill ladder.

CONCLUSIONS

Implications and guidelines for planning are given for each of the levels at which education in agriculture is offered. These guidelines are dependent on continued effort to facilitate articulation among course offerings at the various levels.

HIGH-SCHOOL AGRICULTURAL COURSES. Contrary to statements often heard in uninformed circles, agricultural education at the secondary level is not dying out—nor should it. High-school enroll-

ment increased during the period covered by this study from 20,900, in 265 departments in 1967-68, to 31,928, in 275 departments in 1970-71. All indications are that a continued increase is appropriate.

One historic emphasis of high-school courses should not continue—if it exists even now. The data all reinforce the already widely accepted idea that at the high-school level—or even community-college level—the education is not sufficient for the preparation of owner/operators, either in farming or in some other area of agriculture. Therefore, no program below the state-college level should focus on such preparation.

High-school courses should be focused upon two major objectives. One includes the very important task of helping students start to understand basic concepts, principles, practices, and mechanics of agriculture. This should include an opportunity for introduction to the processes in farming and in agricultural business, from the growing of plants and animals through processing and distribution. Some students may use this initial preparation as a basis for job entry, while others may base future occupational education upon it.

The second objective should be preparation focused upon direct entry into an occupation—either a specific job or, possibly more appropriately, a cluster of jobs. An analysis of job functions suggests that while 340 different jobs were found in agriculture, most of the employees (80 per cent) are in one of 57 titles. These, in turn, can be grouped into 13 major classifications or clusters. See Table 2, page 5. For example, a high school might decide, because of employment opportunities, to give preparation for the major job classification (cluster) of equipment operation, maintenance, and repair. The high school could teach for entry level into machinery operation and maintenance jobs, while the teaching of major repair and overhaul would possibly be more appropriate in the community college.

Many job-entry (employment) skills needed in agriculture can still be taught at the high-school level. Examples include welding, plant propagation, operation of tractors and other farm machinery, handling and care of livestock, maintenance and operation of small gasoline engines, simple building construction, and introductory preparation in management. The secondary school also offers an opportunity for work experience during the regular school year as well as the summer. Experience on the job is given as essential for job entry by 80 per cent of the nearly 5,000 workers interviewed. This type of preparation, which has been a required part of vocational agricultural for over half a century, must be continued and extended.

The potential role of career education should be studied by teachers of high-school agriculture. The adoption of career education has the potential of bringing to all occupationally oriented education the status and support it has long deserved.

This study also indicates that the high school is well equipped to help teach employability assets (such as initiative, responsibility, and dependability) through its early contact with the student in Future Farmers, in farm and nonfarm work experience, and in participation in fairs, shows, and other leadership training activities.

A majority of the high-school agriculture programs are still production-oriented. This emphasis has recently expanded to include ornamental horticulture, forestry, natural resources, and recreation. This direction should be continued, with increased emphasis upon introduction into business, sales, and management-supervision training. Skill in supervising other workers was the function ranked first in importance by workers in each of the 13 job clusters.

While most high schools with agriculture have offerings, in mechanics this preparation is far from its potential. Skills in construction, maintenance, repair, and operation of equipment were rated second in importance among the 22 major functions identified, yet less than one-fourth of the students in vocational agriculture identify a specialization in agricultural mechanics.

The ratio of teachers to students has not kept pace with the increase in enrollment in agriculture from 14,000 to 32,000 in the past ten years. This raises some very vital questions and concerns, such as: Can quality of instruction be maintained with, in many instances, a doubling of the previous limit of 15 to 20 students per class in vocational agriculture? Can adequate supervision be given in on-farm work experience when the ratio of students to teacher has in many instances doubled from the former ratio of 45:1.?

The high school will continue to play an indisputed role in preparation for employment in agriculture. It can help the student begin to develop an understanding of the basic biological processes in plant and animal growth. It can provide realistic, practical work experience and can teach many employment skills to a job-entry level. Possibly even more important, it can play a vital role in the development of employability skills which are so essential to job success.

COMMUNITY-COLLEGE AGRICULTURAL CURRICULA. These curricula have two basic functions. The first, and perhaps the most important in terms of numbers of students served, is the preparation of individuals for job entry at the technician level in production and agribusiness sectors of the industry. The second is the preparation of individuals for advanced agricultural study at the four-year college level.

Articulation between agriculture taught in high schools, in state colleges, and in the university becomes increasingly important with advances in agricultural technology and increases in agricultural enrollments. But whether the student who has had agriculture in high school should bypass introductory courses in agriculture in a community college is a question not satisfactorily answered in general.

3852

The question also remains as to what extent transfer courses should be equated with supposedly equivalent courses in four-year institutions.

Most concerned citizens agree that the community college should continue to take a greater role in preparing technicians for agriculture and paraprofessionals for quality control and other fields. But care should also be taken that there is reasonable opportunity for placement of those properly prepared. This seems to be particularly critical in forestry and natural resources, where job opportunities are currently few.

Master planning of specialty vocational programs in agriculture (possibly on a regional basis) is now beginning and should be extended. Resource shortages (including facilities, adequately trained teachers, funding, and adequate enrollment) demand that certain costly specialty programs in agriculture, such as artifical insemination or horse-shoeing, be cooperatively sponsored by a number of community colleges.

The equipment operation, maintenance, and repair-job group offers one of the highest potential labor demands for new employees. It contains the jobs for which it is most difficult to find qualified employees, and acquiring the skills and knowledge needed in this field was listed as an important part of preparation by 44 per cent of the 4,593 employees interviewed. Sixty of the 511 employees interviewed in this job grouping reported that community-college preparation in the broad area of mechanics and agricultural engineering would be important for entry into their jobs. Yet such preparation is offered in only 12 institutions and enrolls only 242 students (less than 4 per cent of the 6,366 student enrollments in agriculture). Four times as many students are in forestry, natural resources, and related programs where opportunity for placement is not nearly as promising.

The need for preparation in the management of resources, both monetary and human, was listed as essential by over 60 per cent of the employees (45%) interviewed. One-fourth of those in the manager-supervisor or foreman category (1,425 individuals) and one-third of the owner-operators (811) stated that relevant study in a community college was required for job entry; 40 per cent of those in sales (240) agreed with this. Yet only 18 community colleges listed courses in agricultural business, and only 1 offered agricultural sales. Three courses in nursery-floral shop management were listed—but there were no courses concentrating on labor management problems. This is particularly critical because collective bargaining is on the horizon.

Animal science as an identified course appears in only four colleges, although some of this science may be taught in 14 colleges offering animal production courses. This is possibly in line with job demand, since the need for competence in animal science was listed as important by only 12 per cent of employees interviewed (while 36 per cent declared knowledge of plants essential).

The growing need for workers for the landscape-nursery industry is being recognized by community colleges—there are course offerings in this field in two-thirds of the institutions surveyed, and in several colleges preparation includes courses identified with management and maintenance. About one-fourth of workers interviewed in the industry indicated that community college was essential preparation.

Community-college agricultural courses are important but are nowhere near their indicated potential for providing workers with needed skills and knowledge. Some community colleges will need to decrease their emphasis on certain types of preparation in agriculture which may be available in feeder high schools and to concentrate their limited resources on higher-level preparation and on courses in resource management (including labor).

Although no need has emerged for workers to deal with problems of agriculturally related environmental concerns (such as water pollution), community colleges should even now be studying and defining the role which agricultural programs can play in preventing catastrophe in this vital area.

STATE COLLEGE AND UNIVERSITY AGRICULTURE. Program modifications to meet new demands in agriculture have moved faster and further in colleges and universities than lower educational levels. There is a continuing need for 4-year institutions to concentrate on preparation of those who will manage agricultural industry, both on and off the farm. Of the 234 professionals interviewed, two-thirds indicated that 4-year college preparation was essential, as did one-third of the 240 in sales, the 97 in quality control, and the 1,425 in management-supervision. Owner-operators also emphasized that a baccalaureate degree was becoming more essential. It might be expected that the above is an underestimate, for the percentages given are more than double those with 4-year college preparation currently in those positions. Ordinarily, an employee is reluctant to state that he is undereducated for his position.

Of the nearly 2,500 people interviewed in managerial, professional, and owner-operator classifications, three-fourths listed proper business administration and personnel supervision as essential to success on their jobs. Although teaching these subjects may not be the responsibility of the colleges concerned with agriculture, study in these areas should become a requirement for anyone preparing for leadership in agriculture. Labor laws and labor relations and negotiations are rapidly becoming a new necessity for agricultural management, to say nothing of business management.

Colleges of agriculture in the state college and university systems are rapidly developing programs focused upon natural-resource utilization, resource management, and environmental concerns. While no one can question society's need for emphasis upon these, the apparent

interest of the public has not been matched by sufficient funds to do anything about the problems. Students interested in formally studying ecological problems must therefore be cautioned that, for the present at least, jobs in these areas are not plentiful.

There is a continuing need for competent personnel in crops and livestock production, and it appears that the state colleges and university will continue to accommodate that need. Even so, both of these institutions should concentrate on preparing individuals with sufficient expertise to cope with all the management problems facing agriculture. To achieve that end, both institutions should continue to evaluate current programs and develop procedures which identify instructional needs related to changes in industry and technology.

ORGANIZATIONAL AFFILIATIONS

Implementation of this study involved many people and several professional organizations. Throughout the study, close collaboration was maintained with the Liaison Committee for Agriculture, which is a part of the larger California Articulation Conference. The membership of the Articulation Conference represents California public high schools, community colleges, California State Colleges, the University of California, and the State Department of Education.

The Liaison Committee for Agriculture included a subcommittee which worked closely with the study staff. A second group, known as the Administrative Advisory Committee, included representatives from all sectors of agricultural industry—producers, distributors, bankers, labor unions, farm commodity associations, educators, farm commodity associations, educators, farm chemical associations, and state and federal agricultural agencies. Since members of the Liaison subcommittee were so closely involved with the study and contributed so much to its success, special thanks is given to these individuals:

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IDENTIFIERS - OHIO

ABSTRACT - INCLUDED IN THIS SECOND REPORT OF THE ADVISORY COUNCIL ARE: (1) RECOMMENDATIONS FOR THE IMPROVEMENT OF VOCATIONAL EDUCATION IN OHIO, (2) THREE MAJOR CONCERNS OF THE COUNCIL REGARDING PROGRAM EFFECTIVENESS AND EDUCATIONAL CHANGE, AND (3) A FOLLOWUP OF THE RECOMMENDATIONS MADE IN THE FIRST ANNUAL REPORT. AMONG THE NINE RECOMMENDATIONS ARE: (1) THE NEED FOR ADEQUATE FUNDING OF THE JOINT VOCATIONAL DISTRICTS, (2) THE NEED FOR IMPLEMENTING CAREER EDUCATION PROGRAMS ON THE ELEMENTARY, THE JUNIOR HIGH, AND THE SENIOR HIGH LEVELS, (3) THE NEED TO CONSIDER CERTIFICATION OF VOCATIONAL GUIDANCE COUNSELORS ON THE BASIS OF WORK EXPERIENCE IN LIEU OF CERTAIN EDUCATIONAL REQUIREMENTS, AND (4) THE NEED FOR A TASK FORCE TO STUDY THE FEASIBILITY OF CONTRACTED SERVICES RELATED TO VOCATIONAL EDUCATION. IN FOLLOWING UP ON THE ACTION TAKEN CONCERNING THE FIRST YEAR RECOMMENDATIONS IT WAS FOUND THAT PROGRESS HAD BEEN MADE ON MANY OF THE 14 ITEMS. IT WAS NOTED HOWEVER, THAT THE DIVISION OF VOCATIONAL TECHNICAL EDUCATION OF THE U.S. OFFICE OF EDUCATION HAS NOT EXPANDED ITS PERSONNEL DURING THE PAST YEAR AS WAS RECOMMENDED. INCLUDED IN THE DOCUMENT ARE: (1) COUNCIL ACTIVITIES, (2) OBJECTIVES OF VOCATIONAL EDUCATION IN OHIO, (3) VOCATIONAL EDUCATION OFFERINGS IN OHIO, AND (4) PUBLICATIONS. (JS)

VT 014 379

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Ohio Advisory Council for Vocational Education

Second Annual Report — October, 1971

VT014979

SECOND

ANNUAL REPORT

OHIO ADVISORY COUNCIL

FOR

VOCATIONAL EDUCATION

1970 - 71

Submitted to Dr. Martin Essex, State Superintendent of Public Instruction and the State Board of Education for review and further transmittal to the Commissioner of Education, U. S. Office of Education and to the National Advisory Council.

October, 1971

3858

FOREWORD

The Ohio Advisory Council for Vocational Education was organized in May 1969 under the provisions of Public Law 90-576. The purpose of the Council is to evaluate the effectiveness of vocational education and to advise the State Board of Education on changes and improvements to vocational education.

The membership of the Council is composed of 22 representatives from industry, commerce, agriculture, labor, education, government and other segments of the population. All members are vitally interested in the promotion and development of vocational education.

The 1970-71 Annual Report is directed to the State Board of Education for its consideration. A copy has been transmitted to the Commissioner of Education in the U. S. Office of Education and to the National Advisory Council as required.

The Council believes that appropriate action on the enclosed nine recommendations will improve vocational education in our State.

Jesse W. Fulton
Chairman

September 1971

3859

TABLE OF CONTENTS

	PAGE
RECOMMENDATIONS	1
COUNCIL CONCERNS	5
FOLLOW-UP OF THE RECOMMENDATIONS FOR THE FIRST ANNUAL REPORT	11
COUNCIL ACTIVITIES	17
APPENDIX	21
Rules and Regulations of the State of Ohio Advisory Council for Vocational Education	21
Financial Statement	25
Recommendations Presented to the Ohio Commission on Vocational and Technical Education	27
Objectives for Vocational Education in Ohio	29
Vocational Education Offerings in Ohio	31
Publications	33
Learning to Earn in Ohio Through Vocational Education	33
Something Special	33
The Ohio Advisory Council	34
Support of State Plans and Objectives	34
Youth Organizations	34
A Perspective on the High School by Former Students	35
Reports of Meetings	37
Council Workshop	37
Council Listening Forums	37
Annual Public Meeting	38

3869

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Mr. Dean R. Simeral	SECOND VICE CHAIRMAN Associate Director of Public Affairs Ohio Farm Bureau Federation
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PART I

Recommendations

The Ohio Advisory Council for Vocational Education, as a result of its evaluation and study during the past year, observed that vocational education in Ohio continues to expand its services to the citizens of Ohio. Increased appropriations for construction and operation of vocational facilities were provided by the 108th General Assembly and have been of the utmost importance in providing for improved vocational education.

Ohio is moving steadily toward a goal of providing training programs in at least twelve occupational choices for all high school youth as well as a rapid expansion of the adult programs. Several of the noteworthy accomplishments are:

a. The State's 604 school districts have now been consolidated into 104 vocational school districts for better utilization of existing and expanding programs.

b. The large cities are currently expanding their vocational programs to better serve more of Ohio's youthful citizens.

c. Experimental programs have indicated that vocational education has been successful in reducing the high school dropout rate.

d. Evidence thus far seems to indicate that we are making some progress in improving the attitude of educators, parents and young people toward the world of work.

e. Great progress has been made in providing innovative modifications to vocational training for the physically and socio-economically handicapped.

Although the progress has been encouraging, the Ohio Advisory Council for Vocational Education presents the following nine recommendations for a still greater improvement and expansion of vocational education.

RECOMMENDATION 1

The State Board of Education, through the Division of Vocational Education, should continue its efforts to promote the adequate funding of the 30 plus joint vocational districts planned but not currently funded. The State Division should assist these local schools in their local levy campaign to a greater extent than they have in the past. Funding for buildings and equipment costs should remain basically at the 50% level. The State Legislature should provide the necessary matching funds for construction and equipment as well as sufficient funds for the continued operation and support of the vocational centers.

RECOMMENDATION 2

Large city operational funding for vocational education should be the same as in other sections of Ohio. The State Division of Vocational Education should continue experimental, flexible programs within large cities to better serve the needs of inner-city youth and adults.

RECOMMENDATION 3

The Division of Vocational Education should move forward as rapidly as possible to implement an elementary school program on work motivation and career exploration; the junior high program on work exploration; and the senior high program of vocational preparation as contained in the objectives of the State Department of Education, to be attained by 1975.

RECOMMENDATION 4

The State Superintendent of Public Instruction should encourage the Division of Teacher Certification to give serious consideration to certifying vocational guidance counselors on the basis of work experience in place of some educational requirements enabling them to provide more realistic guidance to high school youth, with emphasis on career selection.

RECOMMENDATION 5

The Division of Vocational Education should immediately embark on an extensive public information program to improve the image of vocational education to the citizens of Ohio. Sufficient funds should be made available to employ a staff for this purpose.

RECOMMENDATION 6

The Division of Vocational Education and the Ohio Advisory Council

should immediately form a joint task force to study the feasibility of contracted services related to vocational education and make recommendations for the consideration by the Council.

RECOMMENDATION 7

The State Superintendent of Public Instruction should request leaders of the Ohio General Assembly to create a special legislative commission to study in detail problems existing between such groups as state licensing boards, professional associations, and vocational educators. Evidence seems to indicate that some of the problems inhibit the effort to assist students in preparing for career objectives.

RECOMMENDATION 8

The Division of Vocational Education should assist in providing specialized facilities, equipment and staff for the training of out-of-school youth and adults. The Council recommends that full-time leadership for adult education be provided at the state and local levels. If necessary, additional funds should be secured.

RECOMMENDATION 9

The Division of Vocational Education should not only encourage but insist that local administrators of vocational education make more extensive use of local advisory and local craft committees. The Council recommends that at least one individual on the state staff be assigned this responsibility on a full-time basis.

PART II

Council Concerns

The Ohio Advisory Council for Vocational Education in its evaluation attempts has three major concerns:

(1) How effectively are the State's goals and priorities set forth in the State plan?

(2) How effectively is vocational education serving the needs of adults and youth of Ohio?

(3) How much consideration is given to the Council's recommendations for changes in vocational education?

CONCERN 1 - How effectively are the State's goals and priorities set forth in the State plan?

From the evidence available, Vocational Education seems to be progressing toward serving the needs of students and the communities in those cities presently providing vocational education. These centers, however, need to conduct a periodic evaluation of the needs of students and the prospective employment opportunities so that new programs can be created and unneeded programs abolished. Serious inequities exist in those Ohio communities that do not now have vocational training opportunities available to either high school youth or adults. A greater effort needs to be made on the part of local communities and the State to provide vocational education for all Ohio youth and adults.

Ohio has had significantly successful experimental programs to provide vocational education to the disadvantaged and handicapped for several years. These types of programs should be continually expanded.

Ohio maintains a strong interest in vocational education programs for out-of-school youth and adults and conducts manpower training programs in cooperation with the Ohio State Employment Service.

The State Plan for Vocational Education clearly outlines the goals and contains adequate procedures for implementation of the Plan objectives. All the 1970 goals are not fully attained; however, significant improvement has

been shown. During the past year, high school youth served has increased by 11.2% and enrolled out-of-school youth and adults increased by approximately 10%.

CONCERN 2 - How effectively is vocational education serving the needs of adults and youth of Ohio?

Before any new vocational center is established a complete community survey is conducted which indicates the employment opportunities available as well as the interest and goals of the potential student body. Undoubtedly there are some pockets of population in the State of Ohio where vocational education is not available in the quality and quantity needed. This void will undoubtedly continue until local funds become available to assist in financing these programs of vocational education.

The Ohio Division of Vocational Education has no control over private schools and other agencies involved in providing training. The Division of Vocational Education and the Ohio Advisory Council have attempted to cooperate with these other agencies in providing training. The most serious conflict exhibited to date exists in local communities between proprietary cosmetology schools and high schools offering vocational programs in cosmetology. Some schools believe that we are preparing an oversupply of cosmetologists.

There is good coordination between secondary and post secondary vocational programs since these are generally handled on the local and state basis by the same staff. Some conflict and confusion exists between adult vocational (State Department of Education) and adult technical education (Ohio Board of Regents). More effort must be given to a more cooperative arrangement between these two state agencies.

Potential employers of vocational education graduates are a vital link in the establishment and updating of the programs. Schools offering vocational education are required to have local advisory committees composed of representatives of labor and management. The Ohio Advisory Council believes these local advisory committees are not being used effectively.

All vocational centers assume the responsibility of assisting their graduates in finding a position in the occupational area for which they were trained. Students are not assured jobs upon graduation but the results indicate that Ohio vocational educators are providing this job placement service although there is room for improvement.

Vocational education is concerned about the extent to which it is involved in training for the total manpower development of our state. Many proprietary schools, professional groups, licensing boards and other agencies affect preparation of the total manpower needs. When the additional thirty-plus joint vocational schools are constructed, adequate facilities will be available for training in all parts of the State. All agencies of the state need to cooperate in using these facilities to the best advantage.

No new vocational programs are approved by the State unless a need for the graduates actually exists. The State Division of Vocational Education should insist that obsolete curriculums be eliminated.

Ohio is moving rapidly to meet the State's mandate of providing for all Ohio youth occupational training programs in at least 12 occupational choices. The State fully expects to have this plan in complete operation by 1974.

Because of the number of students enrolling in vocational programs is not proportionate to the theoretical manpower needs of the State, a serious problem exists in Ohio. Most high school students are enrolled in other than vocational programs, yet manpower studies indicate only a small proportion of Ohio's employed population requires a college education.

The success of experimental programs to create an occupational awareness and an orientation to the world of work at all grade levels has encouraged some expansion of this effort. Based on findings at the Council's Listening Forums, the Ohio citizens vigorously support this endeavor.

CONCERN 3 - How much consideration is given to the Council's recommendations for changes in vocational education?

Several of the Ohio Advisory Council recommendations have been implemented, others have been held up. More specific details regarding this are contained in Part III. Several factors have influenced the failure to implement some recommendations. Rapid expansion of vocational education in our state has taxed all members of the State staff almost to the limits. Another factor is the failure of several local communities to pass operating levies and bond issues.

ADDITIONAL CONCERNS

In addition to the three major concerns previously discussed, the Council, as a result of this year's evaluation and study, has suggested nine recommendations for the improvement of vocational education. The following are the highlights of the Council's findings and concerns in arriving at these recommendations.

VOCATIONAL EDUCATION OTHER THAN IN LARGE CITIES

Ohio is divided into 104 vocational school planning districts excluding the nine large cities. This will make it possible for every high school student to have at least 12 vocational training programs from which to choose. At the close of the 1970-71 school year, 24 have been funded or in operation, and 34 are awaiting local and state funds.

Those joint vocational schools in operation have been effective and have been supported by the communities as shown by the fact that the people have supported renewal operating levies. However, many joint vocational school districts across the state have not been successful in passing local levies and bond issues for the creation of new facilities. Many Ohio citizens feel that the State Division of Vocational Education should be of greater assistance to the local community in promoting levy campaigns. Some suggested, at the forums, that the State should be willing to pay the entire salary of the joint vocational school district superintendent for the first year in order to explain vocational education to the community. From the results of the forums Ohio citizens believe that the State should continue funding for building and equipment at the 50% level; few believe that the State should pay a larger proportion of the cost.

VOCATIONAL EDUCATION FOR LARGE CITIES

Large city vocational education has not received the same financial allocation as joint vocational school districts. This has adversely effected the growth and development of vocational education in the inner city areas where it is so vitally needed. All evidence indicates that most large cities are trying to be more flexible in vocational education offerings in their efforts to make programs available to all grade levels in schools located near the residences of the students. Several experimental programs have taken place in the large cities with gratifying results.

STUDENT CAREER PLANNING

Evidence indicates that many Ohio youth are not being realistic in their selection of an occupational career. There in an imbalance of students enrolling in college preparatory and general education courses versus vocational programs.

Ohio is an industrial state with perhaps one-twelfth of its employed population working in occupations requiring collegiate level training. The balance of employed population are in areas that can best be served through vocational training. Yet the majority of high school age students are enrolled in programs other than vocational education. This problem is particularly acute when one considers that approximately 20% of the students leaving the eighth grade never graduate from high school and probably never have an exposure to vocational courses.

It is evident that Ohio citizens, including many educators, do not understand the need for vocational education or its objectives and programs. The problem is that vocational education is for someone else's children with the net result that many college graduates cannot find employment, whereas there is a shortage of some mechanics, technicians and other skilled people.

USE OF PROPRIETARY SCHOOLS

Proprietary school owners are requesting contracts with the State Division of Vocational Education to provide some vocational programs, maintaining that substantial savings would be effected. Information from the U.S. Office of Education indicates that this pattern is not generally followed in other states.

OBSTACLES TO MEANINGFUL JOB TRAINING

Serious problems are evident between such groups as state licensing boards, and professional associations on the one hand, and public vocational educators on the other concerning their roles in the preparation of young people for life's work. As an example: this past year the Ohio Board of Nursing Education has indicated that it would not permit graduates from vocational programs other than those now in existence to participate in the State Practical Nursing Exam. This action, in effect, prohibits vocational schools from offering practical nursing programs for high school students. Similar problems exist with other state agencies in our efforts to provide vocational education to high school students and out-of-school youth and adults.

OUT-OF-SCHOOL YOUTH AND ADULTS

Public vocational education in Ohio has a long history of service to out-of-school youth and adults. Most such programs have been on a short-term basis using high school facilities after the normal school day. It is also evident that most local boards of education are not inclined to provide special educational facilities devoted to the training of out-of-school youth and adults during the day time hours. These same boards of education are not in a position to contribute to the financial operation of such programs.

In a changing society there is a vital need to provide "first-class" educational opportunities to the out-of-school youth and adults who need vocational programs in the same manner that it is necessary to provide courses in higher education for that segment of the population.

COMMUNITY INVOLVEMENT

Research conducted by the Ohio Advisory Council and comments received during the thirteen listening forums have shown that school administrators do not adequately involve local citizens in the planning and operation of programs. The Council believes that when local citizens are involved in the educational process they will better support the educational programs and the school programs will be more relevant not only to the needs of the community but to the needs of the students.

PART III

FOLLOW-UP OF THE RECOMMENDATIONS FOR THE FIRST ANNUAL REPORT

The first Annual Report of the Ohio Advisory Council for Vocational Education contained 14 recommendations for the improvement of vocational education services to the youth and adults of Ohio. Following is a report of action which has taken place on these recommendations.

1969-70 Recommendation 1

The Advisory Council recommends that every effort be made to alert and inform Ohio citizens that capital funds are available on a matching basis for the expansion of Vocational Education and that every effort be expended to use these funds economically and in concurrence with an over-all master plan so that adequately equipped buildings and facilities will be geographically located to best serve the needs of Ohio's youth and adults.

ACTION:

Ohio citizens have been effectively informed and a great deal of growth and development has taken place in the establishing and equipping of new facilities. During this year $60,485,766 in state and federal funds, plus $43,490,042 in local funds have been committed for the creation of new vocational facilities. During this year ten new area vocational school districts have erected buildings and 42 building additions have been added to regular high schools in the larger cities. Only $6,100,000 of the original $75,000,000 State appropriation was unassigned as the fiscal year closed June 30, 1971. The 109th session of the General Assembly was asked to appropriate an additional $53,000,000 to continue this expansion effort. Ohio can indeed be proud of this effort during the past year.

1969-70 Recommendation 2

The Advisory Council recommends that local communities work together in organizing school units of sufficient size that broad vocational offerings will be available to youth and adults.

ACTION:

Most local communities have cooperated as recognized by the fact 604 school districts in the state have now been organized on paper into 104 vocational school planning districts. Fifty-eight of these planning districts are joint vocational schools and 24 of them either have schools in operation or are funded so that their building will be available either at the start of the 1971-72 school year or the following year. Thirty-four districts that have not passed local levies to provide their portion of the building and operating costs, are in the process of resubmitting or submitting a local levy for this purpose.

1969-70 Recommendation 3

The Advisory Council recommends local school officials join with representatives of industry, labor and agriculture in a study of employment needs and develop an occupational education program which will develop qualified, efficient workers. (In this report the terms "vocational education" and "occupational education" are considered synonymous.)

ACTION:

Some progress has taken place during the past year in the cooperation between school officials and representatives of industry, labor and agriculture toward providing more relevant educational programs. The State Director of Vocational Education has forwarded information to the Superintendents of joint vocational schools and Directors of Vocational Education requesting more extensive use of local advisory committees. Evidence indicates that when new programs are established, local citizens are deeply involved. However, the Advisory Council feels that a great deal more cooperation is necessary through the use of local advisory committees. We are further recommending in Part I of this report, a renewed effort in this regard.

1969-70 Recommendation 4

The Ohio Advisory Council recommends that serious consideration be given to our original recommendation that the minimum of 3,000 high school students, grades 9 through 12, should be part of the criteria, rather than the adopted 1,500. This change would result in a greater variety of vocational education opportunities being available on a more economical basis.

ACTION:

Consideration was given to this recommendation by the State Department of Education; however, it was not adopted as a

standard by the State Board.

1969-70 Recommendation 5

The Ohio Advisory Council recommends that the State Department of Education expand, at an accelerated rate, those experimental programs designed to reduce the dropout rate and other specialized programs for the culturally disadvantaged.

ACTION:

The education of students from culturally, economically disadvantaged homes has been of primary importance to the vocational educators. This past year 97 new occupational work adjustment programs were initiated in an attempt to meet this vital need. Additional programs have been started for disadvantaged adults. Typical of these special offerings were classes to train Spanish speaking people in the Machine Tool Trade and another class to educate disadvantaged adults to enter the service occupations. The five large cities all added full-time staff to help expand this phase of vocational education.

1969-70 Recommendation 6

The Advisory Council recommends that provisions be made for adequate facilities and programs for adult vocational education programs on a full-time, day basis when necessary; and on a part-time basis when that type of program will serve satisfactorily.

ACTION:

Enrollments in vocational education of the out-of-school youth and adults in Ohio have increased during the past year by 10%. A full-time individual has been assigned to each of the vocational services to provide leadership for adult education. Evidence gained through the thirteen forums conducted throughout the state, clearly indicated that we have just begun to scratch the surface of these types of educational programs. There was a feeling expressed that vocational education should establish, throughout the state, several job training centers that can provide meaningful vocational courses on a full-time basis.

1969-70 Recommendation 7

The Advisory Council recommends that the movement to create more Joint Voca-

tional School District with a broad student base and a broad tax base be continued.

ACTION:

Considerable progress has taken place to create more Joint Vocational Schools. Through the cooperation of local school personnel, the state has been divided into 104 vocational school planning districts with 15 joint vocational schools in operation; nine additional funded and/or building under construction and only 34 still need to pass local levies to provide the necessary money for construction and operation.

1969-70 Recommendation 8

The Advisory Council recommends a large expansion of the work adjustment programs.

ACTION:

Ohio has been interested in the 14 and 15 year old dropout prone students. During fiscal year 1971, 133 occupational work adjustment programs were in operation throughout the state. Plans for vocational education in Ohio by 1975 call for 100% of the 79,778 dropout prone students to be served by vocational education.

1969-70 Recommendation 9

The Advisory Council recommends that a task force be appointed by the Division of Vocational Education to assist with the expansion of Ohio's service occupation programs and encourage larger student enrollments.

ACTION:

The task force to assist in the expansion of the Ohio service occupational programs was never appointed. However, 60% of the present enrollments in vocational education are in the service occupations. The state has employed special personnel, including a former dentist, to give greater attention to services in the health occupations. A committee of the Ohio Advisory Council was recently created in an attempt to expand vocational education in the field of service occupations.

1969-70 Recommendation 10

The Advisory Council recommends the organization of youth programs in all vocational centers with maximum participation.

ACTION:

Youth organizations in our state have grown to include a total of 51,658 students as members of the five vocational student organizations. The Advisory Council, with the assistance of staff members from vocational education, are in the process of preparing a brochure on the activities of youth organizations. The Council was pleased to note that during the past year more than 11,000 representatives from local youth groups participated in statewide conferences in Columbus without a single instance of student misbehavior.

1969-70 Recommendation 11

(a) The Advisory Council recommends that our State leadership in Vocational Education make a more concerted effort to impress on school administrators and community leaders the need for advisory committees to keep vocational offerings in line with the needs of youth and industry, and (b) The State Division of Vocational Education should develop special guidelines to assist local school personnel in the effective use of advisory and special occupational committees, their functions, composition, interests, and competency.

ACTION:

The inadequate use of local advisory committees continues to be a major concern of the Ohio Advisory Council. Members of the State Vocational Education staff have encouraged local administrators to make more effective use of advisory committees; however, the special guidelines to assist local personnel in the effective use of advisory committees have not been published. A special committee of the Ohio Advisory Council is in the process of publishing a document to encourage local school board members and superintendents to utilize this means of keeping vocational education attuned to the needs of local communities.

1969-70 Recommendation 12

The State Advisory Council recommends a state legislative commission or other group be formed to study ways to eliminate the barriers effecting job training and make the best use of available funds to serve the needs of all Ohio youth and adults.

ACTION:

Although the Legislative Commission on Vocational Technical

Education briefly considered this topic it did not make any recommendations dealing with these barriers. A special commission for this express purpose was not formed. Another example of the type of barrier occurred this year when the Ohio Board of Nursing Education took action curtailing the expansion of practical nursing education as a part of high school offerings. The Council considers this action a most serious barrier in preventing vocational education from serving the needs of young people.

1969-70 Recommendation 13

The Advisory Council recommends that the staff of the Division of Vocational Education in the U. S. Office of Education be expanded and that a reorganization be considered which would include leadership in the occupational areas as well as in the target group areas emphasized in the Vocational Amendments of 1968.

ACTION:

The Division of Vocational Technical Education of the U. S. Office of Education has not expanded its personnel during the past year. In effect, there has actually been a decrease in personnel assigned to this unit. The size of the present staff does not permit them to provide leadership services to the states. No progress has been evident during the past year. The Council is sending a copy of this recommendation, with an appropriate letter, to the Ohio members of the U. S. Congress.

1969-70 Recommendation 14

Our recommendation -- "Keep Moving - Ahead"

ACTION:

Progress has indeed been made during the past year in providing meaningful vocational education programs for the youth and adults of Ohio. Ohioans can be pleased with not only the expansion of building facilities but with services to people. All evidence seems to indicate that this trend will continue in the future.

PART IV

Council Activities

The second full year of Council operation saw increased involvement of members in Council activities. Four regular meetings were held, plus a three-day workshop at Hueston Woods. The Executive Committee met an equal number of times and all of the ten sub-committees met one or more times. Two members attended the American Vocational Association meeting and the Chairman participated in two meetings of National and State Council representatives. A total of 249 days of member time were devoted to official Council business, plus countless hours in related ways.

In compliance with Public Law #90-576 the Ohio Advisory Council conducted its public hearing in Columbus, Ohio on May 27, 1971. Several representatives from proprietary and public schools presented testimony for the consideration of Council. Written testimony of the public hearing is on file in the offices of the Council.

The Council activities were coordinated by an Executive Director serving on a part-time basis. The Executive Director has established offices in Worthington, Ohio.

The Council conducted a series of 13 forums throughout Ohio to secure viewpoints and recommendations regarding vocational education from interested Ohio citizens. More than 600 attended these listening sessions and many valuable comments and suggestions were received.

One three-day meeting at Hueston Woods was held in an effort to better understand vocational education and the factors affecting its operation and effectiveness. Included on the program were the State Superintendent of Public Instruction, Speaker of the Ohio House of Representatives, State Director of Vocational Education and Executive Director of the National Advisory Council for Vocational Education. Discussion periods followed and plans for the year were made, including ways and means of implementation.

The Council approved the Revised State Plan for Vocational Education for 1970-71 and strongly endorsed the Objectives to be Attained by the Year 1975 as planned by the Division of Vocational Education. These objectives included a strong emphasis on all phases of pre-vocational, as well as vocational programs, kindergarten through Grade 12, with major attention to the disadvantaged, handicapped and dropout prone youth. Extensive plans for a

strong post-secondary program were also included.

A study to secure factual information regarding what happens to students when they leave school, graduate or drop out, was contracted for with the Bureau of Educational Field Services, Miami University. This information could provide a basis for recommended policy for vocational education programs and for the fair and equitable distribution of State and Federal monies for these programs. The graduates and dropouts of the classes of 1964 and 1967 in 12 representative Ohio High Schools were studied to determine their progress in education and factors related thereto.

An illustrated brochure containing the recommendations of the First Report of the Ohio Advisory Council was published and 25,000 copies distributed to the public. A similar number of another illustrated brochure was published and distributed depicting how Ohio's program of SPECIAL NEEDS in vocational education creates a better life for the disadvantaged and handicapped. A leaflet, "Vocational Education in Ohio, a Positive Approach to the Gathering Socio-Economic Crisis" was distributed to thousands of leaders in Ohio to stimulate legislative as well as local support for a comprehensive program of vocational education."

The Council also published a leaflet to emphasize the significant performance of more than 50,000 students of vocational education who are members of vocational youth organizations. The leaflet high-lighted the excellent conduct of 11,000 of these youth who met in Columbus on six different weekends to conduct the business of their organizations and receive awards for outstanding work.

The Ohio Commission on Vocational and Technical Education, chaired by State Senator Stanley Aranoff, invited the Council to submit testimony. Mr. Jesse Fulton, Council Chairman, presented 13 recommendations to the Commission; these were studied by the Commission, discussed, and definite support given to many of the recommendations.

The Council is planning several additional studies. One, in cooperation with the State Board of Education, would learn from 1,800 young adults, 19 and 25 years old, how they regard their previous educational programs. In addition, the Council will learn what employers say about these young adults as employees. Another study would attempt to determine the need for training people to enter the allied health fields. The Council may also consider a study to determine how fully vocational facilities are being used.

To study, in more detail, the various aspects of vocational education, the members of the Council served on one or more of the following committees: Adult Education, Educational Facilities, Study of Local Advisory Committees, Legislative, Public Information, High School Student Study, Service Occupaations, Supportive Services, Hueston Woods Workshop and Long Range Planning. Significant progress was made by each of these committees, with some activities being continued into the 1971-72 year.

Members of the Ohio Advisory Council have in various ways endeavored to learn more about vocational education, its problems, progress and changes. Many joined the Ohio Vocational Association and the American Vocational Association to benefit from these organizations. Copies of pertinent articles were sent to Council members and members visited vocational schools. All members of the Council were sent the "Messenger," a brief news sheet prepared by the Executive Director.

Considerable change in the membership of the Ohio Advisory Council will be experienced next year. The term of service for six members expire June 30, 1971 and six new individuals have been appointed to serve on the Council. The Council deeply appreciates the outstanding services provided by the outgoing members: Mr. George Bowers, Mr. Howard Fox, Mr. Ron Guinn, Mr. William R. Mason, Dr. Robert Reese and Dr. David C. Sweet.

A P P E N D I X

RULES AND REGULATIONS OF THE
STATE OF OHIO
ADVISORY COUNCIL FOR VOCATIONAL EDUCATION

As Amended September 21, 1970

ARTICLE I - PURPOSES

The purposes shall be two-fold.

Section 1. To advise the State Board of Education on the development of the State Plan and policy matters arising in the administration of the State Plan submitted pursuant to Part B of Title I (PL9-576), including the preparation of long-range and annual program plans.

Section 2. To prepare and submit annually, on or before September 30, through the State Board of Education, to the Commissioner and to the National Advisory Council, an annual evaluation report, accompanied by such additional comments of the State Board as the State Board deems appropriate, which (I) evaluates the effectiveness of vocational education programs, services, and activities carried out in the year under review in meeting the program objectives set forth in the long-range program plans and the annual program plan and (II) recommends such changes as may be warranted by the evaluation and (III) publish and distribute the results of the evaluation.

ARTICLE II - MEMBERSHIP

Section 1. Appointment of members of the Advisory Council shall be the responsibility and authority of the State Superintendent of Public Instruction and the State Board of Education.

The certification of appointment of the State Advisory Council members signifying formal appointment by the State Board of Education must be signed by the Governor of Ohio and submitted to the United States Commissioner of Education. The qualifications of each member must be submitted with the certification.

Section 2. Membership of the Council shall consist of at least one or more representatives from each of the groups below. In selecting

representatives, appropriate geographical consideration should be given to concentrations of the state's population.

Labor and Management	Manpower and Vocational Education Agencies
State Industrial and Economic Development	School systems with large concentrations of disadvantaged students
Educational Institutions	Physically or mentally handicapped
Vocational Education	
Local Boards of Education	
General Public	

Section 3. Members of the Council shall be appointed for staggered three-year terms. Vacancies shall be filled by the State Board of Education only for the unexpired term.

Section 4. Appointed members of the Council, or designated alternate approved by the appointing authority, are the only members of the Council authorized to vote. If a member of the Council or the approved alternate finds that he cannot be present for a meeting, he may send an observer but such observer may not cast a proxy vote.

ARTICLE III - OFFICERS

Section 1. The officers of the Council shall consist of a Chairman, 1st Vice Chairman, 2nd Vice Chairman, and Secretary.

Section 2. The officers shall be elected at the last regular meeting of the fiscal year and shall serve for a one-year period.

Section 3. The officers and the immediate Past Chairman shall serve as an Executive Committee for the Council and perform such duties that are not deemed necessary for a full meeting of the Council.

ARTICLE IV - MEETINGS AND RULES

Section 1. The Council will conduct a minimum of four regular meetings a year. The exact date, time, and location of each meeting shall be determined at the previous meeting.

Section 2. Special meetings may be called by the Chairman or at the request of not less than seven members of the Council. Written notice of such special meetings will be given to each member at least six days prior to the date of said meeting, stating the time, place, purpose or purposes for which the meeting is called.

Section 3. The Spring meeting of the Council shall be publicized as a public meeting in newspapers of general circulation, at which

times any member of the public may express his views and concerns regarding Vocational Education.

ARTICLE V - COMMITTEES

Section 1. The Chairman may at any time appoint from the Council as he may deem necessary. Such committees may invite non-Council members to serve in lay capacities on such committees. All committees shall be advisory in nature and of two types:

a. Committees involved in Council affairs which shall be approved on a year-to-year or less basis for a specific purpose.

b. Task Force Committees to serve in a liaison capacity with the Office of the Director of Vocational Education at the request of the Director of Vocational Education when advice from the Council is expected.

ARTICLE VI - PROCEDURES

Section 1. The majority of the Council shall constitute a quorum. Should a quorum not be present, a roll call shall be made and a notation made of those absent. The meeting then can be adjourned.

Section 2. All communications relating to policy, sent or received by employed staff shall be reported to the Council.

Section 3. The order of the meeting shall be roll call, minutes, communications (from the public, from Council members), reports of officers of the Council, reports of standing committees, old business and new business.

Section 4. Permission must be obtained from the Council by persons not included on the Agenda desiring to speak to the assembled Council.

Section 5. The Agenda for each meeting shall be prepared by the Executive Committee.

Section 6. Robert's Rules of Order shall be taken as the authority in the transaction of business should the procedure not be defined elsewhere.

ARTICLE VII - AMENDMENTS

Section 1. Amendments to the Rules and Regulations of the Council can be submitted in writing by any member of the Council. A vote shall be taken at the next regular meeting for approval or disapproval.

ARTICLE VIII - STAFF AND EVALUATION

Section 1. The Advisory Council is authorized to obtain the services of such professional, technical, and clerical personnel as may be necessary to enable the Council to carry out its functions under the Act and to contract for such services as may be necessary to enable it to carry out its evaluation functions.

Section 2. Members of the State Advisory Council and its staff, while serving on the business of the Council, shall receive compensation, subsistence and travel allowances in accordance with state laws and regulations applicable to persons performing comparable duties and services. Compensation for Council members will be $50.00 per day, including travel time.

Budget for Fiscal Year 1970-71

Federal Allotment			$91,245.00
Council Staff Expenses:			
Personnel	$12,600.00		
Travel of Council Staff	2,000.00	$14,600.00	
Other Council Expenses:			
Equipment	$ 500.00		
Operation of Council Office	1,360.00		
Council salary, travel and meeting expenses	35,000.00		
Contract services for study	39,785.00	$76,645.00	$91,245.00

Expenditures for Fiscal Year 1970-71

Federal Allotment			$91,245.00
Council Staff Expenses:			
Personnel and travel	$17,545.85	$17,545.85	
Other Council Expenses:			
Equipment	$ 47.35		
Operation of Council Office, Communications, rental, supplies and printing	6,279.11		
Council member expenses, homoraria, travel and meeting expenses	21,388.56		
Research and evaluation	4,314.25	$32,029.27	$49,575.12
Balance remaining for research and evaluation under contract or consideration.....			$41,669.88

RECOMMENDATIONS PRESENTED TO THE
OHIO COMMISSION ON VOCATIONAL AND TECHNICAL EDUCATION
BY MR. JESSE W. FULTON, CHAIRMAN
JANUARY 29, 1971

The Ohio Commission of Vocational and Technical Education, chaired by State Senator Stanley Aranoff, invited the Council to submit testimony to the Commission regarding Vocational Education. Mr. Fulton, Council Chairman, presented 13 recommendations to the Commission. These were studied by the Commission, discussed and definite support given to all of the recommendations except Number Six.

The recommendations follow:

1. *Eliminate the inequality of financing of Vocational Education.*

2. *The State of Ohio should assume a larger share of the building and operational costs of Vocational Education.*

3. *Vocational and Technical Education should begin prior to grades 11 and 12.*

4. *Vocational and technical programs must be made available for adults as well as for youth.*

5. *Technical Education should be made more available to disadvantaged students.*

6. *The Council opposes the following action on the part of the Commission:*

   "The Commission on Vocational and Technical Education supports the Board of Regents' proposal to establish a State Board of Vocational and Technical Education Finance as an interim measure to satisfy the requirements of Federal Law."

7. *Education Resource Centers are mandatory for the future growth of education in Ohio.*

8. *Unnecessary standards for vocational and technical education should be eliminated.*

9. Follow up studies of vocational and technical graduates should be employed to determine the effectiveness of the program.

10. Vocational Education should continue to be offered in both large comprehensive high schools and area or joint vocational schools.

11. Ohio should develop procedures which might make better use of private vocational and technical schools.

12. Counseling and job placement services for vocational and technical students should be improved.

13. The Department of Education and Board of Regents should embark on an intensive public relations effort to improve the status of Vocational and Technical Education.

3886

OBJECTIVES FOR VOCATIONAL EDUCATION IN OHIO
to be obtained by 1975
Prepared by the OHIO DIVISION OF VOCATIONAL EDUCATION
and
Approved by the OHIO ADVISORY COUNCIL FOR VOCATIONAL EDUCATION

1. To provide a Preparatory Job Training Vocational Education Program for 166,958, or 40% of the 417,395 students at the 11th and 12th grade level or 16 years of age and above, including:

   46,957, or 75% of the 62,609 disadvantaged school youth who comprise 15% of all youth at the 11th and 12th grade level or 16 years of age and above who have academic socio-economic, or other handicaps that prevent them from succeeding in a regular vocational education program, and

   20,869, or 50% of the 41,739 handicapped school youth who comprise 10% of all youth at the 11th and 12th grade level or 16 years of age and above, who, because of their handicap, cannot succeed in a regular vocational education program.

2. To provide a dropout prone Youth Occupational Work Adjustment Program for 79,778, or 100% of the 79,788 dropout prone students, which comprises 20% of all youth at the 9th and 10th grade level or below the age of 16 years.

3. To provide re-training and up-grading Vocational Education Programs for 414,222, or 10% of the 4,142,229 adult workers.

4. To provide a Vocational Home Economics Consumer and Homemaking Education Program for 90,103,or 25% of 360,412 girls at the 9th through 12th grade level and 20,510,or 24% of the 85,457 adult women in a one year age span which will prepare them for the role of homemaker in their dual role of homemaker and wage earner.

5. To provide a Career Orientation Program for 270,484, or 75% of the 360,645 students at the 7th and 8th grade level of 12 and 13 years of age to build a basis for a Career Exploration Program realistic in light of all the circumstances surrounding them and the actual and potential labor market demands for gainful employment.

6. To provide a Career Exploration Program for 299,170, or 75% of the 398,894 students at the 9th and 10th grade level or 14 and 15 years of age.

7. To provide by 1975 a Work Orientation Program for 900,609, or 75% of the 1,200,812 students at the K-6 grade level, which will encourage constructive work attitudes in all youth.

8. To provide a Post-Secondary Program for 27,411, or 3.2% of the 856,656 persons 18 to 22 years of age.

9. To provide a Vocational Home Economics Consumer and Homemaking Education and Family Life Program for 7,893, or 50% of the 15,786 dropout prone girls at the 7th and 8th grade level, which comprises 13.2% of the girls at the 7th and 8th grade level and 95,498, or approximately 50% of the 190,995 adult women in a 3 year span living in the culturally and socially depressed areas.

10. To provide a Vocational Work Study Program for 50,087, or 30% of the 166,958 vocational students basically in the 11th and 12th grade vocational program, who are 15 through 21 years of age and who are in need of earnings from employment to pursue a Vocational Education Program.

11. To provide four residential vocational schools for 2,000 youth 16 to 21 years of age who can profit from this type of an instructional program.

VOCATIONAL EDUCATION OFFERINGS IN OHIO
A Brief of a Council Leaflet

A very basic fact of life is that people need jobs, not only as a means of living, but as a basis for identity, a basis for participating citizenship, a basis for worthy leisure, a basis for participating in the fruits of a technological society.

Just as people need jobs, jobs need people. The growth of industry depends upon the skilled and technical people available. Look at your newspaper ads on any given day within a major city; page after page of ads look for people while people look for work. People who do the hiring in our industries and business are not looking for young people who are willing to do anything, they are looking for people who know something and can do something.

Here is where Vocational Education can and must serve. It provides:

* Pre-employment training for high school youth, and out-of-school youth and adults.

* Upgrading training for employed workers who need new skills or technical knowledge to advance in their work.

* Retraining for the unemployed.

Vocational educators in Ohio have carefully studied employment needs and opportunities and have worked with local school officials in the development of 78 different programs of Vocational Education in 797 high schools during the 1970-71 school year. These programs follow:

AGRICULTURAL EDUCATION
- Production Agriculture
- Agricultural Business
- Agricultural Equipment & Mechanics
- Agricultural Processing
- Agricultural Resource Conservation
- Horticulture
- Forestry
- Agriculture for Special Needs

BUSINESS AND OFFICE EDUCATION
- High Skilled Steno
- Medical/Dental Steno
- Clerk Steno
- General Clerical
- Entry Data Processor
- Account Clerk
- Senior BOE CORE - 12th
- Coop Office Education - 12th
- Office Duplication Specialist
- Office Machines Operator
- Clerical Services - DAVY
- Work Experience in Business - DAVY

DISTRIBUTIVE EDUCATION

- Retailing
- Food Distribution
- Petroleum Service
- Vocational Coop DE
- Fashion Coordinating
- Performing Arts
- Disadvantaged DE Coop
- In-School Project Programs
- Communication Technician
- Occupational Work Adjustment

HOME ECONOMICS

- Homemaking
- Child Care Aides
- Child Care Assistants
- Cooperative Institutional Aides
- Cooperative Homemaking Aides
- Cooperative Food Service Aides
- Coop Clothing Seamstress
- Coop Drape/Upholstery Seamstress
- Food Service - Occupational
- Homemaking Aides - Occupational
- Multi-Coop Program
- Multi-Occupational

TRADE AND INDUSTRIAL EDUCATION

- Appliance Repair
- Aircraft Maintenance
- Carpentry
- Painting and Decorating
- Drafting
- Industrial Electronics
- Graphic Arts Occupations
- Machine Tool Operator
- Cosmetology
- Refrigeration
- Millwork and Cabinet
- Nurse's Assistant
- Body and Fender Mechanic
- Commercial Art Occupations
- Electricity
- Construction and Maintenance
- Industrial Electrician
- Radio/TV Repair
- Foundry
- Sheet Metal Operator
- Baker
- Dressmaker
- Occupational Work Experience
- Auto Mechanic
- Commercial Photography
- Masonry
- Diesel Mechanic
- Motor Repairman
- Fabric Maintenance
- Machine Shop
- Welding and Cutting
- Cook-Chef
- Tailoring
- Practical Nurse
- Diversified Coop Training
- Dental Assistant

PUBLICATIONS

The following are briefs of Advisory Council publications developed and distributed during 1970-71. Complete texts are available in the State Office of the Council.

Learning to Earn in Ohio Through VOCATIONAL EDUCATION

A condensed version of the 1969-70 Annual Report was published and 25,000 copies distributed to the public. The purpose was to give the public a better understanding of the extensive progress that has been made in Vocational Education and the tremenduous help it provides Ohio youth and adults in preparing them for useful employment.

The booklet contained 14 recommendations, outlined the finances available, and additional monies needed. It portrayed the progress made through Joint Vocational Schools and the special progress in occupational training. It emphasized the growing need for programs in service occupations and for out-of-school youth and adults who need to learn job skills, upgrade present skills and retrain for new jobs on a full-time day basis. It pointed out the need for local citizen involvement through local advisory committees to keep vocational programs relevant to the needs of local committees. It recognized the value of youth organizations in the development of leadership and good citizenship abilities.

Something Special

Ohio has made significant progress in providing programs designed to meet the special needs of the disadvantaged and handicapped who cannot fit into our regular program of education. To acquaint the public with what is being done and point up the need for additional programs, the Ohio Advisory Council published and distributed 25,000 copies of a booklet "SOMETHING SPECIAL." It included photographs of these students in their local schools, learning a skill so they can be self-supporting members of society.

This booklet identified the people who have special needs in education and how Vocational Education can provide programs which will develop human resources. It pointed out the value of the Impact Home Economics programs for 7th and 8 grade disadvantaged girls, the Career Orientation, OCCUPA-

TIONAL LABORATORIES and WORK ADJUSTMENT PROGRAMS for dropout prone 14 and 15 year old boys and girls who need special attention. It underscored the reduced dropout rate which was obtained by this program in a metropolitan area -- the lowest of ANY school program in that area.

The Ohio Advisory Council

The Ohio Advisory Council published and distributed thousands of copies of a leaflet, "THE OHIO ADVISORY COUNCIL FOR VOCATIONAL EDUCATION IN OHIO." The purpose was to tell the public about the members who comprised the Council, the purposes of the Council and a brief review of its activities.

The leaflet contained the names of the Council members, their present occupations and positions and something regarding their backgrounds. This revealed a wealth of experience in many areas of endeavor, in business, education and community circles, all so necessary for effective Council membership.

Support of State Plans and Objectives

The Council approved the State Plan for Vocational Education for 1970-71 as revised by the Division of Vocational Education, and vigorously endorsed the Objectives to be attained by 1975. To help implement this program the Council published "VOCATIONAL EDUCATION IN OHIO -- A POSITIVE APPROACH TO THE GATHERING SOCIO-ECONOMIC CRISIS." Thousands of copies of this illustrated pamphlet were distributed to local and state leaders.

The pamphlet outlined the projections for the additional vocational programs needed if Ohio citizens are to be given an opportunity to educate themselves at a level which fits their abilities and their needs. It emphasized the need to develop a respect FOR work and a desire TO work in the formative kindergarten through 6th grade years; CAREER ORIENTATION and CAREER EXPLORATION in grades 7 through 10; JOB TRAINING for those over 16; UPGRADING AND RETRAINING for adults and SPECIAL NEEDS PROGRAMS for the disadvantaged and handicapped. Equitable funding was urged for all sections of the state.

Youth Organizations

The Ohio Advisory Council is proud of the young people who are enrolled in Vocational Education and who are members of their respective youth organizations: The Distributive Education Clubs of America, Future Farmers of America, Future Homemakers of America, Office Education Association, and the Vocational Industrial Clubs of America. More than 11,000 of these students recently met in Columbus on six different weekends.

To recognize this outstanding group the Council published a leaflet

"YOU DIDN'T HEAR ABOUT..." and distributed thousands of copies to legislators and leaders of state and local organizations. The leaflet pointed out how these students learn to work together, develop leadership abilities, and assume religious and civic responsibilities as they participate in the vocational education program of their choice. They are to be admired for the goals and standards they set for themselves, their attitudes toward education and work and for the fine personal habits they exhibit.

A Perspective on the High School by Former Students

A major function of the Ohio Advisory Council is to advise the State Board of Education on the development of the State Plan and policy matters arising in its administration. To fulfill these responsibilities it is necessary to secure certain factual information and to obtain this the Council contracted for a study with the Bureau of Educational Field Services, Miami University.

More specifically the Council wanted data about:

1. The percent of high school graduates reported to be college-bound; the percent actually enrolling in college and/or post secondary institutions and the holding power of these institutions.

2. An adequate program of Vocational Education and the basis for a fair and equitable distribution of state and federal funds for Vocational Education.

3. The extent and causes of student dropouts in both high school and college and their subsequent employment.

4. Any additional information related to tbe above three statements.

The data were to be collected for the classes of 1964 and 1967, including those who dropped out, from 12 representative Ohio high schools. The completed report will be available in October, 1971.

REPORTS OF MEETINGS

The following are briefs of more complete reports of meetings which the Ohio Advisory Council conducted or participated in during 1970-71. Complete texts are available in the State Office of the Council.

Council Workshop

A three-day Workshop was participated in by Council members in an effort to better understand Vocational Education, its Objectives and Plans. The Workshop was held at Hueston Woods. A total of 35 members, consultants and guests attended.

Dr. Martin Essex, State Superintendent of Public Instruction, reviewed the status of Vocational Education and new advisory concepts. Mr. Charles Kurfuss, Speaker, Ohio House of Representatives, reviewed the legislators' views of Vocational Education, its opportunities and shortcomings and stressed the need for legislators to be better informed. Dr. Calvin Dellefield, Executive Director, National Advisory Council for Vocational Education, commended the Ohio Council for its aggressive programs and commented on the effectiveness of local, state and national advisory groups.

Dr. Byrl Shoemaker, State Director of Vocational Education, presented the plans and goals for Vocational Education for the next five years, and this was followed by discussion periods chaired by members of the Council. These related to JOB ENTRY training, UP-GRADING AND RETRAINING and SPECIAL NEEDS programs, with attention to plans for the future, including strategy. Council members felt the Workshop was highly successful.

Listening Forums

A series of 13 "Listening Forums" was conducted during the year by the Advisory Council to ascertain the attitudes and opinions of the citizens of Ohio toward Vocational Education. Various state organizations assisted in promoting these Forums which were attended by nearly 600 people, of which 40% were educators and 60% represented labor, business and the general public. These were largely afternoon and evening meetings and much of the time was set aside for discussion periods.

Some of the Conclusions and Recommendations drawn from the Forums follow:

1. *Strong support for the goals and plans of Vocational Education as supported by the Advisory Council was evidenced.*

2. *The Joint Vocational School Districts plan for providing Vocational Education is successful and well accepted.*

3. *Vocational Education in urban areas is flexible and well accepted. Programs in schools near the students' residence are desired.*

4. *Many Ohio youth are not realistic in making career choices. Meaningful guidance and career exploration in the early years are needed.*

5. *Citizens recognize the need for additional financing if the objectives of Vocational Education are to be attained.*

6. *Owners and operators of proprietary schools believe they can provide Vocational Education in some areas on a more economical basis than the public schools.*

7. *Citizens are concerned that licensing boards, professional and apprenticeship groups are determining who and how many are entering their work areas.*

8. *More opportunities for training, retraining and upgrading of out-of-school youth and adults should be provided.*

9. *The people of Ohio do not understand Vocational Education and the need for it. The image of Vocational Education must be improved.*

Annual Public Meeting
Ohio Advisory Council for Vocational Education
May 27, 1971

The second ANNUAL PUBLIC MEETING of the Ohio Advisory Council for Vocational Education was held in the auditorium of the Center for Tomorrow, Ohio State University. Mr. Joseph A. Hall, First Vice Chairman, presided. Public notices, as specified by law, were published in appropriate newspapers, news items regarding it appeared in other journals and periodicals. Also letters of invitation were sent to leaders of many state and local organizations. Those in attendance numbered 130. A verbatim report of the meeting was made.

During the meeting three representatives of private business and cosme-

tology schools asked for and were granted time to speak. Following each presentation the speakers responded to numerous questions and spirited discussion resulted. The private school representatives maintained that financial savings could be effected through contracts with these institutions and that equipment and services can be provided that are not available in public institutions. In spite of this they maintained that they were being ignored. Private schools can make a significant contribution to attaining the objectives of the state plan, the representatives maintained.

One Superintendent of a Joint Vocational School asked for and was given time to comment on the offerings provided through these schools and the success of the graduates.

3856

VT 014 394
RUBINSKY, STANLEY; SMITH, NELSON F.
EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS.

PUBLIC HEALTH SERVICE (DHEW), WASHINGTON, D.C. INJURY CONTROL RESEARCH LAB.
MF AVAILABLE IN VT-ERIC SET.
SUPERINTENDENT OF DOCUMENTS, U.S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D.C. 20402 ($0.25)
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ABSTRACT - THE TWO EXPERIMENTS REPORTED EVALUATE THE EFFECTIVENESS OF USING ACCIDENT SIMULATORS AS A TECHNIQUE FOR TEACHING SAFE PROCEDURES FOR THE OPERATION OF THE BENCH GRINDER. THE SUBJECTS WERE 104 COLLEGE UNDERGRADUATES, AND THE SIMULATED ACCIDENT WAS A STREAM OF WATER PROJECTED IN THE PLANE OF THE GRINDING WHEEL. THE FIRST EXPERIMENT INVESTIGATED THREE DIFFERENT METHODS OF SIMULATED ACCIDENT PRESENTATION, AND TESTED FOR SAFE OPERATING PROCEDURES AFTER A 1-WEEK RETENTION INTERVAL. THE SECOND EXPERIMENT REPLICATED THE FIRST AND EXTENDED THE RETENTION INTERVAL TO ONE MONTH. IN BOTH EXPERIMENTS IT WAS FOUND THAT SIMULATED ACCIDENTS WERE AN EFFECTIVE TECHNIQUE FOR TEACHING SAFE OPERATING PROCEDURES, AND THAT EXPERIENCING THE SIMULATED ACCIDENT WAS MORE EFFECTIVE THAN OBSERVING A DEMONSTRATION. (AUTHOR/GEB)

VT 014 394

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
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ICRL-RR-70-4

INJURY CONTROL RESEARCH LABORATORY

Evaluation of Accident Simulation As A Technique for Teaching Safety Procedures in The Use of Small Power Tools

U.S. DEPARTMENT OF HEALTH,
EDUCATION, AND WELFARE
Public Health Service

VT014394

3898

THE INJURY CONTROL RESEARCH LABORATORY conducts experimental studies of a person's ability to detect and appreciate hazards in his environment and to protect himself from injury. By systematic variation of the pertinent environmental and organismic variables, behavioral scientists and engineers identify the factors that cause errors of perception or judgment that lead to accidents, and assess the effectiveness of countermeasures intended to control these factors. In this manner, methods of anticipating hazardous situations and avoiding injuries are developed and tested by scientific procedures that permit their broad application in programs of community environmental management and control.

FOR INFORMATION ABOUT THE LABORATORY OR ITS programs, contact the Director, Injury Control Research Laboratory, 235 Promenade Street, Providence, Rhode Island 02908, or the Chief, Division of Planning and Standards, Public Health Service, U. S. Department of Health, Education, and Welfare, 5555 Ridge Avenue, Cincinnati, Ohio 45213.

Research Report
ICRL-RR-70-4

February
1970

THIS RESEARCH REPORT IS THE SECOND OF A SERIES directed toward determination of the feasibility and utility of home power tool simulation for research on the causes of accidental injury and for training in the safe operation of power tools.

THE REPORT PRESENTS THE RESULTS OF A LABORATORY study of the effectiveness of an accident simulation technique in teaching safe power tool operation. Details of the bench-grinder accident simulator are included. The results provide strong evidence of short-term retention of safe operating procedures. Study of the question of extended retention will be continued and reported in future reports.

THIS SERIES OF REPORTS WILL BE OF INTEREST TO epidemiologists, behavioral scientists, safety specialists, and educators concerned with manual training methods and equipment.

THE REPORT WAS PREPARED BY MEMBERS OF THE STAFF OF the Industrial Engineering and Psychology Departments of the University of Rhode Island, Kingston, Rhode Island, under terms of a 2-year contract with the U.S. Public Health Service (PH86-68-207). Dr. Nelson F. Smith received his doctor of philosophy degree from Princeton University and is an Associate Professor of Psychology at the University of Rhode Island.

(Continued on Inside Back Cover)

3899

EVALUATION OF ACCIDENT SIMULATION AS A TECHNIQUE FOR TEACHING SAFETY PROCEDURES IN THE USE OF SMALL POWER TOOLS

Stanley Rubinsky and Nelson F. Smith

University of Rhode Island
Contract No. PH86-68-207

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

Public Health Service

Bureau of Community Environmental Management

Division of Planning and Standards

Injury Control Research Laboratory

1971

3900

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3901

CONTENTS

Page

Acknowledgement ii
Abstract v
Introduction 1
  The Simulator 2
  The Accident Simulator as a Training Device 3
Experiment I 4
  Method 4
    Subjects 4
    Apparatus 4
    Procedure 4
  Results 6
  Discussion 9
Experiment II 10
  Method 10
    Subjects 10
    Apparatus 10
    Procedure 10
  Results 10
  Discussion and Conclusions 14
References 16
Appendix A: Schematic Diagram of Accident Simulator 17
Appendix B: Instructions 18

3902

ABSTRACT

The two experiments reported evaluate the effectiveness of using accident simulators as a technique for teaching safe procedures for the operation of the bench grinder. The subjects were 104 college undergraduates. The simulated accident was a stream of water projected in the plane of the grinding wheel. Experiment 1 investigated three different methods of simulated accident presentation, and tested for safe operating procedures after a 1-week retention interval. Experiment 2 replicated Experiment 1 and extended the retention interval to 1 month. In both experiments, it was found that simulated accidents were an effective technique for teaching safe operating procedures. In addition, the results of Experiment 2 indicated that experiencing the simulated accident was more effective than observing a demonstration of it.

INTRODUCTION

The necessity for a vigorous program to reduce the number of accidents and accidental injuries that occur as the result of using small power tools was established by a study sponsored by the U. S. Public Health Service and published in a previous report of Rubinsky and Smith (1). In this report, the use of accident simulation as a training technique was suggested as one approach to the reduction of these accidents.

Two primary questions related to the use of accident simulation were not considered in the original study. The first dealt with the question of the feasibility of the development of accident simulators, and the second was concerned with the effectiveness of the simulators if they were developed as devices for use in safety study and for training operators of small power tools.

The question of the feasibility of accident simulators was studied by constructing a prototype simulator and running a preliminary study to determine its usefulness as a training device. When the results of the preliminary experiment showed promise, a device to simulate accidents on a bench grinder was constructed, and a full-scale experiment in its use as a training tool was undertaken.

It was decided to simulate a grinder accident because the grinder proved to be an important source of accidents (1), a method to simulate some types of grinder accidents was practical, and the simulated accidents could be so devised that actual injury to an operator was virtually impossible.

The three major types of accidents encountered in the use of the ordinary offhand grinder -- either bench or pedestal mounted--are: eye injury caused by flying bits of abrasive; sparks, or minute metal chips; abrasion of the hand or finger by inadvertent contact with the rotating abrasive wheel; and injuries sustained from fragments of the wheel itself if it disintegrates or "explodes" during the operation of the grinder.

Realistic simulation of an eye injury would require the operator to work at the machine with no eye protection. Since this would also expose him to the risk of an actual injury, consideration of this type of simulation was abandoned. The same type of concern led to the abandonment of the hand and finger injury. While another material could be substituted for the abrasive wheel in order to avoid an actual injury, the substitution would prevent the realistic

operation of the grinding process itself, thereby resulting in a simulator that would not reproduce actual operating conditions. Therefore, it was decided to simulate the third type of accident--the disintegrating wheel--by substituting a water spray that would be undesirable from the standpoint of the operator. Therefore, the operator would try to avoid the accident, but no real hazard of injury would be present.

An abrasive wheel on an offhand grinding machine will "explode" for any one of three reasons. First, if the wheel is struck with a relatively heavy blow while it is operating, it can fly apart. This event is rare and can be considered to occur only when extreme or deliberate negligence is exhibited by the operator.

Second, a new abrasive wheel may be highly unbalanced, or it may have been cracked during shipping, while in storage, or by incorrect mounting on the shaft. Third, an abrasive wheel already in use may be chipped or cracked through carelessness while the wheel is not in operation.

Under these conditions, the forces built up as the wheel accelerates from rest to operating speed--when the machine is turned on--may be high enough to cause a defective wheel to shatter and "explode". When the machine has reached operating speed, the force on the wheel is constant so that all danger of an "exploding" wheel is essentially absent. Therefore, one guards against injury from an accident of this type by simply standing away from the plane of rotation of the wheel during startup. Prudent operation, then, demands that when starting a grinder, the operator must stand to one side of the machine until the abrasive wheels attain full operating speed, which can easily be determined by the sound of the machine.

THE SIMULATOR

The simulator developed was a standard bench grinder to which two water jets were attached so that one was located next to each of the two abrasive wheels. The jets were directed so as to spray water in a plane parallel to the plane of rotation of the abrasive wheels, and were mounted so as to be as unobtrusive as possible. The jets were piped through a small pump to a water reservoir. The pump was controlled remotely by means of a momentary contact switch (Appendix A presents a schematic diagram of the simulator). When the switch was closed by the experimenter or instructor, a spray of water was directed at the operator's normal position in front of the grinder; this was the simulated accident. Thus, when an accident was simulated, an operator standing in front of the machine was "injured," while an operator standing in the correct

position to the side of the grinder was not sprayed with water and, therefore, escaped "injury".

THE ACCIDENT SIMULATOR AS A TRAINING DEVICE

The purpose of the two experiments reported herein was to test the hypothesis that safe operating procedures for small power tools would be taught more effectively if the usual training practice--demonstrating safe operating procedures plus the use of written instructions and precautions--were expanded by the inclusion of simulated accidents. In larger perspective, effective instruction in safe operating procedures in the use of power tools should ultimately lead to a reduction in small power tool accidents.

The present experiments were designed to test the effectiveness of using accident simulation to teach safe power-tool operating procedures in the use of the bench grinder. The main variable manipulated in the two experiments was the type of safety training procedures used to teach an inexperienced subject how to use a bench grinder in a safe manner. The subjects were divided into four groups, and the following training conditions were used in both experiments:

Group 1. Written instructions and a demonstration of safe operating procedures;

Group 2. As in Group 1, but with the addition of a demonstrated simulated accident;

Group 3. As in Group 1, but with the addition of an experienced simulated accident when the subject was running the grinder;

Group 4. As in Group 1, but with both a demonstrated and an experiences simulated accident.

The dependent measure used throughout the studies was the number of potential accidents that occurred during training and during the trials that tested retention of training. A potential accident (hereafter called an "accident") was defined as turning on the bench grinder while standing in front of it. Of course, in actuality, the only thing that separates a potential accident from a real accident is whether all the contributing factors necessary for an actual accident are, by chance, operating at a particular time.

EXPERIMENT I

METHOD

Subjects

Thirty-two male college sophomores from general psychology classes at the University of Rhode Island served as subjects. None of the subjects had previously used a bench grinder. The subjects were numbered and assigned to one of the four training conditions by the use of a table of random numbers. The only restriction in the randomization was that there must be eight subjects in each of the four groups. The ages of the subjects ranged from 19 to 23 years.

Apparatus

A standard offhand bench grinder was modified, as previously described, and used as an accident simulator. In addition, 10 steel rods 5/8 inch in diameter and about 8 inches long were used for a spark test. The rods were numbered from one to 10. Each of the rods was of a different composition, varying from low carbon steel to steels with different proportions of silicon, manganese, chromium, and other alloying agents so that their spark characteristics, while being ground, would vary. A chart exhibiting the spark patterns of various steels was displayed directly behind the grinder as a guide to aid the subject in identifying the type of steel in the individual rods. Finally, a special tool rest with a "V" notch to accomodate the steel rods was attached to the grinder. Safety goggles were provided.[1]

Each subject was tested in a 15 by 25 foot room containing only a metal bench on which the simulator was mounted and a chair and table where the experimenter was seated. There was also an anteroom where the subjects read the written instructions and waited their turn for the test. Three pages of operating and safety instructions were prepared. (See Appendix B). These instructions explained the nature of the spark test and outlined the safety precautions that should be followed before operating a bench grinder. The instructions also directed the subjects not to discuss the experiment with any one for 2 weeks after the task was completed.

Procedure

A cover task was used so that the subjects would be unaware of

true nature of the experiment and would not concentrate exclusively on the safe operation of the grinder. The subjects were told that they were participating in an experiment to see whether inexperienced people could use a grinder to conduct a "spark test" to determine the approximate chemical composition of steel rods. In the training phase of the experiment, each subject was told to read the instructions concerning the cover task and to signify when he had finished the instructions and understood the task. The instructions described the nature of the cover task that was to identify the chemical composition of the various bars of metal by their sparking characteristics when held against the grinding wheel. Each subject was told that he was to observe the spark pattern produced by the rods while they were being ground, and try to match it with a spark pattern pictured on the chart placed on the wall above the grinder. The instructions also described the safe procedure for grinding and emphasized the safety precautions to be taken while operating a grinding wheel. These safety precautions were:

1. Not to stand in front of the grinder while turning it on, or before the machine reached operating speeds; and

2. To wear safety goggles at all times.

Next, the cover task was demonstrated by the experimenter. During the demonstration, the experimenter showed the subject how to wear the safety goggles and how to start the machine. The experimenter started the grinder while he was standing at its side, thus demonstrating that an operator should not and, in fact, need not stand in front of the grinder while starting it. In the control group (Group 1) and in Group 3, the demonstration consisted simply of showing the subject how to operate the machine safely while performing the spark test. In Groups 2 and 4, while the machine was reaching a safe operating speed, the experimenter switched on the water that sprayed from the front of the machine in the plane of the wheel. The experimenter then explained to the subject that a simulated accident had just occurred, that the water simulated the grinding wheel flying apart, and that the direction of the spray of water showed the direction in which the grinding wheel fragments would fly. This procedure is hereafter referred to as the "demonstrated accident". At the end of the demonstration, the subject was told to perform the spark test on each of 10 steel bars. Each subject was given a data sheet on which to record his judgments of the kind of metal contained in each sample. The subjects were told to record an X if they could not identify the metal. The experimenter watched each subject to make certain that

3908

he kept his goggles on throughout the experiment.

For each group, an "accident" was said to occur if the subject stood in front of the machine while turning it on. Since there were 10 bars to be tested, there were 10 opportunities to have an "accident" because the subject was instructed to turn off the machine after each rod had been spark tested. Thus, for purposes of this research, the possible number of "accidents" for each subject ranged from 0 to 10 in each session.

For Group 3, which did not see the "demonstrated accident" during the training phase, and for Group 4, which did see the "demonstrated accident," the experimenter watched each subject's performance. Then, the first time the subject stood in front of the machine when starting it, he experienced the simulated accident; that is, he was squirted with the water. The experimenter then explained that the somewhat unpleasant experience of being sprayed with water was the equivalent of an "accident" because the subject had stood in front of the wheel while turning it on and before the machine had reached a safe operating speed. This procedure is hereafter called the "experienced accident". The session was then continued until all 10 bars had been tested. After each subject had completed the cover task, he was asked to return 1 week later. The subjects were not told that they would repeat the original task.

Each subject returned to another experimental room about a week later so that retention of the learning could be tested. The environment was changed in an attempt to make the replication somewhat different from the training. Because of problems in arranging time schedules, it was impossible for every subject to return exactly 7 days later. In actuality, nine subjects returned and were tested 6 days after the original test, and the remaining 23 subjects returned and were tested after 7 days. During the retention session, all groups were treated identically. All the subjects were asked to repeat the spark test on 10 metal bars, and "accidents" were counted. No additional instructions, demonstrations, or experience with the simulated accident occurred.

RESULTS

The mean number of "accidents" occurring in each training condition (group) during training and replication are shown in Table 1. It can be seen that the number of errors decreases from Group 1 to Group 4.

Table 1. MEAN NUMBER OF "ACCIDENTS" FOR SUBJECTS WITHIN TRAINING CONDITIONS DURING TRAINING AND RETENTION SESSIONS (n=32)

Group	Training session	Retention session
1. No simulation of "accident"	5.50	7.12
2. Simulated accident demonstrated	2.75	4.25
3. Simulated accident experienced	.75	.67
4. Simulated accident demonstrated and experienced	.75	.38

Table 2 compares the means presented in Table 1. It presents the results of the analysis of variance of a two-factor, mixed-design experiment with repeated measures on one factor. The analysis of this design is discussed by Bruning and Kintz (2). In Table 2 it can be seen that the differences between groups, sessions, and their interactions were all significant.

Table 2. SUMMARY OF ANALYSIS OF VARIANCE FOR SIMULATED POWER-TOOL ACCIDENTS FOR FOUR TRAINING CONDITIONS AS A FUNCTION OF SESSIONS (n=32)

Source	Sum of squares	Degrees of freedom	Mean squares	F scores	Probability
Total	643.484	63	-	-	
Between subjects	599.984	31	-	-	
Training procedures	356.671	3	118.890	13.68	.001
Error b	243.313	28	8.690	-	
Within subjects	43.500	32	-	-	
Sessions	6.890	1	6.890	8.28	.001
Training procedures X sessions	13.298	3	4.433	5.333	.005
Error w	23.312	28	.832		

441-837 O - 71 - 2

To further identify the effect of the different training procedures, a series of t-tests were performed between the groups for both training and replication. Table 3 shows the results of t-tests for the training session. It can be seen that there were significantly fewer "accidents" in all groups receiving either a demonstrated or an experienced simulated accident (Groups 2, 3, and 4) than in Group 1, which received only typical written and verbal instructions, and a demonstration of safe operating procedure.

Table 3. RESULTS OF t-TESTS COMPARING THE MEAN NUMBER OF ACCIDENTS DURING THE TRAINING SESSION (n=32)

	Training Conditions *			
Group	1	2	3	4
1	–	.05	.01	.01
2		–	NS	NS
3			–	NS
4				–

* Training Conditions
1. Written instruction and demonstrated procedure only.
2. Plus demonstrated accident.
3. Plus experienced accident.
4. Plus demonstrated and experienced accidents.

Table 4 illustrates that, with the passage of 7 days and with a changed experimental environment, the Group 2 subjects exposed only to the demonstrated accident simulation had significantly more accidents than the subjects of Groups 3 and 4, who had previously experienced the simulated accident. It should be noted that Group 2 as well as Groups 3 and 4 still had a significantly fewer number of "accidents" than Group 1.

Table 4. RESULTS OF t-TESTS COMPARING THE MEAN NUMBER OF ACCIDENTS ON THE RETENTION TEST (n=32)

	Training Conditions *			
Group	1	2	3	4
1	–	.05	.01	.01
2		–	.01	.01
3			–	NS
4				–

* Training Conditions
1. Written instruction and demonstrated procedure only
2. Plus demonstrated accident
3. Plus experienced accident
4. Plus demonstrated and experienced accidents

3911

To locate the reliable differences between training and retention, t-tests for related measures were performed on the data of each group. These results indicated that the only significant changes over the retention period were increases in "accidents" in Group 1 ($t = 2.592$, df7, $P < .05$) and Group 2 ($t = 4.58$, df7, $P < .01$).

DISCUSSION

The data show that all groups exposed to either a demonstrated or an experienced accident simulation, or both, (Groups 2, 3, and 4) during the training session had significantly fewer "accidents" than the group that received only written safety instructions and a demonstration of safe tool-operating procedure (Group 1).

In addition, the analysis of the retention session showed that the results of the training procedure were still present after a week's interval and after being transferred to a somewhat different environment.

That the demonstration of the simulated accident was not as effective as the experience of the simulation is indicated by the fact that a significant increase in errors for Group 2 occurred over the 1-week retention interval.

The results of the experiment lend support to the hypothesis that the experience, or even the demonstration, of a simulated accident may be a more effective way to teach safe tool-operating procedures than is the usual training practice of using a demonstration of safe operating procedures and a written, or verbal, description of potential accidents without the simulation of those accidents.

Experiment 1 had several limitations that caused the authors to question the generality of its results. Most serious of the limitations was the fact that there were only eight subjects per group, a very small number from which to draw reliable conclusions. Another concern was whether or not the 1-week retention interval was long enough to test the differential effectiveness of the training techniques. Yet another reason for a replication of the experiment was an interesting aspect of the results of Experiment I: the average number of "accidents" decreased between the training sessions and the retention session--although not significantly--in both groups experiencing the simulated accident (Groups 3 and 4). The authors were anxious to see whether this was a repeatable finding.

With these points in mind, the basic experiment was repeated and expanded. The expansion consisted of the inclusion of a retention test after 4 weeks as well as after 1 week, the inclusion of females as well as males in the experimental population, and the use of a different grinding machine in the 4-week retention test.

EXPERIMENT II

METHOD

Subjects

Seventy-two college students from an introductory psychology course during the summer session at the University of Rhode Island served as subjects for this experiment. Twenty males and 52 females were numbered and assigned to the four training conditions by the use of a table of random numbers. The only restrictions placed on the random assignment to conditions was that there be 5 males and 13 females in each group. The ages of the subjects again ranged from 19 to 23 years.

Apparatus

The apparatus for Experiment 2 was the same as for Experiment I except that an unmodified pedestal grinder was used in the second retention test.

Procedure

The group labels and the training procedures used for the groups were the same as in Experiment I. The procedure of the training phase in Experiment 2 was identical to the training phase of Experiment I. For the first retention test of Experiment 2, each subject returned to the experiment exactly 1 week later and spark-tested the 10 steel bars. For the second retention test, each subject returned exactly 4 weeks after the original trial and again spark-tested the 10 bars while the experimenter noted "accidents".

RESULTS

A preliminary analysis with an F-test revealed that the differences in number of "accidents" between male and female subjects was not significant. As a result of this finding, the male and female data were combined on all further analyses.

The further statistical analyses applied to the data of Experiment 2 were the same as those used in Experiment I.

Table 5 summarizes the mean errors of each of the groups during

3913

the training session and each of the retention sessions. It can again be observed that mean errors decrease from Group 1 to Group 4, with one exception: a reversal occurred between Groups 1 and 2 on the second retention series.

Table 5. MEAN NUMBER OF "ACCIDENTS" FOR SUBJECTS WITHIN TRAINING CONDITIONS DURING TRAINING AND TWO RETENTION SESSIONS (n=72)

Group	Training	Retention 1	Retention 2
1. No simulation of "accident"	7.000	6.888	6.777
2. Simulated accident demonstrated	5.333	4.944	6.833
3. Simulated accident experienced	4.055	4.500	5.055
4. Simulated accident demonstrated and experienced	3.111	3.722	4.500

The results of the two-way analysis of variance on the above means are shown in Table 6. It can be observed that, once again, both the safety training procedures and the sessions variables were significant, their interaction was not significant.

Table 6. SUMMARY OF ANALYSIS OF VARIANCE FOR SIMULATED POWER TOOL ACCIDENTS FOR FOUR TRAINING CONDITIONS AS A FUNCTION OF THREE SESSIONS (n=72)

Source	Sum of Squares	Degrees of Freedom	Mean Squares	F Scores	Probability
Total	2966.204	215	–	–	
Between subjects	2438.871	71	–	–	
Safety training procedures	297.796	3	99.265	3.15	.05
Error b	2141.075	68	31.486	–	
Within subjects	527.333	144	–	–	
Sessions	31.843	2	15.921	4.59	.025
Training procedures X sessions	23.454	6	3.909	1.13	
Error w	472.036	136	3.471		

Table 7, 8, and 9 present the results of t-tests comparing the mean number of accidents for each of the groups during each of the sessions. Table 7 shows that each of the safety training procedures involving either the experience or demonstration of the simulated accident resulted in significantly fewer "accidents" than did the typical written and verbal instructions given with only a safety demonstration. It can also be seen that Group 4, which received both the demonstrated and the experienced "accident," had significantly fewer "accidents" than did Group 2, which received only the demonstration of a simulated accident.

Table 7. RESULTS OF t-TESTS COMPARING THE MEAN NUMBER OF ACCIDENTS IN THE TRAINING SESSION (n=72)

	Training Conditions *			
Group	1	2	3	4
1	–	.05	.001	.001
2		–	NS	.01
3			–	NS
4				–

* Training Conditions
1. Written instruction and demonstrated procedure only.
2. Plus demonstrated accident.
3. Plus experienced accident.
4. Plus demonstrated and experienced accidents.

Table 8 shows that 1 week later the same differences between groups were present as had been found in the training sessions.

Table 8. RESULTS OF t-TESTS COMPARING THE MEAN NUMBER OF ACCIDENTS IN THE FIRST RETENTION SESSION (n=72)

	Training Conditions *			
Group	1	2	3	4
1	–	.05	.001	.001
2		–	NS	.05
3			–	NS
4				–

Table 9 shows the differences between groups after 4 weeks. From this table, it can be seen that the only significant differences remaining were that the subjects of Group 4 had significantly fewer "accidents" than did those of Groups 1 and 2. The mean number of

3915

"accidents" in Group 3 was between that of Groups 1, 2 (see Table 5), and 4 but was not significantly different from either.

Table 9. RESULTS OF t-TESTS COMPARING THE MEAN NUMBER OF ACCIDENTS IN THE SECOND RETENTION SESSION (n=72)

	Training Conditions *			
Group	1	2	3	4
1	–	NS	NS	.05
2		–	NS	.05
3			–	NS
4.				–

* Training Conditions
1. Written instruction and demonstrated procedure.
2. Plus demonstrated accident.
3. Plus experienced accident.
4. Plus demonstrated and experienced accident.

In order to locate significant session effects, four one-way analyses of variance for repeated measures were performed, one for each group across sessions. The results of these tests revealed that the only groups to show significant changes in the number of accidents across sessions were Groups 2 and 4. Tests for related measures were then performed on the data of each of these groups to show where the significant differences occurred.

Tables 10 and 11 show the results of these tests. It can be seen that in both groups the significant increase in errors occurred between the first retention test and the second. It is important to remember that after 4 weeks, Group 4 still had significantly few "accidents" than either Group 1 or Group 2. It is also interesting to note that there was not a significant change in errors over the retention periods tested for either Group 1 or Group 3.

Table 10. RESULTS OF t-TESTS COMPARING THE MEANS FOR GROUP 2 IN THE TRAINING SESSION AND TWO RETENTION SESSIONS

Session	Training	Retention 1	Retention 2
Training	–	NS	.01
Retention 1		–	.01
Retention 2			–

Table 11. RESULTS OF t-TESTS COMPARING THE MEANS FOR GROUP 4 IN THE TRAINING SESSION AND TWO RETENTION SESSIONS

Session	Training	Retention 1	Retention 2
Training	—	NS	.05
Retention 1		—	.01
Retention 2			—

DISCUSSION II AND CONCLUSIONS

The results of Experiment 2 closely parallel those of Experiment 1 in most respects. Once again, a single experience or demonstration of a simulated accident during training significantly reduced the number of "accidents" during the training and the first retention session 7 days later.

The data of the second retention session, however, 4 weeks after the training session, show that the effect of the training procedures was diminishing, since the only group with significantly fewer "accidents" than Group 1 was Group 4. This finding is, of course, more to be expected than was the trend toward continued reduction of errors in the retention session found in the first experiment.

The results of the two experiments provide strong evidence of the potential benefit of including the demonstration and the experience of simulated accidents while teaching safe operating procedures in the use of small power tools.

That the experience of the simulated accident is more effective than its demonstration can be inferred from the order of the mean number of "accidents" (see Tables 1 and 5). This also can be inferred from the data that show that the number of accidents in Group 2 (demonstration of simulated accidents only) increased significantly over the retention periods in both experiments, while the "accidents" in Group 3 (experience of simulated accidents only) remained low.

It is interesting to speculate concerning the reasons why Group 4 was superior to the other groups in both experiments, and was the only group to retain its advantage after 28 days. Group 4 was the only group to receive both a demonstration and an experience of a simulated accident. In other words, the subjects of Group 4 had a double exposure to the accident simulation. Thus, the number of

3917

exposures to the simulated accident may be the most important in the effective use of accident simulation in teaching safe operating procedures.

To summarize, it appears from the data presented that a simulated accident is a "powerful" training tool. While demonstrating the simulated accident tends to reduce the incidence of unsafe acts, the experience of the simulated accident by the operator is a significantly better training technique. The results also indicate that retention of the training is most effective under conditions during which the operator experiences the simulated accident. And finally, it has been demonstrated that learning by accident simulation is transferred from the simulator to a standard machine, even when the shift is made after a period of 4 weeks.

The data of the present study show that the concept of teaching safe operation of power tools through the simulation of accidents is a promising one. Although more research is needed to understand the full potential of this seemingly powerful technique, the method is potentially useful in many areas. If future research continues to show that it is effective and generalizable, simulation should be incorporated into the training programs of schools, shops, and industry. This technique holds the potential for the prevention of untold numbers of accidents. Another area where simulation may be effective is in the training of the mentally, physically, or culturally handicapped, where the most effective training techniques available must be used.

In future studies, it would seem important to further manipulate the ways in which accident simulation could be used in training. It is particularly important to discover the number of simulations that would maximize the effectiveness of the procedures. The retention periods should also be extended to see whether the effects are truly long lasting. The development and testing of accident simulators for other power tools is also indicated in order to test the generality of the present findings.

3918

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3919

APPENDIX A

SCHEMATIC DIAGRAM OF ACCIDENT SIMULATOR

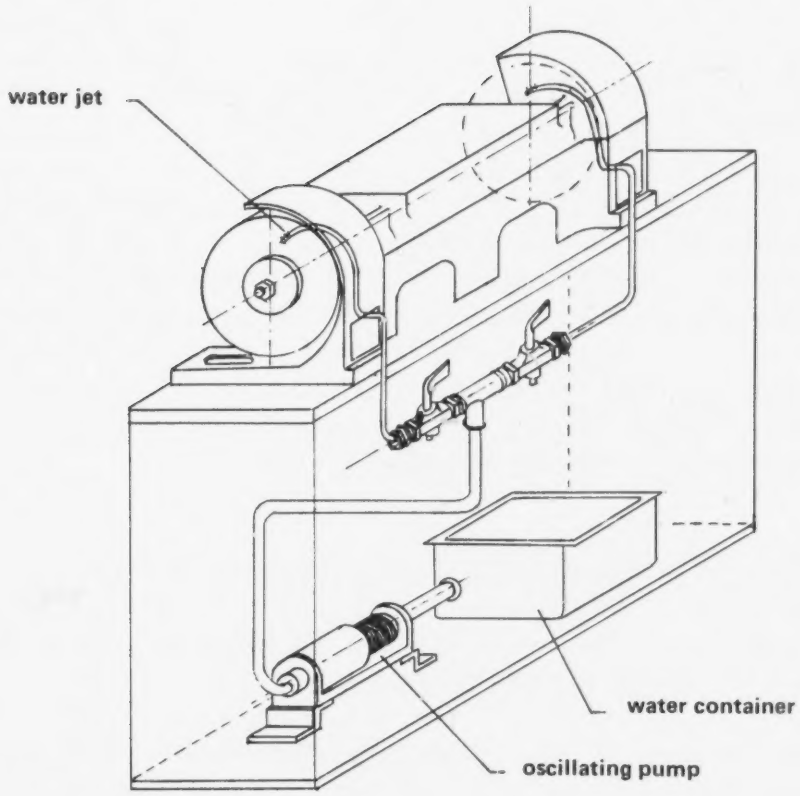

Figure 1. Accident simulator: diagrammatic view of grinder modification.

3920

APPENDIX B

INSTRUCTIONS

We are interested in evaluating certain tests for steels, called "spark-tests." Since the sparks which are generated when a piece of steel is held against a grinding wheel are caused by minute particles of steel burning in the air, the manner in which the steel burns, and, therefore, the appearance of the spark, depend upon the chemical composition of the steel. Thus, the steel can be identified by observing its sparking characteristics. We do not expect you because of your general lack of knowledge about metallurgy and the compositions of the various kinds of steel, to be able to identify any of these steels. We do, however, wish to find out if you can successfully match up the actual sparks during grinding with the diagrams of the various spark patterns. There are several identification clues to look for. Some of these are: 1) Color; 2) Length of spark stream; 3) Relative brightness of spark stream; 4) Presence of bursts; 5) Relative number of bursts. The spark stream will appear as a group of luminous lines which may or may not have bursts of light associated with them. The "bursts" have the appearance of the familiar fireworks "sparklers."

Each one of you will be given ten (10) separate pieces of steel. You are asked to take each piece to the grinding wheel, start up the wheel, touch the piece lightly to the wheel and note the spark pattern. Then, shut off the wheel and record your evaluation of the spark pattern. Repeat this procedure for each piece. A chart of the patterns will be displayed for comparisons.

THE PROCEDURE WILL BE DEMONSTRATED

The use of the grinding wheel is a safe and simple procedure, but four safety precautions must be taken.

1. Place the piece in the "V" shaped holder and feed the piece gently into the wheel. When the piece contacts the wheel you will note the shower of sparks. Hold the piece firmly in your hand.

2. It should be obvious that you hold the piece in such a way as to avoid touching the wheel with your finger or hand.

3. A defective wheel could explode and injure anyone standing directly in front or behind the wheel. This will occur only

3921

when the grinder is being started. After the grinder reaches operating speed, the wheel is considered safe. In order to guard against a possible injury from this source, an operator should stand to the side of a grinder, turn it on, and wait until the machine gets up to operating speed. This will take only a very short time (a matter of a few seconds) after which one may safely stand in front of the grinder. You can hear the machine as it speeds up (an increase in the pitch of the sound) and you can recognize by the steady sound when the machine has reached operating speed.

4. Since there are flying sparks, safety goggles MUST be worn whenever you are near a grinding wheel. Indeed this type of eye protection should be used whenever you are in the vicinity of any rotating cutting machines including the power saws, drills, etc.

Please do not discuss your part in the experiment with any one until the end of the next week, at the earliest. A premature discussion could completely invalidate the results of this test.

The procedure will now be demonstrated to you in the laboratory.

3922

U. S. GOVERNMENT PRINTING OFFICE : 1971 O - 441-837

(Continued From Inside Front Cover)

Previously, he was Assistant Director of Research at the Rhode Island Medical Center. Stanley Rubinsky received his master's degree in mechanical engineering from the University of Delaware and is an Associate Professor of Industrial Engineering at the University of Rhode Island. Prior to this, he was an Assistant Professor of Mechanical Engineering at Norwich University and Mississippi State College. He is a registered professional engineer and is a consultant to various industries. The study was monitored for the Injury Control Research Laboratory by Eugene E. Pazera, B.S., Engineering Officer and Assistant Director.

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IDENTIFIERS - NEW HAMPSHIRE

ABSTRACT - THE PURPOSE OF THIS PLANNING PROJECT WAS TO ANALYZE THE PRESENT SITUATION, IDENTIFY EXISTING PROBLEMS, AND PROPOSE ALTERNATIVE SOLUTIONS AS A BASIS FOR DISCUSSION AND PLANNING FOR THE LOCAL SCHOOL DISTRICT. THIS FINAL VERSION OF THE REPORT, CONTAINS POPULATION PROJECTIONS FOR THE NEXT TEN YEARS, A PRELIMINARY ELEMENTARY STUDY, AND A MAJOR ANALYSIS OF THE SECONDARY OFFERINGS IN THE DISTRICT, WITH A SPECIAL SECTION ON THE VOCATIONAL PROGRAM. THE VOCATIONAL REPORT, CARRIED OUT AS A PART OF A LARGER STUDY, INCLUDED EXTENSIVE FIELD WORK WITH INTERVIEWS AND QUESTIONNAIRES SUBMITTED TO SECTORS OF THE SCHOOL POPULATION, RECENT GRADUATED, AND REPRESENTATIVES OF SELECTED INDUSTRIES. THREE ALTERNATIVE PLANS WHICH OFFER SOLUTIONS TO SOME IMMEDIATE PROBLEMS IN THE SECONDARY SCHOOL ARE OUTLINED.
(AUTHOR/GEB)

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FALL MT.

LONG RANGE PLANNING PROJECT

VT014421

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3925

FALL MOUNTAIN

LONG-RANGE PLANNING PROJECT

To: School Board
Fall Mountain Regional School District
John Hubbard, Chairman

November, 1970

Stanley B. Tufts, Superintendent

CENTER FOR EDUCATIONAL FIELD SERVICES

University of New Hampshire New Hampshire School Boards Association

3926

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FALL MOUNTAIN
LONG-RANGE PLANNING PROJECT

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TABLE OF CONTENTS

INTRODUCTION..... 1

POPULATION PROJECTIONS..... 4

ELEMENTARY STUDY
- Introduction..... 16
- Present Status of Elementary Buildings..... 17
- State Board of Education - Minimum Standards..... 23
- Suggested Alternatives for Space Allocations..... 25
- Recommendations for Change, by School..... 28

PRESENT STATUS OF SECONDARY PLANT..... 34

FINANCIAL STATUS - BORROWING CAPACITY..... 35

PROGRAM AND SPACE NEEDS - FALL MOUNTAIN REGIONAL HIGH SCHOOL
- State Board of Education - Proposed Standards..... 36
- Relationship of Curriculum Needs and Space Requirements.... 37

VOCATIONAL EDUCATION STUDY
- Introduction..... 46
- General Economic Situation - Status and Trends..... 49
- Surveys, Questionnaires, Interviews, Reviews..... 54
- Assumptions and Conclusions..... 61

ALTERNATIVE PLANS
- Introduction..... 64
- Space Studies - Explanation..... 65
- Plan I..... 66
- Plan II..... 70
- Plan III..... 76
- Program Budget Summary..... 80
- Evaluation..... 81

CONCLUDING STATEMENTS..... 84

APPENDIX

INTRODUCTION

INTRODUCTION

The School Board of the Fall Mountain Regional District has contracted with the Center for Educational Field Services to conduct a study of the schools of the district, for the purpose of analyzing the present situation, identifying existing problems, and proposing alternative solutions as a basis for discussion and planning. Although the original contract called for a study of all schools, both elementary and secondary, the main emphasis was to be placed on an examination of the Fall Mountain Regional High School with special attention to the vocational program. On the basis of discussions with school administrators, the CEFS team decided during the course of the project to expand the study of elementary schools in the Fall Mountain Regional District into a separate section of the report.

This, the final version of this report, thus contains population projections for the next ten years, a preliminary elementary study, and a major analysis of the secondary offerings, with a special section on the vocational program. The vocational part of the report was carried out as a part of a larger vocational study covering several other districts under the auspices of the State Department of Education's Research Coordinating Unit. Extensive field work was undertaken, with interviews and questionnaires submitted to sectors of the school population, recent graduates, and representatives of selected industries in the region. The general background was provided through library research. The results of the secondary study are contained in three alternative plans which offer solutions to some immediate problems and provide a foundation for long-range planning for the educational needs of

the District.

The recommendations for change are summarized here:

Elementary Schools: Until the decision is made to consolidate certain schools in order to serve the best interests of the district as a whole, only short-range recommendations can be made. These will relieve the most urgent problems, i.e. overcrowding in some schools, inadequate library facilities, and unsatisfactory provisions for art, music, shop, guidance, and remedial reading as for instance in Alstead. Further study is needed for the development of a comprehensive plan for all elementary schools in the Fall Mountain Regional District.

Fall Mountain Regional High School: The distinctive feature of all three plans proposed for the vocational program is the organization into natural groupings or clusters of course offerings, with a high degree of flexibility allowing students to take advantage of courses in groupings other than their field of specialization. The alternative plans are based on the cluster organization and give three possible methods for providing the necessary spaces for the vocational program, at the same time suggesting some arrangements for the improvement of the academic curriculum and other facilities, such as locker space.

The essentials of the three plans may be summarized as follows:

Plan I: New construction consists of a 6-room addition of 6,600 sq. ft. to the academic wing (5 classrooms and a resource center) and a 20,000 sq. ft. addition to the practical arts wing, providing new spaces for Drafting, Power Mechanics, General Metals, Building Trades, Music, and Homemaking. Renovations and remodeling are proposed to improve

space arrangements in the existing building. Cost is estimated at $861,000.

Plan II: A somewhat larger addition to the academic wing is proposed than in Plan I (8,800 sq. ft.), adding two more classrooms for a total of 8 new rooms (6 classrooms and 2 rooms for resources). Practical Arts would be housed in a separate building, with the present vocational spaces being remodeled to accommodate Art, Music, and Homemaking. Three possibilities are offered for the annex to the Practical Arts building: the smallest version would contain the heating plant, a stock room, a teachers' workroom, and two rooms for drafting; Plan 2A would contain the same facilities and also provide a 1500 sq. ft. space for Visual Communications; Plan 2B is like Plan 2A, but arranges the spaces in a somewhat different manner. The space diagrams were drawn up to provide the maximum amount of flexibility for present and future programs. Cost is estimated at $878,200 or $913,200, depending on which option is chosen.

Plan III: This plan is an expanded version of Plan I. The academic wing would receive an addition of 17,300 sq. ft. (9 classrooms, a resource center, teachers' workroom and teachers' lounge). Pratical Arts would be housed in a wing added to the present shop area with 22,000 sq. ft. This corresponds to Plan I, except for the provision here of better facilities for Physical Education, especially a larger locker area and a teacher's office. Estimated cost is $1,196,300.

POPULATION PROJECTIONS

SCHOOL POPULATION PROJECTIONS

General Information

This report includes the membership data for recent years and a membership projection for future years.

There are four basic methods of projecting membership:

(a) Census projections
(b) Survival ratio projections
(c) Housing projections
(d) Population forecasts

Experience has shown that of these four methods the survival ratio technique provides the simplest and most accurate means of forecasting memberships. Of the children in any one grade, a certain percentage "survive" to enter the next higher grade the following year. This percentage may be more or less than 100 percent, depending on the interaction of many factors.

By computing an average of the survival ratios for anumber of years, it becomes possible to advance the present total school membership year by year, each time dropping the last grade and adding a new first-grade group. The size of the incoming first grade is also estimated by using a "survival" ratio, again based on past experience, but this time on the number of births in relation to those entering the grade six years later.

This method of projection takes into account all the numerous factors which have affected school enrollments for the period studied. For example, migration is included, as are high school dropouts without separate analysis.

It is absolutely essential that these projections be reviewed each year. Whenever it is found that the number of births varies significantly from the number predicted or that a new survival ratio should be selected, then adjustments must be made to reflect the changing conditions.

One other point that needs to be explained has to do with our use of the term "membership". We have used the enrollment data supplied on required reports as of September of each year. The technical usage of the term "enrollment" is frequently construed to be the total number of students that have registered during a given year. For example, if 25 students are in a given division of a given grade in September and 10 new students register during the year, it follows that the "enrollment" for the year would be 35. However, if 10 students had withdrawn for whatever reason, there would have been 35 "enrolled", but the number of students on any given date would have been less than 35. In fact, we think 25 students reported for September to be the more valuable information for planning purposes, since any net growth will be reflected in the survival ratio computed using next September's data, one grade advanced. These membership projections are therefore estimates of the September enrollments for future years; however, in planning school facilities, some flexibility needs to be provided to accommodate the variations in student membership during a given year. The required allowance is generally provided by the use of a utilization factor of 80% or 90% of full capacity. Because of scheduling and multiple course offerings, a secondary school usually requires the use of a lower utilization factor than does an elementary school.

Births

Birth rates are of questionable value in forecasting school membership for the smaller towns because of the margin of error involved in computing percentages. For the purposes of this study we have taken births in the Fall Mountain Regional area and have survived them into first grade for a seven-year period.

Births in the Fall Mountain area over the past ten years have ranged from a high of 180 in 1958 to a low of 124 in 1968. This averages out to 150 births per year over this ten-year period, with a general trend towards a gradual decline in births.

The number of births per thousand population has decreased nationally as well. The State of New Hampshire as a whole has been very close to the national average birth rate in 1960, 1965, and 1966, and the Fall Mountain Regional area reflects the same decrease. A graph has been included comparing the rate decline of Fall Mountain and selected localities.

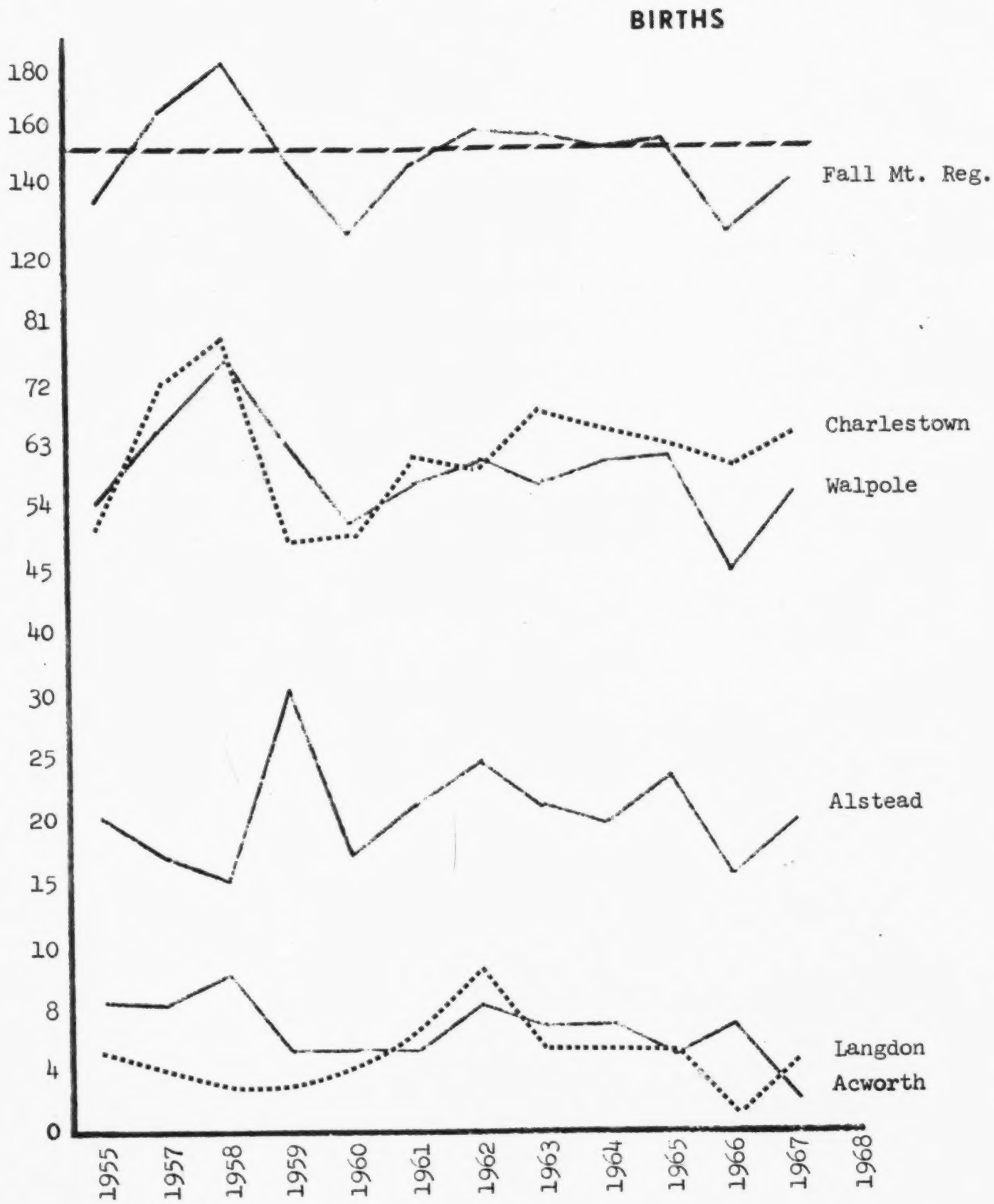
In spite of this decrease in the number of births and in the birth rates, a marked declined in total school enrollments is not foreseeable in the next ten to fifteen years. Children who will be entering the school age population in 1974 are living today, and, though the numbers entering elementary schools will decrease somewhat, the totals remain relatively level through 1975. Factors such as continued improvement in the holding powers of schools and inmigration offset the decline in birth rates.

Graphs I and II

Graph I shows births in the Fall Mountain region as a whole, and also within the separate towns. The gradual decrease noted earlier can be seen in all districts.

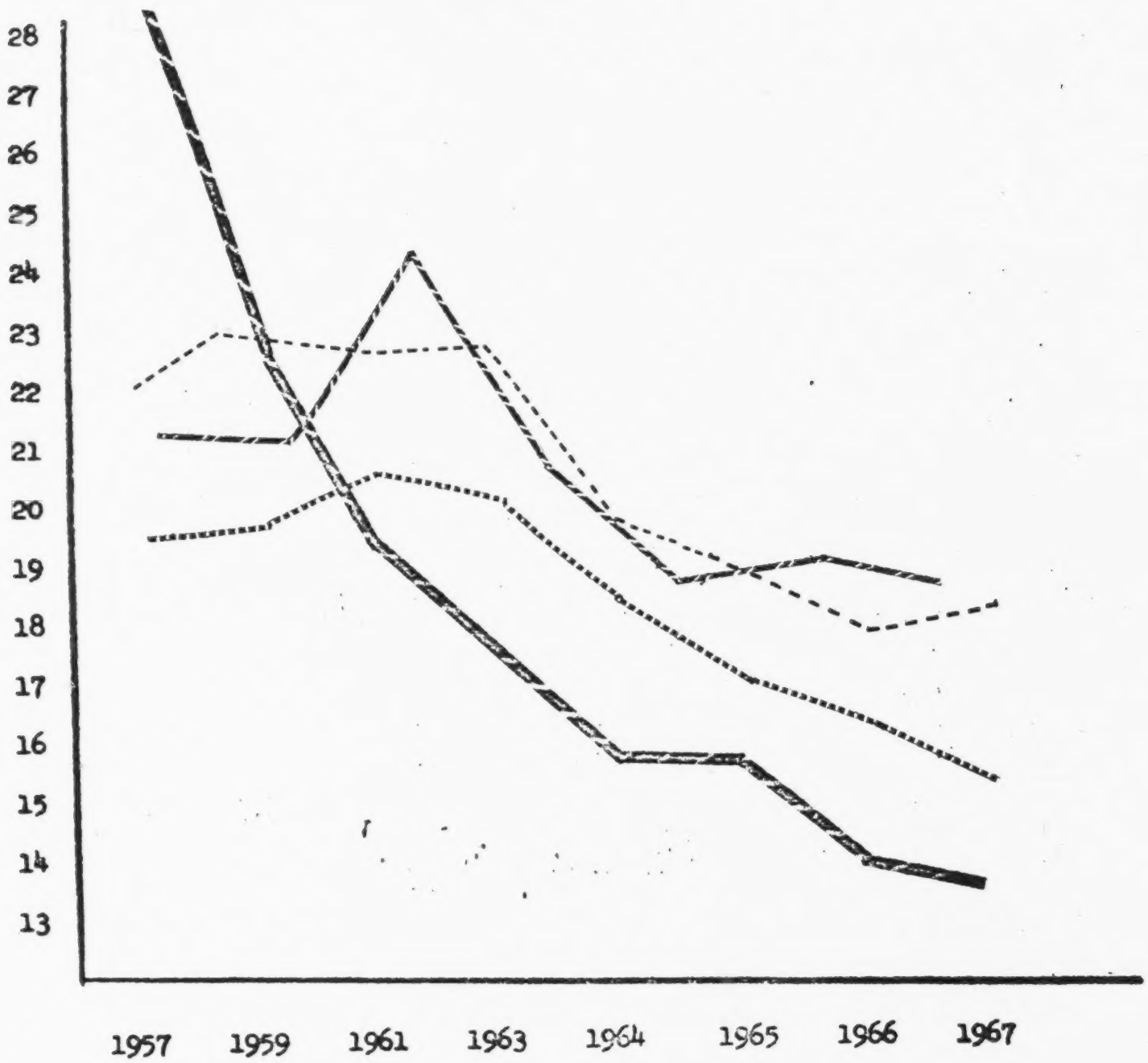
Graph II shows birth rates in Cheshire County and other localities from 1957-1967.

graph I


BIRTHS
180
160
140
120
81
72
63
54
45
40
30
25
20
15
10
8
4
0
Fall Mt. Reg.
Charlestown
Walpole
Alstead
Langdon
Acworth
1955
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968

Graph II

BIRTH RATES



Berlin
Laconia
Concord
Cheshire County

3939

Table I

Table I is an analysis of births to actual first-grade membership. Considering the number of births and the first-grade membership six years later, it can be shown that the Fall Mountain area had an increase of 209 (membership over births) in the seven-year period 1963-1969. This amounts to a 19.3% increase.

The table shows that the largest percent increase was in Langdon, which showed an increase of 85.3%. Alstead was second with 29.7%, followed by Acworth with 27.7% and Walpole with 12.9%.

Table I shows the total increase (or decrease) by year of the Fall Mountain towns. There are no decreases, and the largest increase, 36.2%, appears in 1969, followed by 27.8% in 1966. However, over this seven-year period there was an average increase of only 20.1%.

Although there has been a decrease in births in the Fall Mountain area, it should be noted that the first-grade membership over births has increased by 209 pupils in the seven-year period. In other words, in-migration offsets the lower birth figures in this period.

Table I

Fall Mountain Regional

Analysis of Births to First Grade

		1957	1958	1959	1960	1961	1962	1963	Totals			No.	%
Acworth		8	9	5	5	5	8	7	47	Births			
(Year + 6)		8	10	5	6	6	13	12	60	Gr. 1		+13	+27.7
Alstead		17	15	30	17	21	24	21	145	Births			
(Year + 6)		23	26	37	26	21	21	34	188	Gr. 1		+43	+29.7
Charlestown		71	77	49	50	60	58	67	432	Births			
(Year + 6)		71	77	76	53	67	77	81	501	Gr. 1		+69	+16.0
Langdon		4	3	3	4	6	9	5	34	Births			
(Year + 6)		6	9	7	10	8	12	11	63	Gr. 1		+29	+85.3
Walpole		65	76	62	50	57	60	57	427	Births			
(Year + 6)		61	77	63	66	65	75	75	482	Gr. 1		+55	+12.9
Total Births		165	180	149	126	149	159	157	1085	Births			
(Year + 6)		169	199	188	161	167	198	213	1294	Gr. 1		+209	+19.3
Percent Increase		+2.4	+10.6	+26.2	+27.8	+12.9	+24.5	+36.2	+19.3				

Tables II and III

Table II uses survival ratios generated from the previous ten-year period and applies them to the 1970-71 actual membership for the Fall Mountain region.

Table III gives possible grade-level grouping projections. In general, most peak years in different groupings appear from 1970 through 1975. Any major impact from the Fall Mountain area on the elementary and high school levels will be felt in the early 1970's.

Present total enrollment is 2071 (plus 11 Special Class students), and the projected high is 2101 in 1971-72, an increase of 30. However, this high is not mainteined in following years.

Table II

A - Known Marsh
B - Known Births
C - Projected Births

Fall Mountain Regional

Projections

	1	2	3	4	5	6	7	8	9	10	11	12	Spec.	
1970-71	181	200	177	161	152	175	207	177	196	163	149	133	11	
1971-72	184	177	192	170	163	152	180	209	193	176	165	140		
1972-73	158	180	170	184	172	163	157	182	228	179	157	155		
1973-74	178	155	173	163	186	172	168	158	198	212	159	148		
1974-75	155	174	149	166	165	186	177	170	172	184	189	149		
1975-76	163	152	167	143	168	165	192	179	185	160	164	178		
1976-77	163	160	147	160	144	168	167	194	195	172	142	154		
1977-78	163	160	154	140	162	144	173	169	211	181	153	133		
1978-79	163	160	154	148	141	162	148	175	184	196	161	144		
1979-80	163	160	154	148	150	141	167	149	191	171	174	151		
1980-81	163	160	154	148	150	150	145	169	162	178	152	164		
1981-82	163	160	154	148	149	150	154	146	184	151	157	143		
1982-83	163	160	154	148	149	149	154	155	159	171	134	148		
S. R.	98	96	96	101	100	103	101	109	93	89	94			

S. R. Births to 1 (1.25) Boxed figures indicate peak years

3943

Table III

Fall Mountain Regional

Possible Grouping Projections

	1-6	7-12	1-4	5-8	9-12	1-8	1-5	6-8	7-8	7-9	10-12			Total
1970-71	1046	1025	719	711	641	1430	871	559	384	580	445			2071
1971-72	1038	1063	723	704	674	1427	886	541	389	582	481			2101
1972-73	1027	1058	692	674	719	1366	864	502	339	567	491			2085
1973-74	1027	1043	669	684	717	1353	855	498	326	524	519			2070
1974-75	995	1041	644	698	694	1342	809	533	347	519	522			2036
1975-76	958	1058	625	701	687	1329	793	536	371	556	502			2016
1976-77	942	1024	630	673	663	1303	774	529	361	556	468			1966
1977-78	923	1020	617	648	678	1265	779	486	342	553	467			1943
1978-79	928	1008	625	626	685	1251	766	485	323	507	501			1936
1979-80	916	1003	625	607	687	1232	775	457	316	507	496			1919
1980-81	925	970	625	614	656	1239	775	464	314	476	494			1895
1981-82	924	935	625	599	635	1224	774	450	300	484	451			1859
1982-83	923	921	625	607	612	1232	774	458	309	468	453			1844

Note: Boxed figures indicate Peak Ye rs

SUMMARY

The elementary membership for grades 1-6 is projected to reach its peak in 1970-71 at 1046, followed by a gradual decline. A half-day kindergarten program in all the schools of the district will require four classrooms for a projected enrollment of 200 in addition to the space needed for grades 1-6. Future construction should be designed to accommodate 1200 in grades 1-6.

The membership for grades 7-12 will increase from 1025 in 1970-71 to a projected peak of 1063 in 1971-72, an increase of 38. In terms of a building program to meet future needs, Fall Mountain should plan facilities for 1200 pupils in grades 7-12.

If a middle school, grades 5-8, is considered, then facilities should be provided for 800 pupils in grades 1-4, 800 in grades 5-8, and 800 in grades 9-12. It should be noted again that kindergarten will require additional space for approximately 200 pupils.

If the above recommendations are followed, Fall Mountain will provide accommodations for approximately 2400 pupils in grades 1-12, and for 200 in kindergarten. Total enrollment projections show the peak year as 1971-72 with 2101 pupils. However, new facilities should have a capacity above the projected highest enrollment to allow for unexpected growth and the possible future changes in instructional programs.

Again the reader is reminded that projections must be reviewed and, if necessary, up-dated each and every year.

ELEMENTARY STUDY

INTRODUCTION

The original agreement between the Fall Mountain Regional District and the Center for Educational Field Services stipulated only an analysis of the district's facilities, both elementary and secondary, with the main emphasis on an in-depth study of secondary program and space requirements. However, subsequent discussions with Fall Mountain school administrators brought to light certain areas of concern in the elementary school system. As a result of these discussions, the consultants decided to expand the project by delineating the areas of concern and suggesting certain solutions to the most urgent problems. In the interest of clarity, it was decided to present this preliminary elementary study as a separate section of the final report.

PRESENT STATUS OF ELEMENTARY BUILDINGS

There are ten elementary schools in the Fall Mountain Regional District, ranging in size from 2 room buildings (Farwell and Langdon Schools) to Walpole's 15 room elementary school. Attendance patterns vary, with all schools except Acworth, Marlow, and Langdon providing for kindergarten. Some of the elementary schools are overcrowded or near capacity with present enrollments, while others such as Walpole, have unused classrooms. An unusual feature of this district is the number of former high schools that have been converted to elementary school use after the formation of the Fall Mountain Regional District in 1963. Charlestown Elementary, the Vilas School in Alstead, and the Walpole Elementary all have certain problems with regard to optimum utilization for elementary purposes of space that was originally intended for high school use. Where applicable, these problems will be discussed in greater detail in the separate sections on each school that follow.

Acworth Elementary School (Grades 1-5)

This school, located on a limited site, contains three classrooms and has a pupil capacity of 60. As of September, 1970, two of these classrooms are in use for an enrollment of 38. Grades 1 and 2 share one room, and grades 3, 4, and 5 share the other, with the third room serving as an all-purpose activity room. The building is in good condition, with modern sanitary and heating facilities. It is capable of accommodating a larger enrollment than at present and should fulfill the needs of the district for the immediate future.

Alstead Primary School (Grades K-5)

This school, built in 1960, shares a site with the Vilas School (see next section) and contains 6 classrooms of approximately 800 sq. ft. each. The new elementary standards require a minimum of 900 sq. ft. per classroom. The building could serve a maximum of 150 students on the basis of 25 per classroom, or 180 on the basis of 30 pupils per classroom. With an enrollment in September, 1970, of 192, the school is overcrowded by any standards. There is no space available for a library or resource center.

Alstead Elementary School - Vilas School (Grades 6-8)

The Vilas School was built in 1934 and contains 8 small classrooms. The largest of these is the science room at 803 sq. ft. There is one room with 536 sq. ft., four with 506 sq. ft., and two with 440 sq. ft. It is evident that these classrooms do not approach the minimum space requirement of 900 sq. ft. Using 30 sq. ft. per pupil, the maximum capacity of this school is at best 140. In September, 1970, there were 142 pupils in grades 6-8 (this figure includes the 6th graders from Acworth and Langdon) and 14 in grade 2, for a total enrollment of 156. The facilities for upper-grade instruction are good if an area can be re-assigned for an adequate resource center.

Charlestown - Farwell School (Grades 1-3)

The Farwell School, built in 1890, is a wood frame and cobble stone building located in North Charlestown. It contains two small classrooms of approximately 500 sq. ft. each and an activity area in the basement. At 30 sq. ft. per pupil, the maximum capacity of this school would be around 33 pupils. The present

enrollment of 45 would appear to indicate overcrowding. Maintenance of the building is excellent.

Any changes in the present organization of the Farwell School would have to be worked out in the framework of the operating agreement between the school's Board of Trustees and the Regional School Board.

Charlestown Primary School (grades K-4)

This school, built in 1966, is a very attractive structure containing 10 rooms of 800 sq. ft., 2 of 784 sq. ft., a kindergarten of 1000 sq. ft., and a cafetorium of 2000 sq. ft. With a capacity of 350 pupils, the present membership of 277 leaves a comfortable margin for a possible increase in enrollment. Maintenance was found to be excellent. The most serious drawback at the school is the lack of satisfactory library facilities.

Charlestown Elementary School (grades 5-8)

This is one of the former high schools which has been adapted for lower-grade use. One of the attendant difficulties of this transformation is the variation in classroom size and capacity. At 30 sq. ft. per pupil, some rooms could accommodate only as few as 13 students, while others are large enough for a class of 36. Assignment of pupils and functions is difficult under present conditions. With very careful planning the maximum capacity would be approximately 300, although 280 would be recommended. The present enrollment of 314 places a strain on the facilities. The building as a whole would seem more suitable to upper-grade use, with departmentalized teaching taking full advantage of the existing smaller classrooms. The library is not adequate according to the new standards.

Langdon Elementary School (Sarah Porter School) (Grades 1-5)

This school, built in 1937, is located on a limited site. It contains two classrooms 596 and 560 sq. ft. respectively and an enrollment of 28 in grades 1-5. With an operating capacity of approximately 40 pupils, the building is not overcrowded. The basement area has been modernized and is used as a cafeteria and activity room.

The structure was found to be in fair condition. There is no emergency exit from the basement and insufficient insulation between the heater area and the activity room.

Marlow Elementary School (Grades 1-6)

Built in 1847, this school is the oldest structure in the district. The site is very limited. Beginning as a one-room school, the addition of a second classroom of the same size (675 sq. ft. each) provides for a capacity of 44 pupils. The present enrollment of 39 is below capacity. Factors such as the age, small size, and isolation of the school, make it difficult to offer the pupils at Marlow facilities of the same quality as at the other elementary schools in the supervisory union.

North Walpole Elementary School (K-6)

This school, built in 1958, contains 8 regular classrooms (5 at 637 sq. ft. and 3 at 775 sq. ft.) and one kindergarten of 907 sq. ft. Although the classrooms are small by current standards, the present enrollment of 128 does not even approach the maximum capacity of 225. Some of the unused spaces could

be adapted for library facilities and better accommodations for the principal, teachers, and the nurse. The activity room and the stage contribute to the well-rounded facilities of the building as a whole.

Walpole Primary School (Grades 1-3)

This school, built in 1957, contains 6 rooms and was designed for easy expansion. The classrooms, at almost 900 sq. ft. each, are close to the state standard for classroom size. At 30 sq. ft. per pupil, the capacity of this building is 180, placing 30 pupils in each section. If the more desirable figure of 25 per classroom is used, the school's capacity would be 150. The present enrollment of 138 provides a margin for some increase in attendance. Although no separate library facility is required for schools with an enrollment below 150, some provision should be made for a resource center, possibly using the library at the Elementary School as a home base for the circulation of learning materials.

Walpole Elementary School (K, Grades 4-8)

This school was built in 1951 as a high school. Of the 15 regular classrooms, 13 contain 840 or more sq. ft. and 2 have between 648 and 700 sq. ft. The facilities for science and homemaking at the junior high level are excellent. On the other hand, the shop facilities were found to be inadequate. If the home room stations in the homemaking and science rooms are not used, the capacity of the building is 335. Present enrollment is 318, thus below capacity. The library is small and should be expanded. Appearance of the building could be improved by a regular summer maintenance program, including repainting, as well as more careful maintenance during the school year.

Summary

The number and variety of elementary school buildings in the Fall Mountain Regional District present problems of different orders of magnitude. The needs of the district as a whole may be identified as follows:

1) Better distribution of pupils by attendance areas. Some schools have empty rooms while others in the same district face serious overcrowding.

2) Provision for adequate library facilities at every school.

3) Better space provisions for music, art, shop, guidance, and remedial reading in the majority of schools.

STATE BOARD OF EDUCATION-MINIMUM STANDARDS AND RECOMMENDATIONS

The following brief summary of the minimum standards and recommendations of the State Board of Education as they apply to the Fall Mountain Regional District is presented here to clarify the rationale underlying the suggested solutions in the next section.

Elementary Schools (K-8)

School Sites

Minimum Standard (Requirement)	Each elementary school shall include a minimum of five acres plus an additional acre of land for each 100 children of projected maximum enrollment for new construction.
Recommendations:	Each elementary school site should include a minimum of ten acres plus an additional acre of land for each 100 children of projected maximum enrollment for new construction.

Classroom Size

Kindergarten	50 sq. ft. per pupil (at least 1000 sq. ft.)
Regular classrooms 1-6	30 sq. ft. per pupil (or 900 sq. ft., whichever is greater).
Regular classrooms 7-8	30 sq. ft. per pupil (no less than 800 sq. ft.)

Resource Centers or Libraries

K-6:	Less than 150 pupils	- Space may be provided in regular classrooms.
	150 - 300 pupils	- 1000 sq. ft., or one regular classroom.
	300 - 500 pupils	- 2000 sq. ft., or two regular classrooms.

Over 500 pupils -	Minimum area is 10% of enrollment times 40 sq. ft. per pupil.
7-8:	Minimum area is 10% of enrollment times 40 sq. ft. per pupil - minimum area approved is 1800 sq. ft.

3955

SUGGESTED ALTERNATIVES FOR SPACE ALLOCATIONS

General Considerations

As a result of discussions with Fall Mountain school administrators, the consultants have expanded this study to include preliminary projections by attendance areas. We recognize that attendance areas can be changed in response to existing space and pupil density, and we also realize that at some future date a decision may need to be made to consolidate Alstead, Acworth, Langdon, and possibly Marlow. Since the decision to consolidate may or may not be made at the local level, it becomes necessary to summarize the demography in terms of each option. If one views the attendance areas as flexible, then it follows that total attendance must be distributed in the total spaces available in the district. The charts and graphs in the first section of this report are based on that assumption. If, on the other hand, attendance areas are deemed unchangeable, it will be necessary to meet the space requirements on something less than a district-wide basis.

Teacher Stations Required According to Different Options

Alstead as a separate attendance area would need the following teacher stations for the next eight to ten years (the consultants realize that grades 6, 7, and 8 are consolidated at the present time; the figures for these grades given here represent projections for Alstead alone):

Grade Level	No of Teacher Stations	Projected Enrollment
Kindergarten	1	Half-day program, 50 pupils
Grades 1-5	6	Peak membership of 150
Grades 6-8	4	Peak membership of 100
(7 and 8)	(3)	Peak membership of (70)
	11	300

3956

If Acworth and Langdon were to be consolidated with Alstead, the following teacher stations would be required:

Kindergarten	2	Half-day program,	68 pupils
Grades 1-5	10	Peak membership of	240
Grades 6-8	6	Peak membership of	154
(7 and 8)	(4)	Peak membership of	(106)
totals	18		462

If Acworth, Langdon and Marlow were to be consolidated with Alstead, the requirements would be as follows:

Kindergarten	2	Half-day program,	76 pupils
Grades 1-5	10	Peak membership of	248
Grades 6-8	7	Peak membership of	178
(7 and 8)	(5)	Peak membership of	(122)
totals	19		502

It should be noted that the above figures refer only to regular classroom teacher stations. If satisfactory facilities for art, music, shop, guidance, and remedial programs are to be provided, appropriate spaces must be added to the totals cited here.

Charlestown must be viewed separately if attendance areas are unchangeable. After study of the population projections, the necessary teacher stations were found to be as follows:

Kindergarten	2	Half-day program,	75 pupils
Grades 1-5	16	Peak membership of	400
Grades 6-8	10	Peak membership of	250
(7 and 8)	(6)	Peak membership of	(160)
totals	28		725

Now, even in the case of Charlestown, there are two possibilities: Farwell School may be continued or it may be closed. The latter course would have no significant effect on the space requirements. However, there are at the

present time minimum requirements which must be met and space constraints which should be resolved, independently of future decisions as to the disposition of the Farwell School.

Walpole as a separate attendance area does not seem to present problems for the immediate future, and no new space is recommended at this time.

This preliminary study indicates that a long-range comprehensive plan for all grades K-8 in the Fall Mountain Regional District would probably offer the best solution for present problems and provide for future needs. The recommendations and space diagrams* on the next pages contain some suggestions as to changes and improvements in each school along these lines.

*See below for an "Explanation of Space Studies". The elementary space studies are of a preliminary nature only and do not include cost estimates.

3958

RECOMMENDATIONS FOR CHANGE, BY SCHOOL

The following proposals provide for some change in attendance areas and a certain degree of consolidation. They do not represent a comprehensive plan for the over-all reorganization of the elementary system of the Fall Mountain Regional District, although they could well be a first step in that direction.

Acworth Elementary School

This school (present enrollment: 38) with its capacity of 60 is not being utilized to fullest advantage. This modern building could and should accommodate more pupils, possibly from other districts where overcrowding exists.

Alstead Primary School

Space must be provided for library facilities in this school. Also, the 14 second-grade students presently attending the Vilas School should be returned to the Primary School. The Primary School is not adequate for either current or projected enrollments and should have an addition containing two classrooms of 900 sq. ft., a kindergarten of 1200 sq. ft., and an activity room of 1400 sq. ft. to serve as a cafetorium. One of the existing classrooms could then be used as a library, and space would be available for a special class area. The space study on the next page indicates where this addition might be placed.

If consolidation is effected, Alstead will be the elementary attendance center for Acworth, Langdon, and perhaps Marlow. At that time, the School Board will have to make a decision as to whether to add 6 more classrooms to the Primary School to accommodate the increased membership or to build a new elementary school on a new site.

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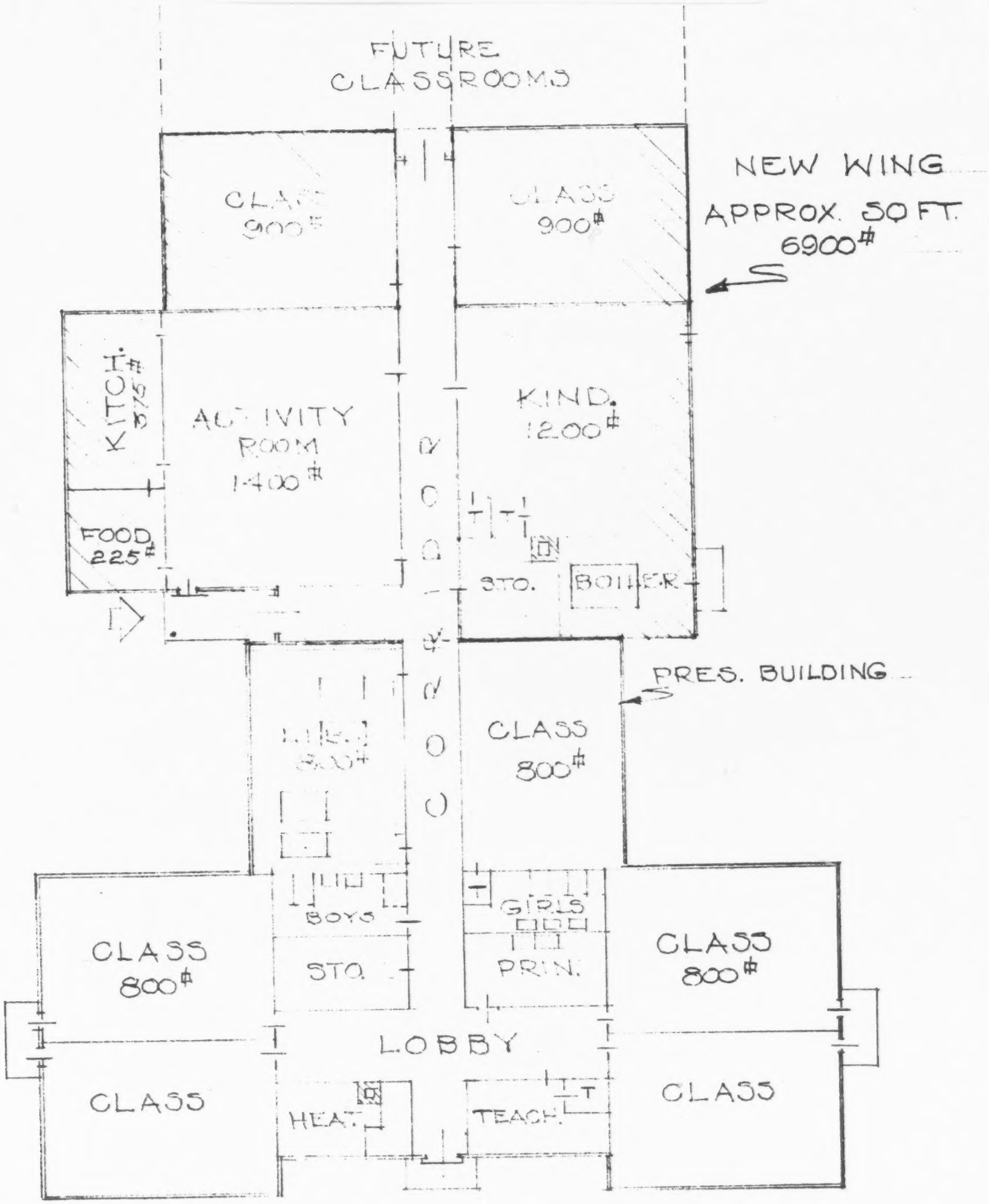


ALSTEAD ELEM. SCHOOL
GRADES K-5

SCALE 1" = 20'

Alstead Elementary School - Vilas School

The small size of most rooms in this school makes it very difficult to use the building for the elementary grades. The suggested addition to the Primary School could relieve some of the congestion at Vilas and permit the best possible use of its facilities for grades 6-8 only, for which they are better suited in any case. Consideration should be given to the reassignment of spaces for art, music, guidance, and remedial reading.

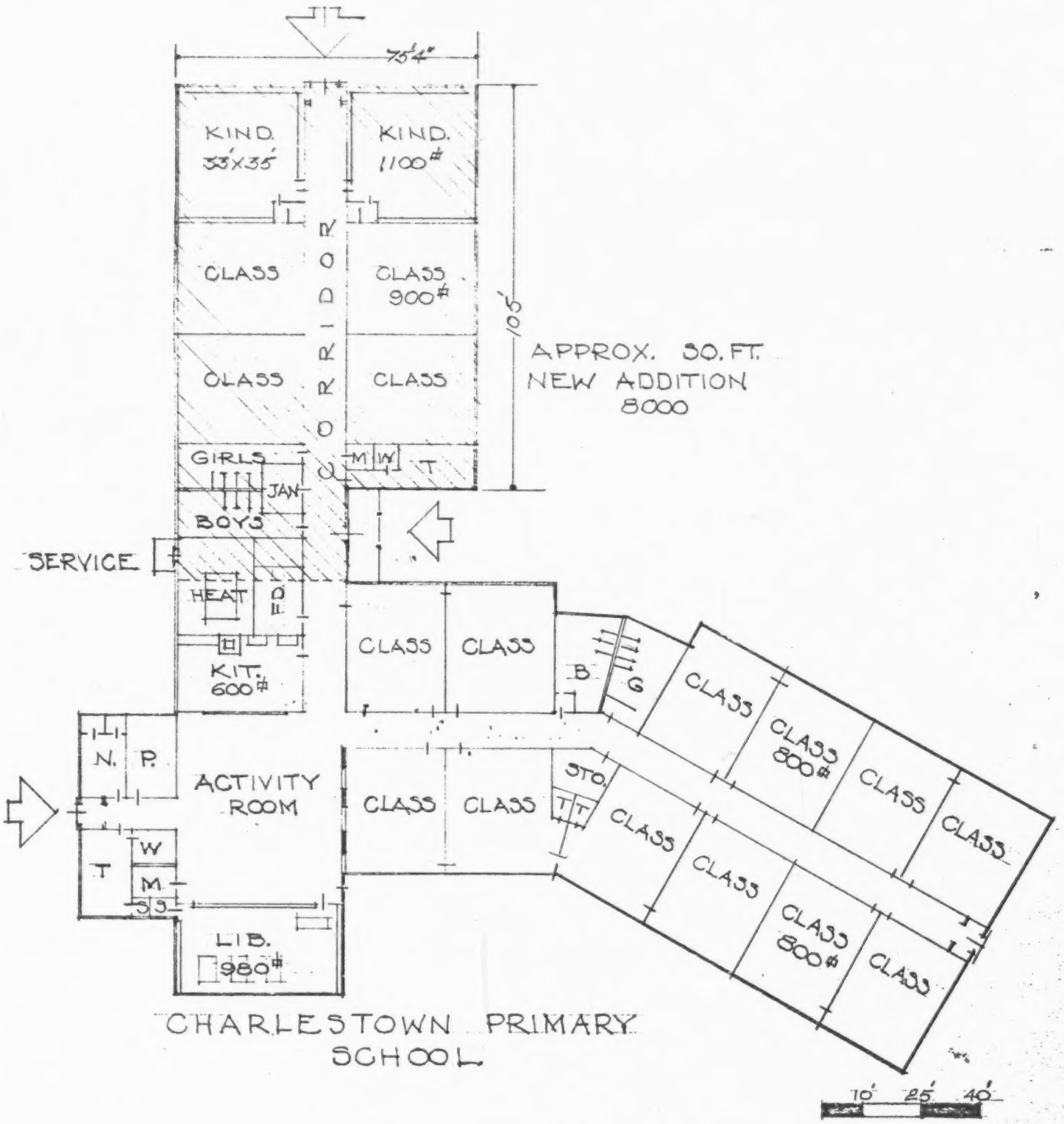
Charlestown - Farwell School

It is suggested that some arrangement be made to relieve the overcrowding at this school, which has an enrollment of 45 with a capacity by state standards of only 33. The best solution would be to close this school and house the present three grades at the Charlestown Primary School.

Charlestown Primary School

This school, which presently serves grades K-4, should be expanded in order to take in grade 5, which now attends at the Charlestown Elementary School. In this way the Elementary School could be given over entirely to upper-grade instruction (grades 6-8), and the best possible use could be made of the facilities of this former high school. The Primary School would then require an addition of approximately 8000 sq. ft., which would provide six new classrooms to relieve present overcrowding, accommodate grade 5, and provide library space, required for a school of this size.

The sketch on the next page shows how this addition might be designed. It was developed from an idea originally proposed by the architect.



CHARLESTOWN PRIMARY SCHOOL

3962

Charlestown Elementary School

If grade 5 can be housed at the Primary School, this former high school building can be put to excellent use for grades 6-8. The small classrooms lend themselves much better to departmentalized teaching than to elementary purposes. The library facilities must be improved, and removal of grade 5 will provide an opportunity to do this at minimum cost.

Langdon Elementary School (Sarah Porter School)

The basement area of this school should be equipped with a safe emergency exit directly from the basement, and the wall separating the heater from the activity room should be made more fire resistant. In general, it is recommended that spending on this plant be kept to a minimum. The Langdon school should be discontined as soon as a long-range district-wide plan for K-8 has been developed.

Marlow Elementary School

No major expenditures are recommended for this school, although the facilities offered the students are in many ways inferior to those in other elementary schools in the Supervisory Union. Like Langdon, Marlow should be closed if and when the district is reorganized.

North Walpole Elementary School

Few changes are recommended for this school. Although a separate library would not be required for a school this size, there is space available which might be assigned for this purpose. It is also suggested that the facilities for the principal, teachers, and the nurse be improved to provide more space.

Walpole Primary School

No recommendations for change are made at this time for the Walpole Primary School, except perhaps that some provision could be made for the circulation of books, perhaps using the Elementary School library as a central resource area. When the enrollment exceeds 150, a separate library will have to be provided, and it might become necessary to move one grade section into the Elementary School at that time.

Walpole Elementary School

This school needs improvement in the area of library facilities. The present library should be expanded into the adjacent classroom in order to meet the state requirements. The shop area should be upgraded as soon as possible, and better over-all plant maintenance should be provided.

In general the buildings in Walpole appear to be adequate for current and projected enrollments, with the exception of the areas mentioned above. Any rearrangement of attendance areas would not affect the Walpole schools, since this part of the district is to all intents self-sufficient with regard to school needs.

Summary

The foregoing suggestions and recommendations would solve the most urgent problems of the district's elementary schools with regard to overcrowding in certain areas and the provision of library facilities in schools which do not meet state requirements. The Fall Mountain Regional School Board would be well advised, however, to give serious consideration to more far-reaching long-range planning with respect to its total elementary school system.

PRESENT STATUS OF SECONDARY PLANT

FALL MOUNTAIN REGIONAL HIGH SCHOOL - PRESENT STATUS

The Fall Mountain Regional High School was built in 1966 and is located on an excellent site of 78 acres in the town of Langdon. It was designed for 700 students and has a present membership of 645 in grades 9-12.

This well-built, attractive structure incorporates many features reflecting sound educational planning. The facilities for art, library, science, home economics, and shop as well as the auditorium and lecture hall were constructed in accordance with the latest trends in education. However, after only four years of operation, pressure has developed in certain areas, due not so much to inadequate planning as to unexpected student demands. For example, the library, which nearly conforms to modern standards, is receiving far more use than the planners had envisaged. A similar situation exists in art, science, and drafting. The agricultural shop area must be expanded if agricultural machines are to be brought in for repair and study. The consultant team found one entire shop area taken up by one of these machines, with the result that this space was unavailable for student use for extended periods of time.

Apart from these immediate needs, it would seem advantageous to expand the music facilities eventually to include a suite of rooms with space provided for music appreciation.

The section on program and space needs further on in this report will deal with these questions in greater detail.

FINANCIAL STATUS

FINANCIAL STATUS

BORROWING CAPACITY

The assessed valuation as equalized for the Fall Mountain Regional District was $47,439,655 in 1968. With a borrowing capacity calculated at 10% of the assessed valuation, or $4,743,000, and an outstanding debt of $1,537,000, the District has a net borrowing capacity of $3,206,000. As the debt is paid off, the borrowing capacity will increase by $110,000 yearly for the next two years, and by $113,000 thereafter (one bond issue will be paid off by 1972).

This borrowing capacity is amply sufficient to implement any of the three plans proposed for the Fall Mountain Regional District, the most expensive of which would cost approximately $1,200,000.

It should be noted also that funds would be available to implement any reorganization of the elementary schools on a district-wide basis, if the School Board decides on this course of action at a future date.

PROGRAM AND SPACE NEEDS

FALL MOUNTAIN REGIONAL HIGH SCHOOL

STATE BOARD OF EDUCATION

PROPOSED STANDARDS FOR SECONDARY SCHOOLS

Standards for secondary schools (grades 7-12) are now being developed under the auspices of the State Board of Education and are introduced here in draft form. Although they may undergo some revision before approval of the final version, in essence they represent the intentions of the State Board with regard to future requirements for secondary schools.

A REGULAR CLASSROOM, WITH FIXED PARTITIONS, SHALL CONTAIN A MINIMUM OF 800 SQ. FT., INCLUDING STORAGE, OR 30 SQ. FT. PER STUDENT, WHICHEVER IS GREATER.

Subject	Square Feet per Student	
	Acceptable	Recommended
Regular Classrooms (English, Math, Language)	30	35
Social Studies	35	40
Language Lab.	35	40
Science		
Combination Lab-Classroom	60	70
Single-Purpose-Room Lab.	50	60
Art	50	60
Music		
Instrumental	35	40
Choral	10	15
Practice Rooms and Storage as Required		

3970

Subject	Square Feet Per Student	
	Acceptable	Recommended
Industrial Arts		
Junior High	75	100
Senior High	100	125
Home Economics		
Food or Clothing Laboratory	50	60
All-Purpose Department	60	70

Library-Resource Center: 10% of enrollment at 40 sq. ft. per student. Minimum area approved: 1800 sq. ft.

Vocational Offerings		
Business and Office Occupations		
Bookkeeping, Stenography	40	50
Typing, Business Machine	35	40
Office Practice Lab-Classroom	50	60
Distributive Occupations		
Combination Lab-Classroom	60	70
Occupational Home Economics		
Food Service, Lab-Dining Area and Storage	110	120
Child Care Services	110	120
Trade and Industrial Education		
Auto Mechanics	175	200
Machine Shop	150	175
Building Construction	125	150
Drafting	60	80
Electricity-Electronics	60	80
Printing-Graphic Arts	100	125
Welding	60	80

It is recommended that classrooms and related laboratory facilities be located adjacent to each other or in close proximity, also that additional storage space be provided.

RELATIONSHIP OF CURRICULUM NEEDS AND SPACE REQUIREMENTS

Introduction

The basic assumption of the space needs survey is that space projections should be not only related to anticipated school populations, but that the kind of space and the priority of needs should be determined by the nature of the desired educational program. Usually educational desires are quite different from present practice. Thus, it is normal that the desired program represent a need for curricular change as well as change in facilities.

It is assumed by this investigator that effective and lasting change is best brought about by the commitment and involvement of those persons most directly responsible for implementation and support of changes.

The data for this study were obtained from two days of discussion with teachers and administrators, and from a questionnaire submitted by faculty members describing specific space needs in relation to curriculum. The resultant information and ideas were then evaluated by the consultants in relation to the purposes of this report.

3972

SPACE AND PROGRAM NEEDS

It appears that the present program is already limited by space needs in the library, art facility and science area, as well as in the shop and drafting rooms. In the fall of 1970, the high school population numbered approximately 645. CEFS school population projections estimate a peak enrollment of about 719 by 1972-73, an increase of about 11.5% within two years. This increase in the number of students will further strain the resources of the areas already under pressure as mentioned above. There will also be additional space needs in several classroom areas, in music, and in the cafeteria. The School Board would be well advised under any circumstances to plan for a membership of 800, since in-migration and other factors may necessitate revision upward of the current population projections.

In addition to needs due to present and projected school population, the faculty and staff desire curriculum changes which will require space addition and modification.

The strategy for recommending space needs will be to project needs based on present programs, planned course changes, and school population projections using the standard Castaldi formula.[1)]

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1) The Castaldi Formula is as follows: $T.S. = 1.25 \frac{E}{C} \cdot \frac{n}{N}$, where

T.S.	=	Teacher Stations
E.	=	Number of Students
C	=	Desired Class Size
n	=	Periods per Week
N	=	Number of Periods per School Week

These needs will be combined with some of the major recommendations for program changes to generate several alternative plans for space development at the Fall Mountain Regional High School.

The Castaldi calculations are based on the following data for Fall Mountain:

- Present 9-12 enrollment = 645 (1970-71)
- Possible future enrollment = 800
- 35-period teaching schedule
- Projected increases or decreases in percent enrollment based on curriculum plans submitted by faculty and principal. (These are changes over and above total school population changes. They include planned course additions, deletions, and predicted enrollment changes in certain courses).
- Class size figures are based on nature of program and, in some cases, on nature of present facility. In most subject areas, the class size figure in the Castaldi calculation has been an average, estimated from the various course requirements in that subject.

3974

Summary of the Castaldi Calculations

Subject	Teacher Stations Required	Now Available
Mathematics	5+	3-4
Business Education	4	3
Social Studies	6	3+
English	7	7
Drafting	2	1
Art	2	1
Language	2.5 (3)	2
Driver Education	1	0
Science	5	4
Home Economics	2	2
Music	1	1
Vocational and Industrial Arts	*	2

* Number of Future Teacher Stations will depend on decision as to type and scope of program.

3975

In addition to data leading to the above calculations, teachers and administrators were asked for recommendations of priority areas for curriculum change and space development. [1] This information was appraised by the CEFS team, and specific recommendations were made. Since the district may not find it feasible to implement all the desired changes, an attempt has been made to order suggestions by priority. The arrangement of these priorities was developed after discussions with principal and faculty at the Fall Mountain Regional High School and agreed on by members of the CEFS team. The alternative space plans in this report are based on various combinations of these priorities with minimum space needs.

Priority Areas for Program and Space Development

(1) An enlarged and improved vocational education-industrial arts program and facility was considered a high priority by most staff members and by the CEFS team. This area is the subject of an in-depth study resulting in specific assumptions listed in the Vocational Education section of this report.

(2) A coordinated vocational-academic program for slow and reluctant learners was a second major recommendation. Such curriculum development is strongly supported by CEFS but does not involve specific space requirements.

(3) Resource areas and independent study - Initial discussion with faculty and the results of the faculty questionnaire suggested a strong desire for the elimination of some or all required study halls and development of several resource areas for student use. The implications of this change for faculty supervision of resource

1) See Appendix A for sample questionnaire.

areas and for location of additional space were discussed with the general faculty. There was general consensus that the following changes were desirable: the expansion of the present library and the addition of resource area space and facilities for Math-Science, English-Social Studies (possibly as part of the central resource area), Art, Vocational-Industrial Arts Studies, and Physical Education.

It was also suggested that space for student independent study be provided for Business, Home Economics, and Agriculture.

Implementation of the resources area-independent study concept will require a sizeable expansion of the present library as well as other additional spaces.

(4) The development of a reading lab as a remedial and resource area was considered as a high priority by many staff members.

(5) An improved and enlarged art area was felt by school staff and the CEFS team to be desirable for the basic art program and possible resource area use.

3977

Summary of Desirable Changes Within Subject Areas

1. English (7 basic stations needed)

   - One additional classroom
   - One large remedial-developmental reading room
   - An English-Social Studies resource room with adjacent teacher office space
   - Departmental storage space
   - Conference room space within central library resource area

   Note: Needs for the Humanities program are listed under Social Studies

2. Business Education (3-4 stations needed)

   - Consolidation of classrooms in one area
   - Consolidation of small sections of the same courses
   - One large additional room for office machines, etc., and student independent use (This is not seen as a high priority since consolidation of sections would permit continuation of program with three stations.)

3. Social Studies (6 stations)

   - 3 additional classrooms with flexible partitions allowing conventional, large and small group activities
   - Shared resource area and office space with English
   - Consolidation of small sections of the same course (e.g., United States History, World History)

3978

4. Science (5 stations)

   - Add 2 laboratory-classrooms
   - Math-Science resource and project room with adjacent teacher office space

5. Driver Education

   - One classroom

6. Art (2 stations)

   - Development of large 2-station area with adequate storage and natural lighting

7. Mathematics (5 stations)

   - Addition of 2 classrooms
   - Shared resource and office area with science

8. Physical Education

   - Part-time use of one classroom
   - Additional storage space

9. Vocational-Industrial Arts Program: the in-depth study conducted by the CEFS team has resulted in the recommendation of extensive changes, both in program format and in space needs.

The reader is referred to the separate section below for a detailed presentation of these recommendations.

VOCATIONAL EDUCATION STUDY

INTRODUCTION

The general survey of needs in the Fall Mountain Regional District revealed a priority concern for improvement of the vocational program at Fall Mountain Regional High School. The Research Coordinating Unit, Vocational Technical Division, New Hampshire State Department of Education, made funds available on a matching basis so that CEFS could undertake a more thorough study of curriculum needs in this area.

In order to carry out this type of in-depth study, the CEFS research team utilized the Critical Path Method, a systems-based approach which includes the following steps: statement of the problem, identification of the areas of investigation, summary and analysis of the findings, and development of alternative responses appropriate to a solution of the problem as originally stated.

The problem, in essence, was to evolve a vocational education program in sufficient detail to establish space requirements for the Fall Mountain District. A valid assessment of the area's needs would be based on an evaluation of the economic situation of the district and the surrounding region and a review of employment statistics. Since there was a strong interest in cooperative education-vocational education, special attention was directed to the interests and needs of employers in the Fall Mountain area. Questionnaires and letters to selected industries were followed up by personal interviews with 31 employers. A sample of these, together with a list of the industries, will be found in Appendix B at the end of this report.

Students were also surveyed to obtain their general reaction to the present curriculum and their specific interest in a work-study plan (see Appendix C for sample

questionnaires and findings). In addition, members of the high school staff and administration were involved in discussions of curriculum needs in the vocational area.

General background was provided by a review of current literature on the subject and an analysis of the Lexington, Mass., Work-Study Program ("Education Without Walls") already in operation.

This investigative effort brought out the following points:

- The region has excellent growth potential, with certain industries (machinery, lumber, paper) leading in manufacturing. The biggest increase will be seen in construction and services, reflecting a national trend. Agriculture will continue to decline.
- Employers stressed the importance of a solid basic educational background and of good work attitudes.
- Students, both recent graduates and current students, agreed with employers on the necessity for useful basic skills rather than specialized training. Considerably more than half favored a work-study program.
- School staff identified desirable changes in the vocational program, with flexibility seen as the most important feature.
- General literature emphasized the fact that change is the essential characteristic of modern technology. The role of education is to prepare students for successful careers by providing training in basic skills and in adaptability to different work situations.

- "Education Without Walls" is a practical application of this theory. Its stated objective is the removal of the "walls" surrounding the vocational student from the working world. All aspects of curriculum and program administration are designed to serve this objective.

The CEFS team then studied the vocational programs in other high schools in the area (see Appendix D for a summary) and formulated a number of assumptions on which to base their recommendations for the Fall Mountain Regional District. The essential feature of the proposed vocational-industrial arts program is the "cluster" concept, whereby the vocational offerings would be organized into natural groupings. This differs from the traditional method of "straight-line" courses listed by title where students are locked into a course of study with no opportunity for taking advantage of related offerings outside the limits of their particular course. The cluster concept provides flexibility both within each natural grouping and between individual clusters. To take a specific example, the Electrical cluster would be utilized not only by future electricians, but also by students in the Building Trades. This built-in flexibility also offers the dual advantage of responding to the present needs of the vocational program and of facilitating future changes if and when these are found to be necessary.

GENERAL ECONOMIC SITUATION: STATUS AND TRENDS

I. Arthur D. Little Report[1] - a Review

A very brief summary of the findings of the Arthur D. Little Report is included here as background for the Vocational Study carried out by the CEFS committee. The projections for Sullivan and Cheshire Counties in New Hampshire and Windham and Windsor Counties in Vermont were grouped together for a survey of the economic future of the total area surrounding the Fall Mountain Regional District. The growth potential is above that for New England as a whole, with the Vermont counties ahead of the New Hampshire counties in population and employment gains by 1980, (Vermont: 65% growth in population, 74% gain in employment; New Hampshire: 27% in population, 40% in employment). The biggest manufacturing employers in New Hampshire are textiles, apparel and leather, non-electrical machinery, and the lumber, furniture, and paper industries. In Vermont the tool machine industry is the chief manufacturing employer. By 1980, it is expected that the order of importance of the manufacturing industries will have been reversed in New Hampshire. Although the same categories will still be the leading employers, non-electrical machinery will be the leader in the field, followed by printing and publishing, instruments and ordnance, and last by textiles, which is to experience a relative decrease during this period. In Vermont, non-electrical and electrical industries will make some gains; however, the non-manufacturing industries of construction and services will show by far the biggest increases in employment, accounting for a major part of the projected 74% growth mentioned above.

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1) New England: An Economic Analysis. A Report Prepared for the New England Regional Commission by Arthur D. Little, Inc., Cambridge, Mass., 1968.

Agriculture is a relatively small part of the economic pattern of this four-county region. Dairy farming and apple production are the leaders in this field, with Vermont showing a more rapid rate of decline than New Hampshire in number of farms, acreage cropped, and apple production. For purposes of this study, serious consideration should be given to the fact that this trend is expected to continue, with agriculture playing an even smaller role in 1980 than it does now in the economic life of the region. The vocational-industrial arts program should reflect this development.

II. "Twenty-Five Years" - Review

The autumn 1970 issue of Vermont Life contains an article surveying the changes which have taken place in the twenty-five years since the magazine was first published. Some excerpts from the article are quoted here as pertinent to the vocational study.

> "A population two-thirds rural a generation ago has now become two-thirds urban and one-third land-based. Non-agricultural employment jumped 33,000 from 1958 to 1967, while agricultural employment dropped from 21,000 to 17,000."

The following table illustrates what has been happening to farming in Vermont since 1900:

Year	% of Land Area in Farms	No. of Farms (in Thousands)	Acres in Farm
1900	81	33	143
1930	67	24.8	156
1950	59	19	185
1964	43	9	273

3985

"The farm landscape seems largely unchanged , but the farmer wears two new hats - as mechanic and business manager...

"Massive second-home projects on a scale unprecedented in the state are under way. One of these is planned for 2,000 families placed on 6,000 acres...in a previously wholly rural area...

"Vermont employment in construction has more than doubled since 1950 (4,000 to 9,550), but builders insist they can not hire enough good men, and their work schedules extend months ahead." 1)

In summary, the small hillside farm is on the way out, the farms still in operation are larger, more mechanized, and the farmer must increasingly act as technician, mechanic, and business man. The farmer is also finding off-season employment in the enormously expanding construction business. The growth in construction of second homes raises another issue relevant to vocational education, that of environmental planning and control. More trained experts in this field will be needed every year, and perhaps it would be timely for vocational planners to give serious consideration to developing a new type of agricultural vocational program to provide future farmers with the expertise in other areas which they will need in order to make a living in agriculture.

Although the manufacturing industry still dominates the economic scene to a greater extent in New Hampshire than in the two Vermont counties adjacent to the Fall Mountain area, the points made in this article with regard to agriculture are just as valid for New Hampshire as for Vermont.

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1) Vermont Life. "Twenty-Five Years". Fall, 1970. Vol. XXV, No. 1.

EMPLOYMENT STATUS AND TRENDS

I. In New Hampshire and Vermont

The New Hampshire and Vermont Departments of Employment Security and Industrial Development have provided the data for the following summary of employment conditions. Statewide non-agricultural employment has increased steadily, while agricultural employment shows a consistent decline. In manufacturing, the leaders in durable goods are manufacturing machinery, electrical machinery and products, metal products, lumber and wood products. In non-durable goods, paper, plastics, rubber, and printing are the biggest employer industries. In non-manufacturing, the greatest number of jobs is provided by construction, trades in general, services, and government services.

In Sullivan, Cheshire, Windsor, and Windham Counties agriculture is declining as elsewhere in the two states. The leading employers in durable goods are machinery, lumber and woods; in non-durable manufactures, paper, printing, publishing, plastics, and rubber are showing appreciable growth. In non-manufacturing, construction, general trades, and services are gaining substantially.

The implications of this employment picture must be considered as one of the basic factors in the development of a vocational education program for the Fall Mountain District.

II. In the United States as a Whole

An article in U.S. News and World Report, Nov. 2, 1970, forecasts "Where the Jobs Will Be in the Next Ten Years". It is interesting to note that according to these national projections the four counties surrounding the Fall Moun-

tain District will experience employment conditions reflecting the national trends. The fastest growth in jobs in the U.S. will be in manufacturers of office, computing, and accounting machinery; business services; state and local government; medical and educational services; electronics; rubber products; some machinery makers; broadcasting; drugs; plastics; finance and insurance; amusements; instruments and construction. Slow-downs are predicted in employment opportunities for teachers, blue-collar workers, miners, and agricultural workers. The chief industries in the Fall Mountain area and environs have been underlined.

The chart below illustrates these projections:

JOB PICTURE FOR 1980— AN OFFICIAL REPORT

MORE WORKERS will have jobs in these fields:

	Employment in 1969	Employment expected in 1980	INCREASE, 1969-80
Services, miscellaneous	13,412,000	18,097,000	4,685,000
State and local government	9,446,000	13,662,000	4,216,000
Trade	17,274,000	20,282,000	3,008,000
Manufacturing	20,545,000	22,133,000	1,588,000
Construction	4,208,000	5,427,000	1,219,000
Finance, insurance, real estate	3,896,000	4,593,000	697,000
Household help	2,322,000	2,770,000	448,000
Federal Government	2,758,000	2,970,000	212,000
Transportation	2,935,000	3,086,000	151,000
Communications, utilities	1,698,000	1,840,000	142,000

FEWER WORKERS will have jobs in these fields:

	Employment in 1969	Employment expected in 1980	DECREASE, 1969-80
Agriculture	3,932,000	3,156,000	—776,000
Mining	654,000	584,000	— 70,000

Source: U.S. Dept. of Labor

Source: U.S. News and World Report, Nov 2, 1970. "Where the Jobs Will Be in the Next Ten Years", pp.73-74.

3988

SURVEYS, QUESTIONNAIRES, INTERVIEWS

This section presents a summary of the results of questionnaires, interviews, and discussions with representatives from those groups most directly concerned with the type of vocational program offered at Fall Mountain Regional High School.

1. Employers.

Some general concepts were commonly stressed by most of the 31 employers interviewed. They felt that more emphasis should be given to practical training which would include the application of theoretical concepts to actual work situations. Education in basic skills should be in the student's area of interest and in closely related fields, and supplemented by a good background in general education. Attitudes were deemed extremely important, for good relations with fellow workers, for meeting the public, and for adapting to different work situations. This last aspect was considered crucial in view of the changes taking place in society as a whole and in many areas of employment. On the one hand, workers are increasingly leaving jobs for which they had trained to take up occupations in other fields, often because of varying patterns of supply and demand. On the other hand, products, procedures, and processes are undergoing constant modifications, resulting in the elimination of some traditional job categories. Apprenticeship training was considered valuable in work requiring comprehension of the process because it provided an opportunity to demonstrate the ability to apply this understanding. Some examples of this type of work would be the machine tool industry, the building trades, the automotive industry, stenographic and clerical work.

II. County Agents

The county agents in Cheshire and Sullivan counties were interviewed to obtain expert information on the status and trends in agriculture in the region. Dairy farming is the chief agricultural occupation, followed by apple production. There is some vegetable and small fruit farming. In forestry, maple products are leading the field, followed by Christmas tree farms and general tree farming. The trend in agriculture is towards larger units (bigger herds of cattle for instance); more mechanization in planting, harvesting, and packaging; and towards more emphasis on retail sales, resulting in higher demand for standardized methods of sorting, crating, etc. As the article from Vermont Life reviewed earlier in this section stated, the farmer is now also a mechanic, technician, and retailer. In addition, concern for ecological issues is becoming very much a part of the agricultural scene.

As a consequence, the county agents stressed the necessity for expanding the traditional concept of agriculture to include the related fields of distribution, conservation, hobby farming, land engineering, and general technology. The laboratory approach and more research on the application of modern technology to the type of agriculture practiced in the area were seen as desirable components of a vocational agricultural program.

III. Students

The results of the questionnaires submitted to former and current Fall Mountain High School students (see Appendix C) have interesting connotations for vocational planning. On questions related to their school work, teacher attitudes, etc., the following reactions were recorded. Although most students were not highly interested in their high school subjects, they did feel that the subjects were related to their future job plans. On the other hand, few former and current students felt homework was related to their future job plans, and extremely few saw any relationship between future jobs and in-school and outside-school activities. Few students believed their teachers were interested in their future jobs, and few students gave full time or support to their school work. In general, their high school subjects did not bring out their full potential, but many felt that they would have demonstrated more of their ability if school work were preparing them for a job. In line with this response, an extremely high percentage of students reacted favorably to a work-study program with school attendance in the mornings and supervised work experience in the afternoons.

The students' actual job choices bear out the general impression given by the above statements. Senior boys have chosen 35 different vocations (11 made no choice); the leading vocations were machine tools, office work, engineering, teaching, and drafting. The senior girls chose 62 different vocations (7 made no choice), the most popular ones being office work, teaching, nursing, beautician, laboratory technician, commercial art, and social work.

IV. Man, Education, and Manpower[1)]

Some pertinent material from Dr. Grant Venn's book has been included in this report. According to this author, the most significant element of the new technology is the process of constant change. For instance, in the last few years the increasing use of automated machinery and computers has resulted in a massive displacement of jobs and personnel, not only among the older group of workers, but especially among recent high school graduates whose education had prepared them rather adequately for subsequent schooling and not at all adequately for competition in today's job market. Dr. Venn predicts that by 1975 workers in professional and technical fields will outnumber skilled craftsmen, and the proportion of unskilled workers will fall below 5%. The 1969 Manpower Report of the President gives the following figures for the projected change in occupational groups from 1965 to 1975:

Occupational Group	% Increase or Decrease 1965-75
Professional and Technical	45.2
Managers and Proprietors	23.3
Clerical Workers	32.5
Service Workers	34.4
Sales Workers	25.0
Skilled Workers	23.1
Semi-Skilled Workers	10.5
Laborers	- 2.4
Farm Workers	- 21.6

These numbers indicate that there will be serious shortages in the number of skilled technological workers within a few years, while American

1) Venn, Grant. Man, Education, and Manpower. The American Association of School Administrators. Washington, D.C., 1970.

youth is being trained for jobs which may no longer exist by the time the student graduates from high school. As a result the average youth will change occupations five times within the next forty years. Dr. Venn states that the "existing and projected lack of meaningful employment opportunities for large numbers of youth growing into adulthood is perhaps the major domestic problem in America today."

Educators must take an entirely new look at the function of vocational education today. The high degree of specialization found in many vocational and technical curricula seems to bear little relation to conditions in the outside world. More time should be devoted to the development of broader technical understanding, of communication and computational abilities, combined with an appreciation of civic, cultural, and leisure activities. The specific job training should be left to the future employer. Apart from job skills and general education, a potential employee should receive some training to develop a sense of responsibility and cooperation, the ability to take instruction, and adaptability to different working conditions.

Some concrete suggestions as to the school's role in this process are made by Dr. Venn. Schools must help the student make the transition from the classroom to the world of work by increased vocational and career counseling and by providing work experience as an integral part of education. Placement and follow-up services are a vital complement to the counseling and training activities.

V. "Education Without Walls"

This program was the result of a two-year study undertaken in Lexington, Mass. Designed for the academically capable chronic "underachiever", it is a voluntary program open to all those who request admission. It offers a wide choice of electives as well as flexible scheduling and grouping and gives students the opportunity to participate in a work-study program. Its primary aim is to remove the "walls" which all too often constrict course offerings, isolate the underachiever in stigmatized groups, separate learning from the real world, and separate the student from the educational and vocational resources within his own community. A prerequisite for the success of the program is a strong interrelationship between school and community, so that the student may acquire academic skills while at the same time profiting from the opportunities for work or service experience in his home town.

All students attend classes in the morning from 8-12. The courses address themselves to four main themes: environmental awareness, the widening community, creative expression, and the economic world. In the afternoon the students may take classes in business education, home economics, or industrial arts if they wish. They also have the choice of supervised work experience, projects, or independent study. Special arrangements can be made if desired. Although potential employers serve as consultants, this is not a vocational program in the strict sense of the term, as students may qualify for college via this course.

"Education Without Walls" hopes to provide more relevancy for the student who is uncertain about his future plans, to reduce the gap between students and teachers, and to stimulate greater student interest in academic achievement.

This project uses an original approach to the solution of some of the problems that have long beset education. Although it is too early to assess its long-range effectiveness, its progress should be watched with interest.

ASSUMPTIONS AND CONCLUSIONS

The extensive surveys undertaken by the CEFS team and summarized on the preceding pages led to the identification of certain assumptions. The element of change is common to all of them - changes in society, changes in technology, changes in procedures and techniques, changes in attitudes. The vocational program must respond to the needs of today's high school students by educating them in basic skills and by developing attitudes that will help them to achieve success in their chosen field from the beginning of their work experience throughout their working life. Flexibility and adaptability to change must be inherent characteristics of a good program.

Employers want employees who have acquired vocational skills, knowledge of mathematics, English, etc., who are willing to learn more specific skills on the job. The employee should be able to get along with his co-workers and to be a part of a team. The demand for skilled workers has changed in many areas, so that a new look must be taken at employment demands. For instance, production farming has decreased to a few isolated large operations operated by a few men using specialized tools and machines. The service industry has become a major employer and will tend to become more so. The typical office secretary is taking less dictation today but is required to know how to use the transcriber, operate the copying machine, etc.

The implications of these trends for vocational education are that much of the traditional vocational curriculum is out of date. Skills and machines are changing so fast that there is little justification for having a student spend long periods learning to run an obsolete milling machine or planer, or make a duct for hot-air heating systems, etc. In addition to equipment that is outmoded, many of the classroom practices that

we have been teaching are behind the times and must be revised to keep pace with present and future needs. For instance, in the machine shop the student should be taught the basic functions of a lathe, milling machine, types of metal, etc., rather than spending a long time on a special hand-operated milling machine when industry today is using tape- or key-operated machines.

In the field of program planning it is no longer sufficient to set up a rigid framework of "vocational courses"; in this era of rapid change such a structure may be obsolete even before it is implemented, and it will be incapable of adapting to future developments. With this in mind, the consultants are proposing the concept of natural groupings or "clusters" of vocational offerings. Students will not be restricted to courses in their own area of specialization, but will be able to take advantage of supplementary courses in another cluster.

The following is a list of suggested natural groupings which will enable the student to pursue his studies in depth in one area while profiting from offerings in another if desired.

<u>Agriculture</u>
Farming
Forestry
Horticulture
Conservation
Agricultural Services
Environmental Sciene

<u>General Metals</u>
Operating Machines
Metals
Drafting
Coop. Machine

Building Trades
Planning and Drafting
Woodworking
Plumbing
Heating and Ventilation
Concrete
Electrical (Wiring)

Health Occupations
Home Nursing
Institutional Nursing
Nurses' Aides

Business Education
Office Practice
Data Processing
Secretarial
Bookkeeping

Home Economics
Foods and Nutrition
Home Nursing
Clothing
Quantity Cooking

Electricity
Home Wiring
Electronics

Power Machines
Small Engines
Automotive
Auto Body
Power Tools

It must be understood that this list is by no means definitive. Additions or deletions may be made according to the specific program to be offered. The consultants suggest that this concept merits serious consideration by the School Board and school administrators. The space recommendations in the alternative plans incorporate the cluster concept by making possible many different combinations of vocational programs and courses in the spaces provided.

ALTERNATIVE PLANS

INTRODUCTION

The three alternative plans in this section of the report represent possible responses to present and future space needs of the Fall Mountain Regional High School. The CEFS projections show a peak enrollment of 719 in 1972-73; the School Board, as pointed out earlier in this study, would be well advised to provide spaces for an enrollment of 800 in the interests of sound long-range planning.

All plans are designed to relieve existing pressure areas in the school, and each suggests additional and improved spaces for both the academic and the vocational program. Plan I offers the minimum desirable additions; Plan II provides for a new building to house the practical arts program; and Plan III is an expanded version of Plan I. Detailed descriptions of the plans, with space studies, are to be found in the following pages.

SPACE STUDIES

The building diagrams accompanying each Alternative Plan are in no way intended to be architectural studies or sketches. These space studies were drawn up to help the Fall Mountain Regional School Board visualize the changes proposed as a result of this survey. The diagrams show the amount of space needed for a particular activity or program, and the relationship of this space to other areas in the building. They are drawn to appropriate scale and thus provide a basis for computing the budget estimate according to the area required (in square feet). A unit cost of $25.00 per square foot was used, based on unit costs of recent projects; this would include the cost of construction, equipment, engineering, and, where applicable, of site development.

PLAN I

This plan proposes the addition of an academic wing of 6600 sq. ft. containing 5 new classrooms, a small resource area, and lavatory facilities. The classrooms would be assigned to English, placing them adjacent to Social Studies. The resource area could be used by both departments and would make more space available for independent study. Modifications and reassignments of spaces in the existing building would be as follows: one of the homemaking rooms would become a resource area for mathematics and science, adjacent to the library. The other homemaking room would become a biology laboratory, and the present art room would serve Earth Science, thus grouping all science spaces in the same general area. Business Education would be assigned one of the existing rooms, so that 4 teacher stations would be provided for this department. Two rooms of 2000 and 1600 sq. ft. would be provided for Art in the present shop spaces. These changes would accommodate future growth in enrollment and relieve "pressure areas" now existing, as in science, art, and the library. Another advantage would be the possibility of natural groupings by subject in English, Social Studies, Mathematics, and Science.

The practical arts program would be housed in a new addition, and some changes made in the present shop areas. A new shop wing of 20,000 sq. ft. is proposed, offering a great deal of flexibility in the assignment of spaces. The consultants have made the following tentative space assignments in this area, which may provide the School Board with some guidelines in reaching a decision on the actual assignments.

4002

Subject	Area (sq. ft.)
1. Homemaking Suite	2600
2. Music Suite	3000
3. Building Trades	3500
4. General Metals	3500
5. Power Mechanics	3500
6. Drafting (2nd Room)	1200

The total area of 20,000 sq. ft. provides excellent spaces for the proposed arrangement of offerings.

The present shop wing would be remodeled to provide space for Art (mentioned above); the present music room would be converted to a teachers' workroom and space for stage craft and stage storage. Visual Communications (2000 sq. ft.) and one Drafting room (900 sq. ft.) would complete the reassignment of major existing areas. The one small room now used for drafting could serve for music theory and/or music appreciation; the shop teacher might also utilize this space on occasion.

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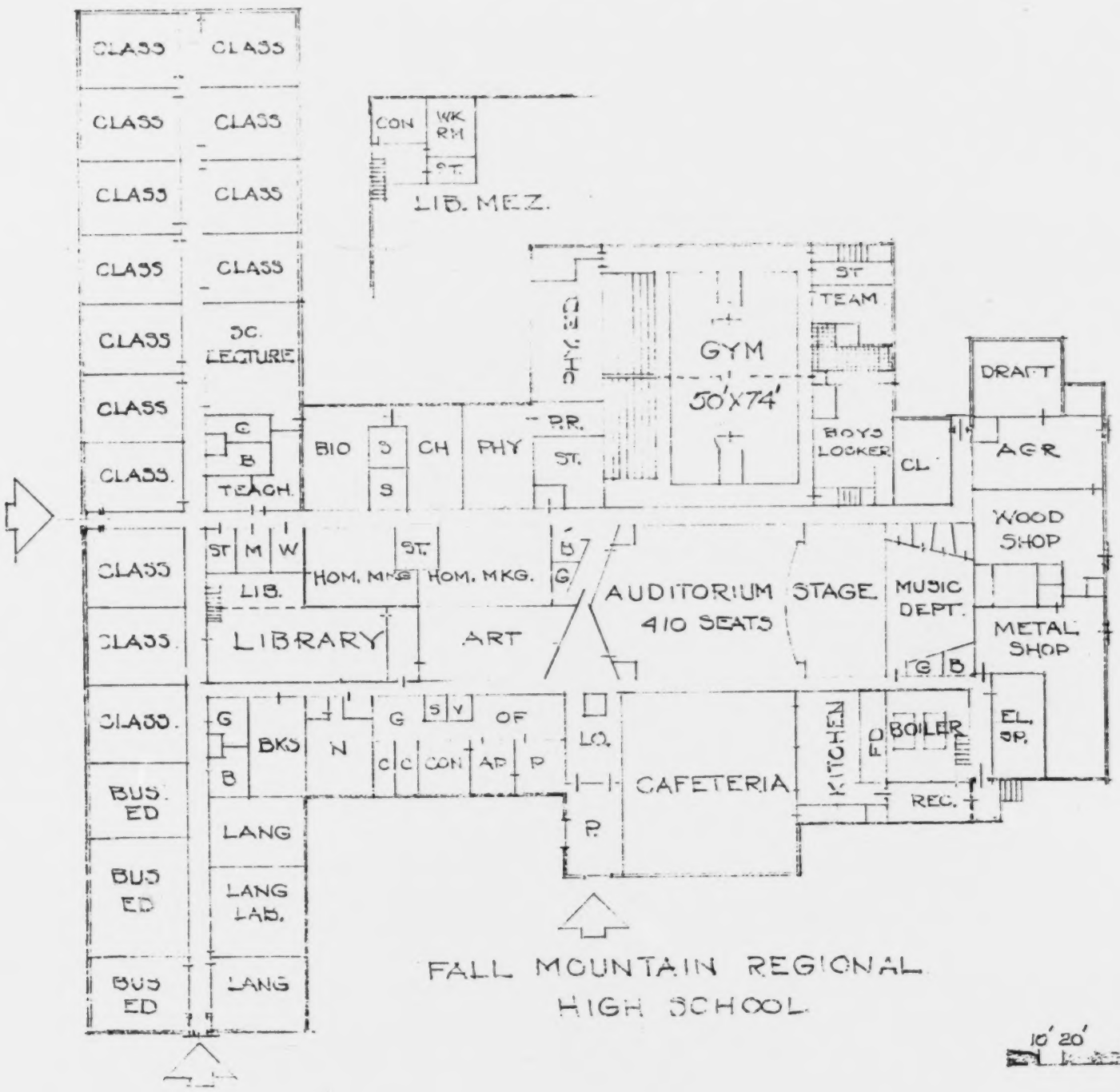
PRESENT PLANT
BUILT 1965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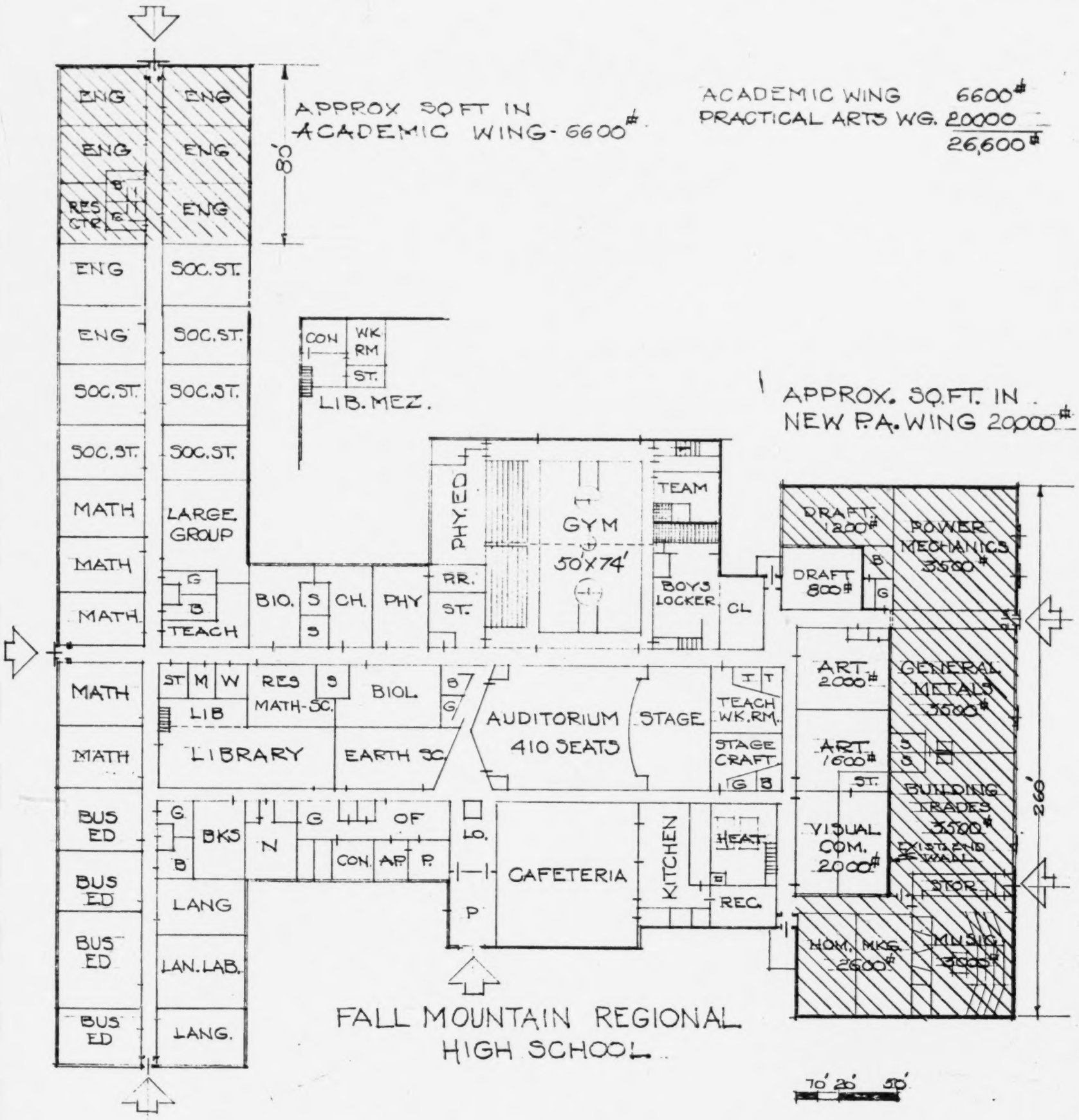
PLAN 1
ROOM SPACE STUDY

ACADEMIC WING 6600#
PRACTICAL ARTS WG. 20000
26,600#



FALL MOUNTAIN REGIONAL HIGH SCHOOL

PLAN II

According to this plan, the only addition to the present building is to be made to the academic wing. This addition, slightly larger than in Plan I, would contain 6 new classrooms, a resource area, a book storage area, and lavatory facilities. One of the existing rooms would be converted to a workroom for English and Social Studies, and other rooms are assigned as required, including an extra room for Business Education. Other changes in the existing building would be the conversion of the present homemaking space to a resource area for Mathematics and Science and a biology laboratory. The present art room would be used as an Earth Science laboratory. The music room also would be converted as in Plan I, partly to a teachers' workroom and partly for stage craft and storage. The present shop area would be reassigned as follows: 2 art rooms of 900 and 1400 sq. ft. (slightly smaller than in Plan I), a new music room of 2600 sq. ft., an adjoining classroom of 800 sq. ft., and a homemaking suite of 1800 sq. ft. The small drafting room could be assigned as a classroom as needed.

Practical arts would be housed in a separate building to be constructed adjacent to the school. The advantage of this plan would be greater flexibility than the proposed addition to the present high school of Plans I and III, including the possibility of easy expansion when necessary.

Tentative space assignments have been made as follows:

Subject	Area (sq. ft.)
1. General Metals	3400
2. Power Mechanics	3400
3. Agriculture	2500
4. Building Trades	2900
5. Drafting	2200
1 at 1300 sq. ft.	
1 at 900 sq. ft.	
6. Visual Communications	1500
7. Teachers' Workrooms & Office	
8. Toilets, Stockroom, Boiler Room	

With regard to the offering in vocational agriculture, the results of the CEFS survey treated earlier in this report indicate the necessity for careful planning on the basis of present trends. The School Board must give serious consideration to two aspects of this problem: first, the decline in agricultural production in the region and second, the inclusion of related fields such as conservation, forestry, environmental control, etc. The concept of natural groupings of vocational courses with a great deal of interdisciplinary flexibility is a fundamental assumption of the space studies shown below.

It should be noted that two slightly different designs are proposed for the new building, one of approximately 19,800 sq. ft. and a slightly larger one of 21,400 sq. ft. This will give the School Board two options as to total space offered, as well as several possibilities for internal space assignments.

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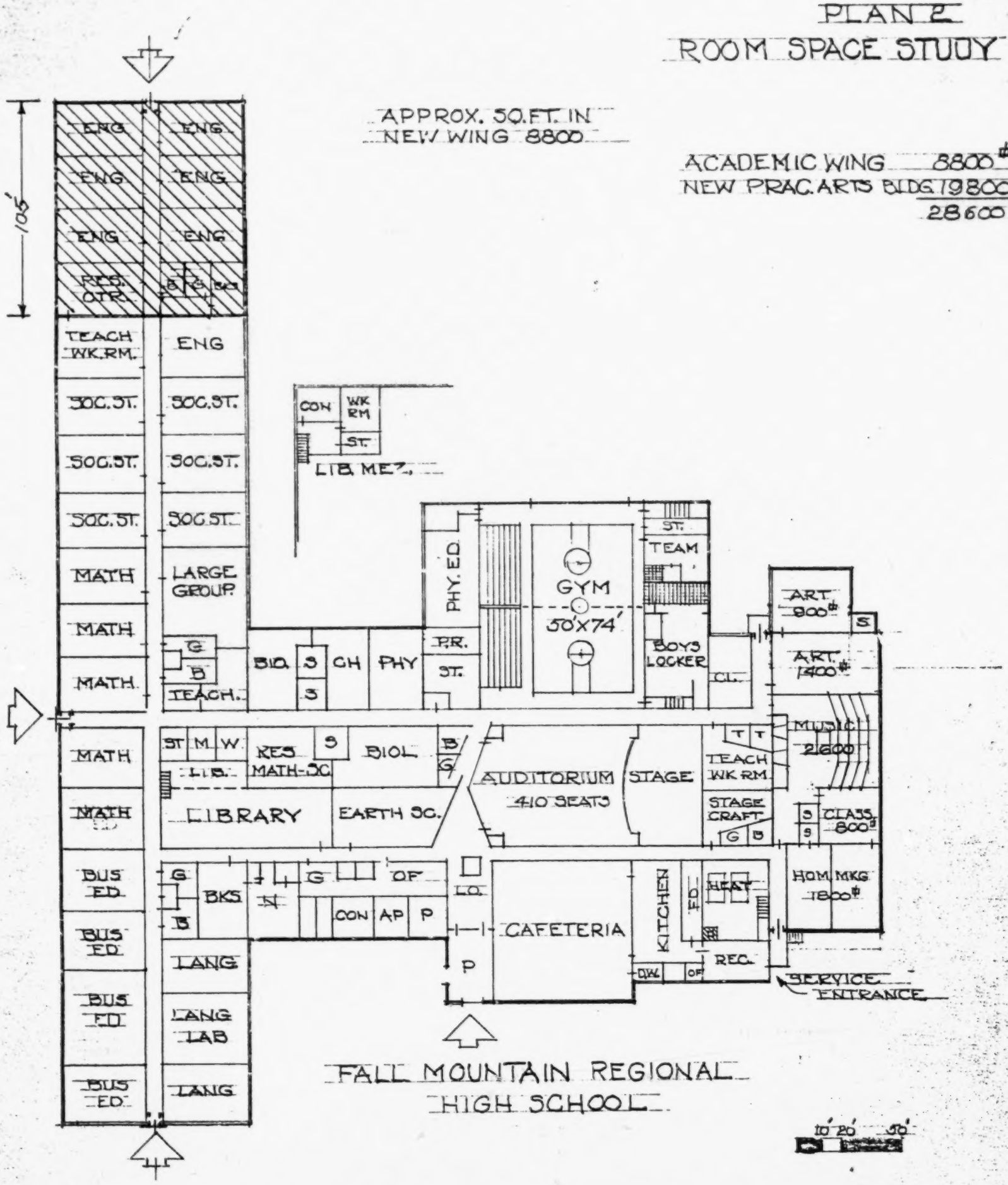
PLAN 2
ROOM SPACE STUDY

APPROX. SQ.FT. IN
NEW WING 8800

ACADEMIC WING 8800#
NEW PRAC. ARTS BLDG. 19800
28600#

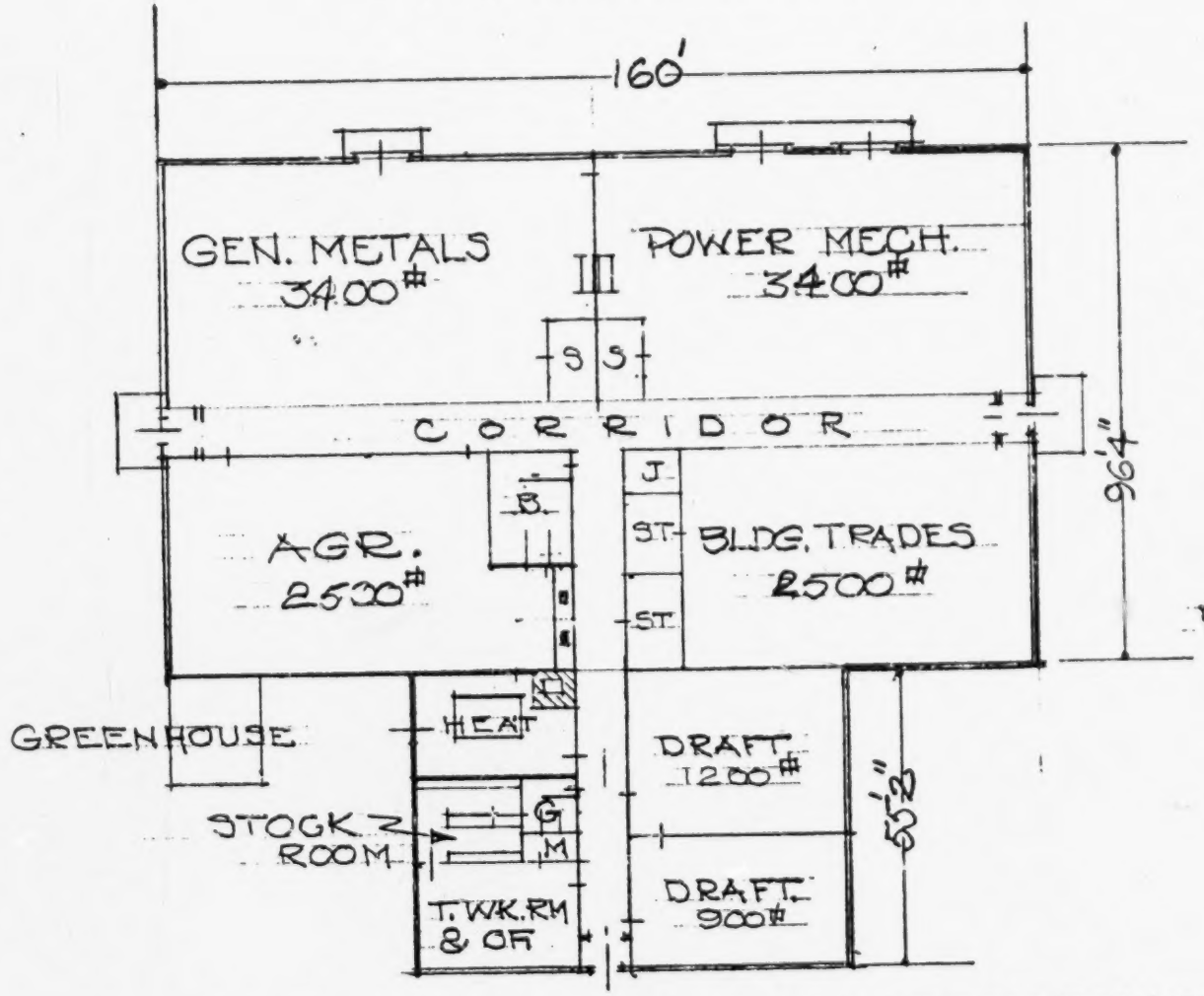


FALL MOUNTAIN REGIONAL
HIGH SCHOOL

4008

PLAN 2
ROOM SPACE STUDY

PRACTICAL ARTS BUILDING



APPROX 90 FT - 19800#

PHASE I
GENERAL METALS
POWER MECHANICS
BUILDING TRADES
DRAFTING
AGRICULTURE

PHASE 2
ADD VISUAL COM. OR
ELEC-ELECTRONICS
DROP AGRICULTURE

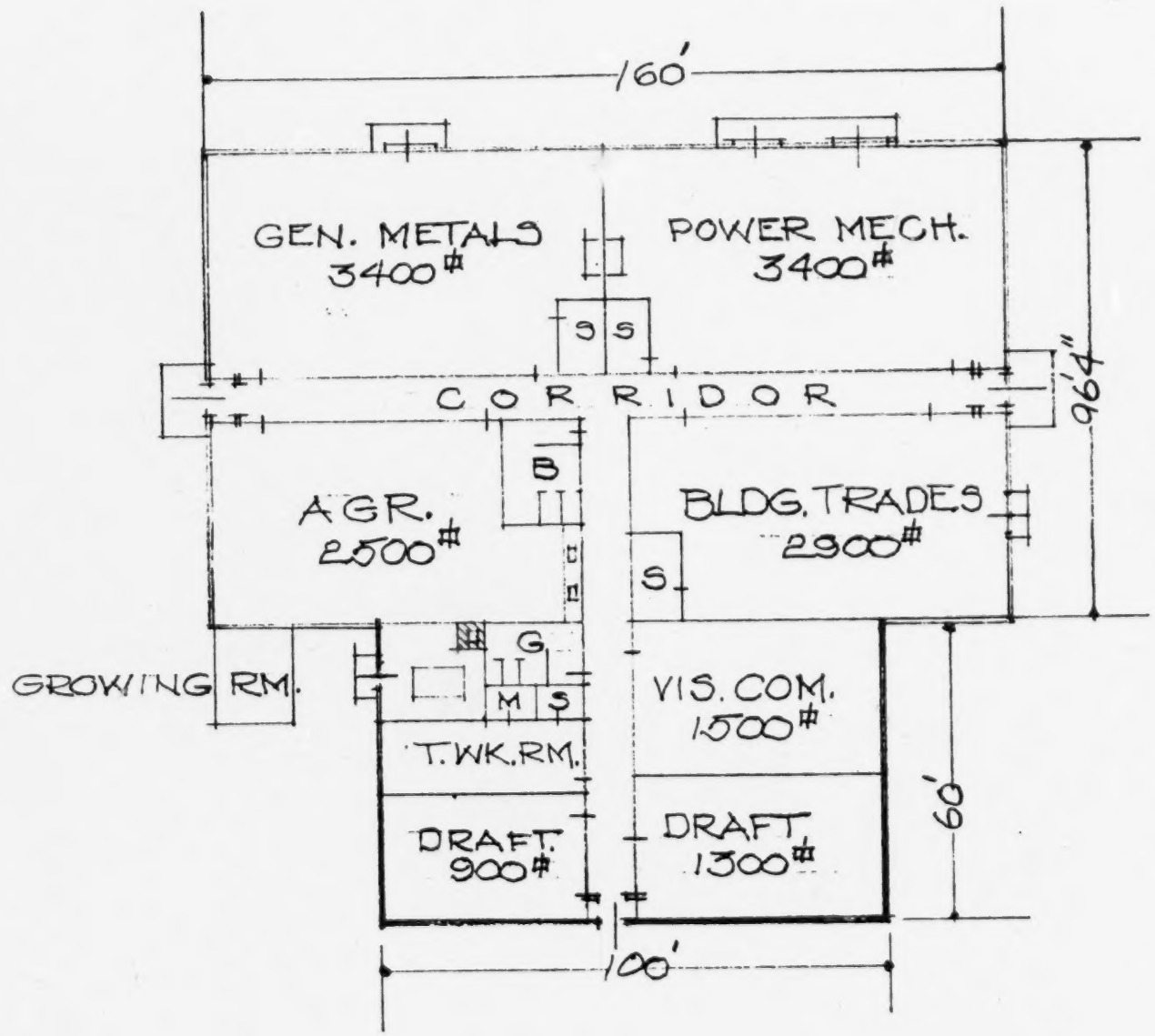
FALL MOUNTAIN REGIONAL
HIGH SCHOOL

SCALE 1"=40'

4009

PLAN 2 A
ROOM SPACE STUDY

PRACTICAL ARTS BUILDING



APPROX SQ.FT.-21400.

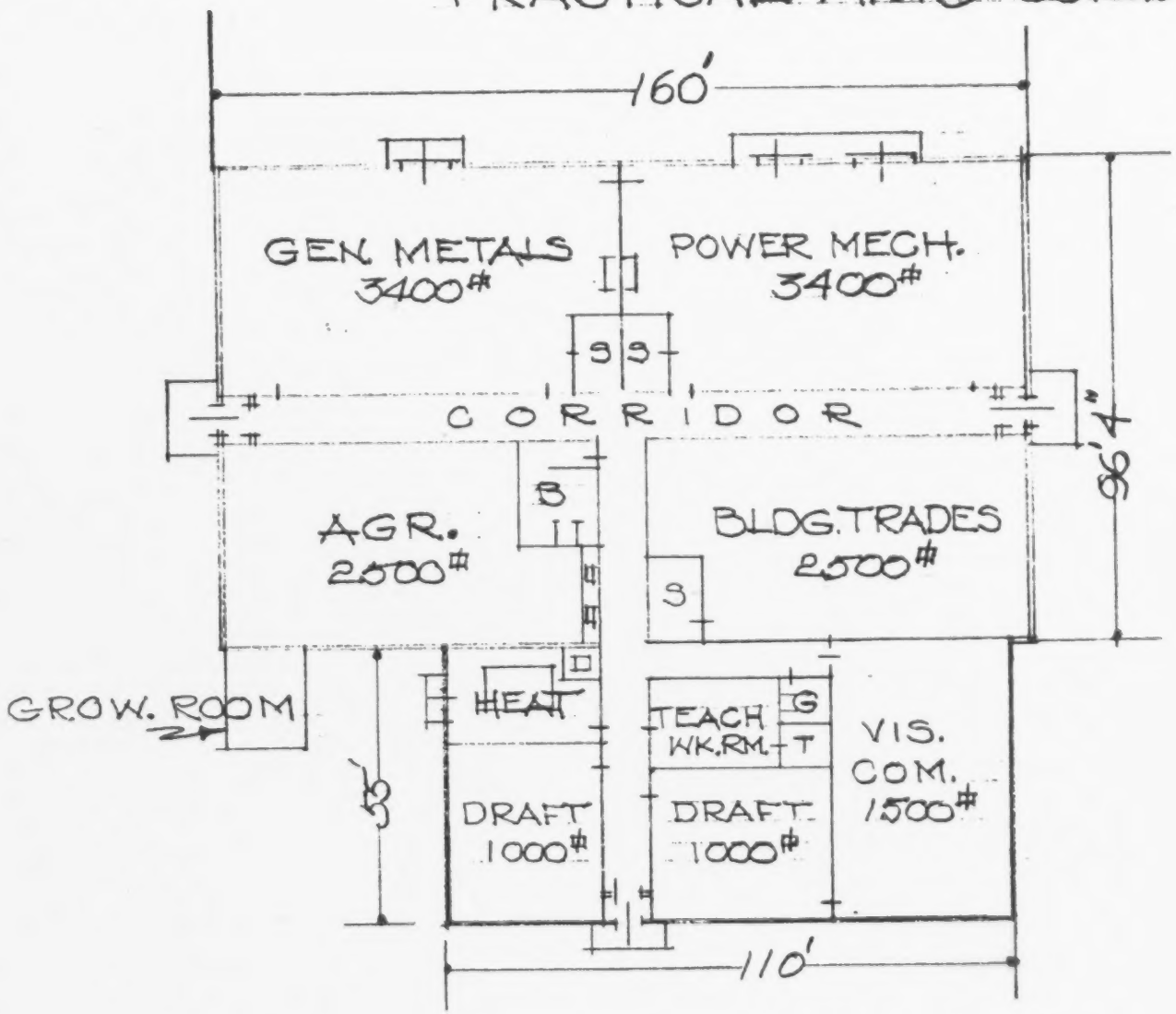
SCALE 1"=40'

FALL MOUNTAIN REGIONAL
HIGH SCHOOL

4010

PLAN 2B
ROOM SPACE STUDY

PRACTICAL ARTS BUILDING



APPROX SQ. FT.-21400

FALL MOUNTAIN REGIONAL
HIGH SCHOOL

SCALE 1"=40'

4011

PLAN III

The third alternative initially developed by the CEFS team underwent some modification as a result of a meeting with school administrators. This revised version of Plan III incorporates some changes suggested at that time while retaining the generous space provisions of the original scheme.

The new academic wing would contain approximately 17,000 sq. ft., including 7 classrooms for English, 1 classroom for Social Studies, 1 classroom for Driver Training (not provided in Plans I or II), a resource area for English - Social Studies (1156 sq. ft.) a teachers' workroom (850 sq. ft.), and a teachers' lounge. This addition would free spaces in the present building for other purposes, such as teacher workrooms for Business Education, Language, and Shop. Latest research has shown that instruction can be greatly improved by providing teachers with a place of their own for a desk, files, book storage, and visual communication equipment. Other spaces are re-assigned in the present high school building along the same lines as in the first two plans, resulting in natural groupings by subject, giving one more classroom to Business Education, and some space for stage craft and storage. The library is enlarged considerably, resulting especially in an improvement to the library reading room which is currently one of the pressure areas in the high school.

New construction would consist of a shop wing of approximately 22,000 sq. ft., with the following tentative space assignments:

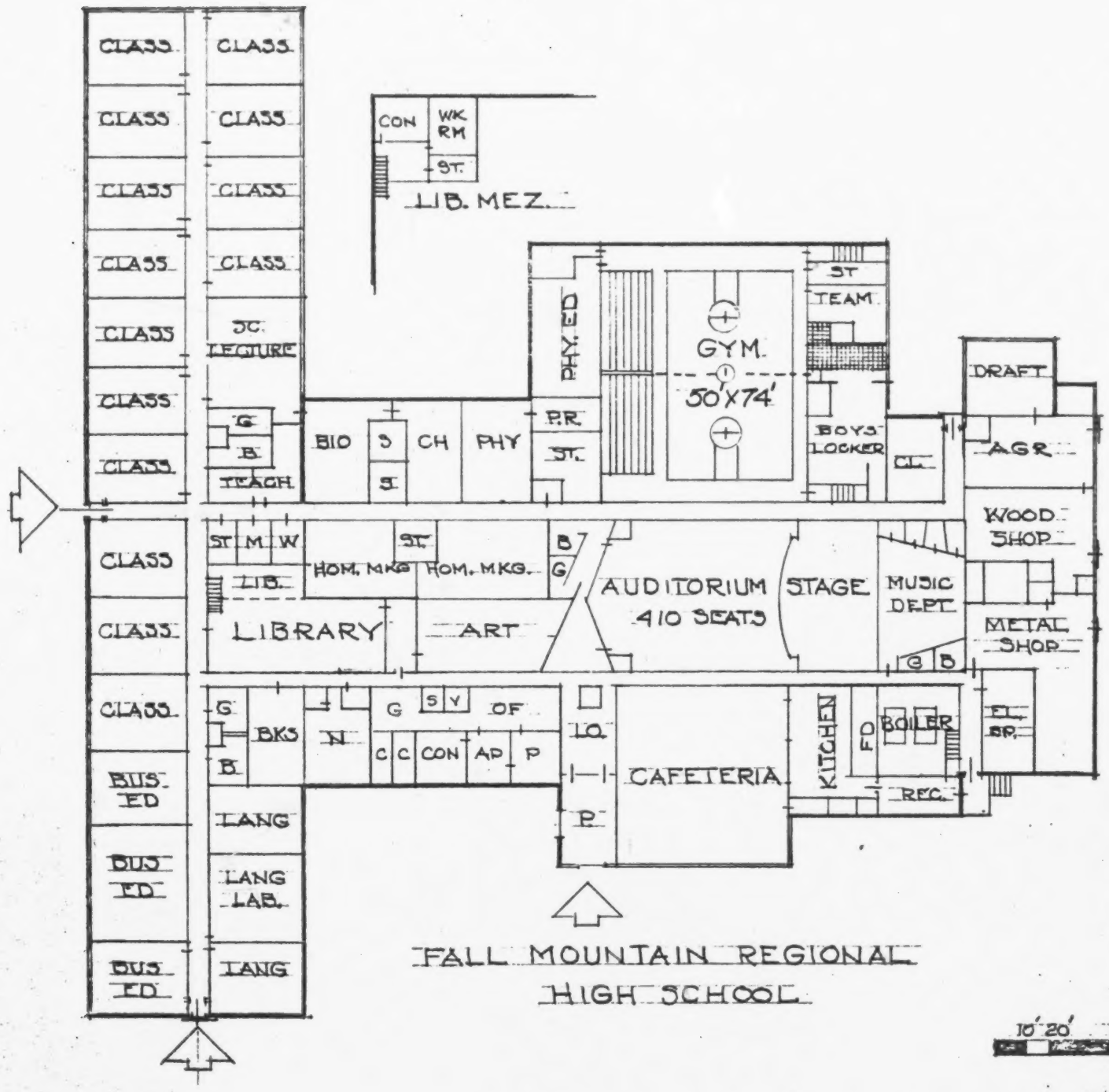
Subject	Area (sq. ft.)
1. Homemaking	2600
2. Music	3000
3. Building Trades	3500
4. Power Mechanics	3600
5. Drafting (2nd Room)	900

These space assignments by major areas are flexible enough to leave room for small class instruction of practical art students when necessary. An additional feature of this plan is the increased space for locker rooms and an improved office for the coach by a small addition to the present physical education facilities.

Remodeling of the existing shop area would be similar to that proposed in the other two plans and provide the following spaces: a drafting room of 900 sq. ft., 2 art rooms of 3500 sq. ft. total area, a visual communications room of 200 sq. ft.

The next two pages contain the space studies for the proposed changes.

PRESENT PLANT
BUILT 1965



FALL MOUNTAIN REGIONAL HIGH SCHOOL

HAYNES, LIENECK & SMITH
ARCHITECTS

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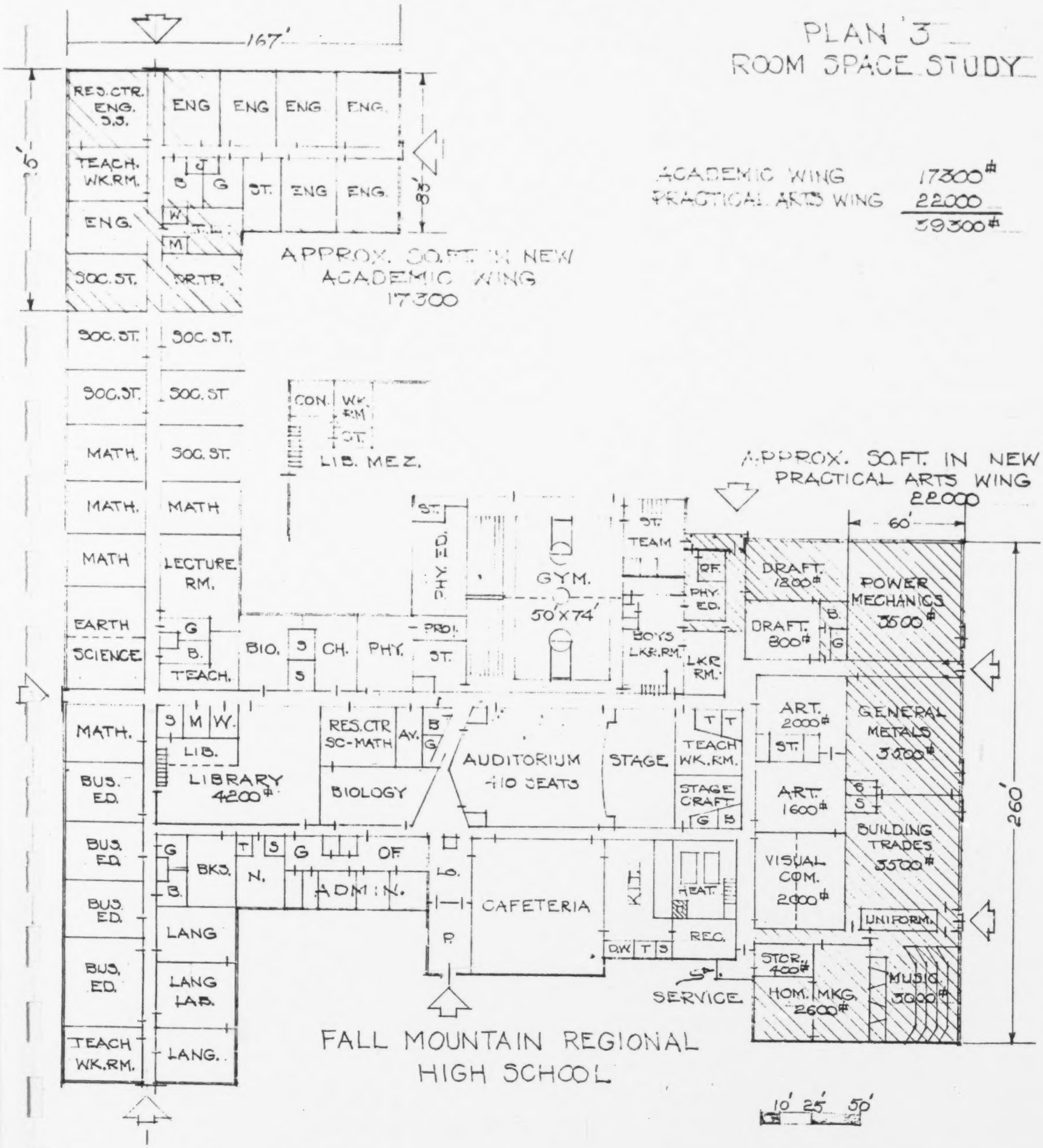

PROJECT BUDGET SUMMARY

The individual budgets for each plan are shown together for the reader's convenience in order to facilitate comparisons of costs of construction and equipment.

Item	PLAN I	PLAN II	PLAN III
New Construction			
Academic Wing	$166,000	$220,000	$432,500
Practical Arts Wing	500,000	495,000 *	550,000
Renovation and Remodeling	80,000	80,000	90,000
total	$746,000	$795,000	$1,072,500
Equipment			
Power Mechanics	15,000	15,000	15,000
Visual Communication	35,000	------**	35,000
Machine Shop to General Metals	10,000	10,000	10,000
Wood Shop to Building Trades	5,000	5,000	5,000
Drafting (1 New Room)	3,000	3,000	3,000
Homemaking	10,000	10,000	10,000
Music Suite	5,000	5,000	5,000
Science (2 New Labs)	20,000	20,000	20,000
New Classrooms (5)	6,000	(6) 7,200	(9) 10,800
Teacher Resource Centers	5,000	5,000	7,000
Teacher Workrooms (1)	1,000	(3) 3,000	(3) 3,000
total	$115,000	$83,200	$123,800
* Separate Building (19,800 sq. ft.)			
** Additional for Visual Communications (Plans 2A, 2B)	----	35,000	----
Total Estimated Cost	$861,000***	$878,200*** or $913,200 (Plans 2A, 2B)	$1,196,300***

*** Note: All estimates must be adjusted to reflect costs at time of construction.

EVALUATION

In developing the three alternative plans discussed above, the CEFS consultants took full advantage of two favorable features of the existing high school. First, the site is ideal in extent and general topography for any type of expansion desired. Second, the high school building itself is a modern structure offering many up-to-date facilities in its present condition. Therefore no special study was made of the heating, sewage, and electrical systems, as these were assumed to be sufficient to service the additional spaces proposed. Also, the administrative suite and the cafeteria were found to need no change at this time. Expansion of the gymnasium was not recommended either, even though it does not quite meet the recommended standard of 50' x 84' of playing space. Fall Mountain High School has three satisfactory physical education teacher stations.

All plans propose an addition to the academic wing and new construction for the practical arts area, as well as a certain amount of remodeling and reassignment of spaces within the present building. Plans I and III are very similar, with Plan I proposing improvements that are considered essential to relieve pressure and to provide for a future enrollment of approximately 800. Plan III suggests a slightly larger practical arts wing (due to the inclusion of increased locker space for physical education) and a much larger addition to the academic wing (17,300 sq. ft. as compared to 6,600 in Plan I). Under Plan III a room for driver training could be made available, and many other spaces in the present building could be released to provide greatly improved resource areas, including the library reading

room, as well as better facilities for teachers.

Plan II resembles the other two plans in many respects. The recommended academic addition is slightly larger than in Plan I (8,800 sq. ft. instead of 6,600). A similar amount of new space is proposed for the practical arts section as in Plans I and III, only in a separate building. This would provide more flexibility both for present space assignments and for future expansion when necessary. Two alternatives for space distribution are given for the new building.

The comparative table on the next page shows the essential features of all three plans and includes present facilities where applicable.

PLANS I, II, AND III - COMPARATIVE DATA

Item	Plan I	Plan II	Plan III	Existing
Total Cost	$ 861,000	$ 878,000 or 913,200 (2A)	$ 1,196,300	----
Space Added (sq. ft.)	26,600	28,600 or 30,200 (2A)	39,300	----
Academic	(6,600)	(8,800)	(17,300)	
Voc. Educ.	(20,000)	(19,800) or 21,400 - 2A)	(22,000)	
Remodeling Costs	$ 80,000	$ 80,000	$ 90,000	----
New Equipment Cost	115,000	83,000 or 118,000 (2A)	123,800	----
Resource Areas	2	2	2	0
Library Space (sq. ft.)	3,350	3,350	4,200	2,800
Teachers' Workrooms	1	3	3	0
Teacher Stations				
Science	5	5	5	3
English	7	7	7	7
Social Studies	6	6	6	3+
Mathematics	5	5	5	3
Business Education	4	4	4	3
Language	3	3	3	3
Spaces Provided (sq. ft.)				
* Art	3,600	2,300	3,600	1,326
Drafting	2,000	2,200 (2A) 2,000 (2B)	2,000	1,900
* Homemaking	2,600	1,800	2,600	2,340
Power Mechanics	3,500	3,400	3,500	----
General Metals	3,500	3,400	3,500	2,110
Building Trades	3,500	2,900	3,500	1,990
Visual Comm.	2,000	1,500	2,000	----
** Agriculture	--	2,500	----	1,400
* Music	3,000	2,600	3,000	1,250
Locker Rooms Increase	--	--	2,000	----

* The figures given here show the spaces provided for Art, Homemaking, and Music. The number of teacher stations to staff these spaces is left to the discretion of the School Board.

** If it is decided to offer a vocational agriculture course more space is required even for the traditional type of program. Plan II provides this option in terms of space.

CONCLUDING STATEMENTS

CONCLUDING STATEMENTS

This report falls into two main categories: a survey of the elementary facilities in the Fall Mountain School District and an in-depth study of the Fall Mountain Regional High School, with special emphasis on the vocational program.

The elementary survey was of necessity preliminary in nature. An analysis of the present buildings and organization resulted in several recommendations for change to meet present needs and accommodate projected future enrollments. These objectives can be attained to a certain extent by retaining the present attendance areas and constructing additions to existing buildings. A more desirable solution requires the adoption of a long-range plan for the entire district. The CEFS team strongly recommends such a long-range plan be developed, giving consideration to natural attendance areas and the best use of existing school facilities. The actual consolidation does not have to be accomplished with instant and sweeping reorganization but the plan, if it is adopted, will avoid short-sighted responses which could prove inflexible and wasteful.

In the high school study extensive field work was carried out by the consultants on which to base their recommendations for improvement of the vocational education program. In the course of the research the areas in need of change were identified and the concept of natural groupings or clusters was developed as being preferable to the conventionally rigid structure. Flexibility and adaptability to change were found to be the essential features for a successful vocational program, and the space studies which accompany the alternative plans

provide for these elements. In general, the consultants recommend that the academic facilities be expanded to relieve existing pressure areas and to accommodate projected higher enrollments. With regard to vocational education, new and improved spaces are proposed which may be adapted to any type of program determined by the School Board and administrators of the district. Special consideration should be given to the subject of the vocational agricultural program. It is suggested that the traditional type of offering be expanded to include other related fields such as conservation, distribution, land engineering, etc. Acceptance and implementation of the cluster concept would provide an excellent foundation for a training program that would truly meet the requirements of the agricultural student.

APPENDIX

APPENDIX A

FACULTY SURVEY ON CURRICULUM STAFF AND SPACE NEEDS

1. How many teachers are in your department? _____

2. List the courses offered in your department and approximate number of students enrolled in each course.

3. Does your department have interest in intradepartmental team teaching or in interdepartmental-interdisciplinary team teaching and planning? If so, describe briefly.

4. For your present program and present enrollments:

   A. Does your department need more teachers? _____
      If so, how many? _____

   B. More rooms? _____
      How many and what kind?

C. Teacher office and/or work space? _____
If so, describe (including any desired sharing with other departments.)

D. Other needed facilities?

5. If you were to change your present program to make it what your department thinks it should be .....

A. What courses would you eliminate?

B. What courses would you add? (Indicate number sections and number of additional teachers required.)

C. What kind of additional facilities would be required? (Classrooms, large group areas, small group areas, labs, etc.)

6. Would members of your department like to separate the 7th and 8th grade from the high school?

   If so, how would this affect the needs listed in questions 4 and 5?

7. What is the attitude of your department towards study halls, student free time, and independent study? Would your positions on these matters require any special facilities or scheduling? Describe:

8. What kind of library resource center(s) would your department like to see and how would you like to have it used?

9. Is the present schedule satisfactory? _____

   If not, how would you like to change it? (use activity period for classes, shorten periods, add one period to the day, move to modular, flexible scheduling, etc?

10. List, in order of priority, the areas of curriculum you think are in greatest need of change in the whole school.

APPENDIX B

COOPERATIVE EDUCATION 1969-1970

Cooperative education is a program for students who are enrolled in a school and who through a cooperative arrangement between the school and employers, receive part-time vocational instruction in the school and on-the-job training through part-time employment. It provides for alternation of study in school with a job in industry or business, the two experiences being planned and supervised by the school and employer so that each contributes definitely to the student's development in his chosen profession or occupation. Work periods and school attendance may be on alternate days, weeks, or other periods of time; but the hours at work are during the school day and equal or exceed the hours spent in school during the regular school year.

The major purpose of this program is to encourage students to continue their education, acquire work experience, and to obtain a high school diploma.

Students participating in this program attend school in the morning; in the afternoon, they are employed in the community at not less than current minimum wages.

The student who is enrolled in this program

(1) must meet the regulations of the school regarding the program,
(2) will be graded four times a year by the employer on the quality of his work.

If a student wishes to participate in the program, the first step is to obtain parental consent. If the parent agrees that it is in the best interest of the student, he is enrolled in the program for the school year.

SUBJECT: Occupational Survey

Dear Employer:

The local School Study Committee is making an effort to sample the thinking of local employers relative to the existing program at Kennett High School.

Enclosed is an Occupational Inquiry Form which has been prepared to assist the Committee in this attempt to gain insights into ways in which the employers and the school can work closely together to provide the kinds of educational experiences that will better prepare the student for employment.

Will you please take a few moments to think about the items listed on this form and jot down your reactions? Within a few days, a representative from the Committee will contact you personally about this form and discuss it with you.

Thank you very much for your cooperation in this important matter.

FOR THE COMMITTEE

Enclosures

OCCUPATIONAL SURVEY

Name of Concern _____

Address _____ Tel. No. _____

Name of Person Interviewed _____

Title of Person Interviewed _____

1. Nature or Type of Firm, Industry, or Business:

   _____

2. Maximum Number Employed: Men _____ Women _____

3. List Payroll Jobs Available:

Position	Min. Age	Qualifications

4. Are you able to employ those who may be handicapped?

   ( ) Physical ( ) Mental

5. What kinds of information would you like to know from the schools about prospective employees?

   _____

   _____

   _____

   _____

OCCUPATIONAL SURVEY

Name of Concern _____

6. What do you believe the schools can do to better serve the employers in this area?

   Subject matter content _____

   _____

   Development of skills _____

   _____

   Development of attitudes _____

   _____

   Other _____

   _____

7. What is the nature and extent of training given by the employer?

   _____

   _____

8. To what extent has it been necessary for you to recruit labor outside local sources?

   _____

   _____

9. What kinds of jobs do you find the hardest to fill?

   _____

   _____

OCCUPATIONAL SURVEY

Name of Concern_____

10. What interest do you have in a Cooperative Educational Program wherein the students will work during part of the school day in on-the-job training with pay?

( ) Very much interested

( ) Would like to know more about how it actually works

( ) Not interested

11. General Comments:

SURVEY OF INDUSTRIES

INDUSTRIES VISITED IN FALL MT. AREA

	LOCATION	INDUSTRY	PRODUCT
N. H.			
	Charlestown	Keil Lock Co.	Locks
	Claremont	Dartmouth Woolen	Cloth
		Joy Mfg. Co.	Heavy Machinery
		Topstone Furniture	Furniture
		I. G. A.	Services
		Grand Union	"
		Merit Clothing	"
		Queen Shop	"
		Pleasant Restaurant	"
		Grants	"
	Hanover	Mary Hitchcock Hospital	"
		Trumbull-Nelson	Construction
	Keene	American Optical	Lenses
		Central Screw	Steel Prod.
		Kingsbury Mach. Tool	Machines
		Markham Corp.	Steel Prod.
		Miniature Precision	Bearings
		Sprague & Carleton	Furniture
Vt.			
	Bellows Falls	Mountain Paper	Paper
		Robertson Paper	"
	Brattleboro	Agway Inc.	Service
		American Optical	Lenses
		Book Press	Book Binding
		Loney, H. Construction	Construction
		Margolin H. & Co.	Leather Prod.
		Vermont Printing	Printing
	Springfield	Bryant Grinder	Machines
		Fellows Gear Shaper	"
		Jones & Lamson	"
		Springfield Printing	Printing
		Wiggins-Blders. Supplies	Const.

APPENDIX C

CURRENT STUDENTS (CS)
Class of 1970

FORMER STUDENTS (FS)
Class of 1969

1. Are (were) you interested in the subjects you take (took) in high school?

C.S.		F.S.
7%	Extremely Interested	4%
32%	Very Interested	34%
50%	Somewhat Interested	50%
10%	Very Little Interested	12%
1%	No Interest At All	0%

2. Do you feel your H. S. subjects help (helped) you to prepare for your future job (job you now hold)?

13%	Extremely Helpful	9%
21%	Very Helpful	20%
31%	Helpful	30%
31%	Somewhat Helpful	28%
4%	No Help At All	13%

3. Are (were) your homework assignments related to the job you would like (currently hold)?

2%	Highly Related	5%
7%	Very Related	15%
28%	Related	15%
32%	Somewhat Related	28%
31%	Not Related At All	37%

4. Do (did) after school activities in H. S. prepare you for the job you would like to have (currently hold)?

9%	A Great Deal	8%
12%	Quite A Bit	15%
17%	Little	15%
22%	Very Little	13%
40%	Not At All	49%

5. Do (did) after school activities outside of school prepare you for the job you would like (currently hold)?

14%	A Great Deal	6%
18%	Quite A Bit	28%
23%	Little	19%
19%	Very Little	15%
26%	Not At All	32%

6. Do (did) you feel that your teachers are (were) interested in your future job plans?

6%	Extremely Interested	10%
18%	Very Interested	20%
41%	Somewhat Interested	39%
23%	Very Little Interested	27%
12%	No Interest At All	4%

7. How much effort do (did) you put into your homework?

9%	As Much Effort As Possible	11%
20%	A Great Deal Of Effort	8%
62%	An Average Amount of Effort	62%
9%	Little Effort	19%
0%	No Effort At All	0%

8. Do you feel that the subjects you study (studied) in H. S. bring out your abilities?

9%	Very Well	7%
25%	Quite A Bit	26%
51%	Somewhat	50%
11%	Very Little	11%
4%	Not At All	6%

9. Would you show (have shown) more of your ability if your schoolwork were (had been) preparing you for a job?

22%	A Great Deal More	22%
46%	Quite A Bit More	25%
26%	About The Same	41%
4%	Very Little More Would Show	4%
2%	No Additional Ability Would Show	8%

10. Do you feel that school would be (would have been) more helpful to you if you could (could have) attend (attended) school from about 8 a.m. to 12 Noon and work (worked), from 1 p.m. to 5 p.m., at a school supervised job which is (was) useful and enables (enabled) you to earn money?

59%	Extremely helpful	32%
19%	Very Helpful	28%
7%	Helpful	13%
7%	Somewhat helpful	17%
8%	Not Helpful	10%

RESULTS OF SURVEY

1. 39% current students +38% of former students extremely or very interested in H. S. subjects.

2. 65% of current students + 59% of former students felt school subjects were extremely helpful, very helpful or helpful in preparing them for future job.

3. 37% of current students + 35% of former students feel homework is highly related, very related or related to their job plans or job.

4. 79% of current students + 77% of former students felt that in school after school activities had little, very little, or no relationship to their future job aspirations.

5. 68% of current students + 66% of former students felt that outside activities while in school had little, very little, or no relationship to future job aspirations.

6. 24% of current students + 30% of former students said their teachers were extremely interested or very interested in their future. 35% of current students + 31% of former students indicated their teachers had very little or no interest.

7. 29% of current students + 19% of former students indicated that they put a great deal of effort or as much effort as possible into their schoolwork.

8. 34% of current students + 33% of former students felt their subjects in H. S. brought out their abilities very well or quite a bit.

9. 68% of current students + 47% of former students felt that they would have shown a great deal more, or quite a bit more, of their ability if their schoolwork were preparing them for a job.

10. 78% of current students and 60% of former students feel that a work study program* would be extremely helpful or very helpful.

* A work study program would enable certain students to attend school from 8 a.m. to 12 Noon.

APPENDIX D

SUMMARY OF HIGH SCHOOL VOCATIONAL PROGRAMS IN FALL MOUNTAIN AREA

COURSE OFFERED	SCHOOL
Vocational Agriculture	Fall Mountain Brattleboro
Distributive Education	Claremont Brattleboro Bellows Falls Springfield
Quantity Foods	Keene Springfield
Machine Shop	Fall Mountain Keene Bellows Falls Springfield Windsor
Auto Mechanics	Springfield Bellows Falls Newport
Building Trades	Springfield Bellows Falls Brattleboro
Comprehensive Clerical & Secretarial	Claremont Keene Newport Brattleboro Bellows Falls Springfield Windsor Fall Mountain

Cooperative Work Study

Distributive Education	Claremont
Machine Shop	Keene Springfield
Office Occupations	Keene
Auto Mechanics	Newport (Planned for 1970-71)

VT 014 448
AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT.

CALIFORNIA COMMUNITY COLLEGES, SACRAMENTO.
OFFICE OF EDUCATION (DHEW), WASHINGTON, D.C.
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IDENTIFIERS - *CALIFORNIA

ABSTRACT - DURING 1967, THE NEED FOR A SOCIAL SERVICE TECHNICIAN PROGRAM WAS EXAMINED AND IT WAS DECIDED TO ESTABLISH THIS NEW PROGRAM IN THE COMMUNITY COLLEGES. THIS REPORT IS FOR THE PURPOSE OF DESCRIBING THE DEVELOPMENTS THAT HAVE OCCURRED IN CALIFORNIA CONCERNING THE ESTABLISHMENT AND IMPLEMENTATION OF THE PROGRAMS. AS OF MARCH, 1971, 15 COMMUNITY COLLEGES, SEVEN STATE COLLEGES, TWO UNIVERSITIES OF CALIFORNIA, UNIVERSITY EXTENSION DIVISION, AND EIGHT PRIVATE COLLEGES AND UNIVERSITIES OFFERED UNDERGRADUATE PROGRAMS RELATED TO SOCIAL WORK EDUCATION. SOME FINDINGS OF THE AD-HOC COMMITTEE WERE THAT: (1) TRADITIONAL EDUCATION AND TRAINING FOR SOCIAL SERVICES, AT ALL LEVELS, HAS GENERALLY NOT CONCENTRATED UPON THE TASKS THAT THE STUDENTS HAVE FOUND REQUIRED OF THEM IN AGENCIES, (2) STUDENTS FIND TRANSFERRING FROM THE 2-YEAR PROGRAM TO A 4-YEAR PROGRAM DIFFICULT, (3) THE STRUCTURE FOR HIGHER EDUCATION TENDS TO BE INFLEXIBLE BY ATTEMPTING TO ACCOMMODATE LARGE NUMBERS OF STUDENTS IN A VARIETY OF PROGRAMS, AND (4) WITHIN GIVEN ORGANIZATIONS, JOB MOBILITY FOR THE NEW WORKERS IN THE HUMAN SERVICES WITHOUT ACCEPTABLE POST-SECONDARY EDUCATION IS BLOCKED. (AUTHOR/GEB)

VT 014 448

AD HOC COMMITTEE ON PUBLIC SERVICES--SOCIAL WORK EDUCATION OF THE ARTICULATION CONFERENCE REPORT

May 10, 1971

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
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INTRODUCTION

The purpose of this document is to report to the Administrative Committee of the California Articulation Conference the developments that have occurred in this State concerning the establishment and implementation of Community College programs to train persons for jobs in social service agencies; the problems and issues concerning articulation of programs between the segments of higher education; and the recommendations of the Ad Hoc Committee on Public Services-Social Work Education, established May 19, 1970.

Section I: Background

A. Planning Phase

During February, 1967, the potential for a Social Service Technician program was explored as a public service program for the California Community Colleges. A Statewide advisory committee representing such agencies as: Corrections, Social Welfare, and Mental Health plus the State Personnel Board, and Community and State Colleges was called by the Community College State Staff to determine if there was a need for an Associate of Arts degree program to train persons for entry level jobs in service delivery agencies.

The committee agreed there was a dramatic evolution occurring in the social services and the need for social service personnel. The demand from society for more services from all the agencies was increasing. The United States Congress was responding by increased legislation related to the broad area of social welfare. Local jurisdictions were following suit. All of the bills called for additional social work manpower that resulted in a "responsibility explosion" for social work education.

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After discussion of agency structure and job analysis of various personnel, the committee agreed there was a job for a person trained at the Associate level of education. A review of the commonality of various services offered by the agencies resulted in the development of a "core" of courses that included knowledge and skills general enough to train persons for employment in any of the agencies. Agencies had, in the past, the entire responsibility for training personnel with no professional education, and in most cases, had neither the time nor sufficient training staff to do the job adequately. Therefore, this new program in the community colleges should result in developing personnel capable of performing many needed services within agencies.

In order to augment the consensus of the committee, the State Staff central office for Community Colleges completed a study of agency need for personnel and suggested areas of training throughout the State. The findings suggested a program design that paralleled the recommendations of the advisory committee. Therefore, as a result three regional meetings were held at community colleges. The purpose of the meetings was to bring together representative personnel who were in positions influencing the immediate and long-range developments in public agency programs to plan more effective utilization of agency resources, personnel, and services. In 1968 the meetings were held at Chabot College, Hayward; Merced College, Merced; and El Camino College, Torrance. The results of the meetings indicated interest in implementation of programs at community colleges plus a need to establish some continuity in program standards for each college to adopt. The 1969 local District Plans for Vocational Education reported fourteen Social Service Technician type programs in operation.

The Council on Social Work Education, the professional organi ation for accrediting undergraduate programs in social welfare graduate schools of social work and setting membership standards for four-year institutions, became interested in the community college movement. They published Community College and Other Associate Degree Programs for Social Welfare Areas, D. Feldstein, CSWE, New York, 1968. In it is reference to a report by the Committee of Deans of Schools of Social Work in New York State, 1967, "in addition to increasing graduate enrollment, schools of social work must assume some responsibility for the development of a continuum of education in social welfare, and must assert leadership in aiding local community colleges in the development of a continuum of education in social welfare, and must assert leadership in aiding local community colleges in the development of such a continuum."

The California Deans of the Schools of Social Work have indicated their support in "the development of educational programs in the California Community Colleges to prepare social service technicians as part of the movement to develop new career opportunities and to articulate such education with four-year bachelor's degree programs in social welfare." (See Appendix for letter.)

The Council on Social Work Education, in 1969, established an Ad Hoc Committee to study guidelines for an associate degree program in the social services. The Public Service Consultant from California was on that committee. The resultant publication was, The Community Services Technician Guide for Associate Degree Programs in the Community and Social Services, CSWE, New York, 1970. The position of the CSWE is clearly stated in the following:

"Systematic planning for Linkages must occur from the 'bottom up'..... the AA programs should be determined only by what is educationally sound and feasible; and that which is educationally sound and feasible rests solely on what is learnable by the AA student. It follows logically, then, that the responsibility on higher levels of education is to build from this point upward."[1]

The American Association of Junior Colleges sponsored three regional meetings in 1970, in Chicago, Philadelphia, and Los Angeles. The purpose of the meeting was to discuss the CSWE guidelines and determine how they could best be implemented at the community colleges across the nation. Over 100 representatives from social service agencies, community colleges and state colleges attended the Los Angeles meeting. The 1970 California District Plans for Vocational Education reported fifteen programs and 1700 persons being trained.

That same year the Consultant in Public Service programs was requested by the U. S. Office of Education to serve as project director to write comprehensive guidelines and course content for the development of such programs. Concurrently with this action the Administrative Committee of the Articulation Conference granted formation of the Ad Hoc Committee on Public Services-Social Work Education, of the Articulation Conference. (See Appendix for both lists of committee members.)

B. Description of Current Programs

To gain a better understanding of the problems and issues concerning the need for discussion and articulation between the segments of higher education the following overview of the various types of programs at the different levels of education is offered.

As of March, 1971, fifteen Community Colleges, seven State Colleges, two University of California, University Extension Division, and

[1]Marylyn Gore, "Two Goes Into Four: Linkages Between Two and Four-Year College Programs in Social Welfare" Special Report, CSWE.

eight private colleges and universities offered undergraduate programs related to social work education. Five additional Community Colleges expect to have such programs beginning the Fall of 1971.

1. Community Colleges

The Community College programs differ somewhat in content and orientation throughout the State. Much of the difference stems from the philosophy of the department in which they are housed and from the educational and occupational background of the faculty. Even though programs may be centered in the department of sociology, one school reports a faculty member has occupational experiences in corrections whereas another college reports their faculty has occupational experience from social welfare. Another college offers their program through the department of psychology and the instructor had previous experiences as a marriage counselor. Still another college designed their program for new careerists in all public service agencies, while another college trains only welfare aides. It has been only since the Vocational Act Amendments of 1968, Public Law 90-575, included Title IX-Education for the Public Service, that these programs have been considered vocational in nature. By and large, they were considered transfer in nature and there were no courses designed specifically as training for an entry level job in the social services. Today, emphasis in many colleges is still on the tranfer nature, thus courses are designated as Psychology 50 or Sociology 56, etc., rather than Social Services I or Social Services II, etc. The specific designation would give the program identification and clarify its status as a career program. Also, the program would gain recognition with four-year educators. They would be assured the course content was educationally sound and definitely related to the "building blocks" in the philosophy, the goals, and the values of social work education.

Therefore, transfer with recognition of credits into the School of Social Work could be more easily accomplished.

Nearly all committee representatives and faculty have agreed that early contact with the field is part of the foundation, and is appropriate for lower division students. The initial supervised field instruction and work experience is offered on all Community College campuses. The responsibility for this experience is accepted by the college. The faculty, agency supervisor, and student usually meet to design a sequence of on-the-job educational experiences that correlate with the classroom theory. If a student is to make a decision to follow a career in the social services, an early "testing" is necessary prior to making a commitment.

The key element, however, is the nontransferability of designated courses toward the major. This was stated most succinctly by Horace Crandell in his report of Early Childhood Development Programs to the Coordinating Council for Higher Education, January 1971.

> In nearly every research study of the academic success of vocational students transferring to four-year institutions, two findings have been reported: (1) These students did as well academically as the native students who entered the college as freshmen, and as well academically as students who had completed the Community College transfer program; (2) The most accurate predictor of upper division grade-point-average and persistency to graduation was the cumulative grade-point-average earned in the Community College. The authors of these various research studies concluded that the vocational, practical student is highly motivated to succeed in acquiring the bachelor's degree. However, being practical he sets his sights on more immediate goals initially--that of achieving associate degree in a job-oriented field. At least with this background behind him, he may be prepared to enter the job market. At the same time he has tested himself in the academic world. Armed with the security of occupational training and the knowledge that he has held his own academically with students in the transfer program in their common core of liberal arts courses, the vocational student feels ready to challenge the next hurdle--upper division study leading to the baccalaureate degree.

The point made by researchers and by Community College faculty interviewed in this study is that although there are vocational career and transfer associate degree programs, there are no terminal or transfer students. This being the case, although one program may appear to more appropriately prepare a student for either immediate employment or continued study, the student who has succeeded in completing a two-year associate degree program at the Community College with relative academic success should be allowed maximum transfer of credits to the four-year institution. Ideally, only one-half of his baccalaureate degree requirements would lie ahead. This is not the case at present in California. Although a student may now find most or even all of his Community College credits accepted by the senior institution, he finds he must take additional credits beyond those taken by native students to complete the degree. In some cases, he may be required to take courses in his major very similar in title and content to courses he has already completed at the Community College, and at times these courses may even use the same text.

The State Colleges

Heretofore, the State Colleges have offered few specific courses, other than "Social Welfare as a Social Institution" and "Community Service Agencies" in the lower division. There has been a trend, however, over the last five years, to restructure the BA and the MSW programs. San Diego State is now offering what was traditionally the first year of the two year MSW program, in the upper division years. With an additional twelve months of study he may complete requirements for the master's degree in social work.

Other colleges are following this same trend. CSWE has relaxed their previous requirements of two years following the BA allowing for variations in combining undergraduate/graduate programs. Discussion, however, centers around the possibility of offering a more comprehensive program in the lower division, corresponding to the Community College Social Service program. This would give all students, those from Community Colleges as well as those entering the four year school as a freshman, a change to test their career choice at the earlier level. In addition, the two year student would be educated and trained to qualify for a job, or "stop-out" before

continuing his education to attain a higher degree. Plus, ultimately, with the restructuring of the entire program, making each level of education relevant to the type of job to be done: the AA graduate would primarily be the entry level and perform direct service functions; the BA graduate would primarily perform entry-level supervisorial and administrative or clinical functions; the MSW graduate would perform middle-management and executive roles; i.e., teacher, program specialist, and advanced clinical practitioner, etc.; and the holder of the doctorate would be researcher, consultant, program policy developer, etc. (see Appendix "Summary of Levels of Social Service Workers").

University Programs

Although only the graduate program in social work education is available, the lower/upper baccalaureate division dichotomy is not as pronounced or restrictive at the University of Southern California as it is in the State College system. All courses transferred from the Community Colleges that are deemed by the Admissions Officer to have "substantative content" are accepted. There is no "line" or required number of courses that must be designated either lower or upper division. Courses that do not "match" traditional courses may be considered elective credit and apply either toward the lower or the upper division elective credit. In addition, if a Community College course is considered by the department chairman to be parallel to the USC major, the requirement to take it is waived. In any case, the student finishes with the traditional number of units for graduation. Many times, in the State College system, a student cannot use all of his units (toward elective or major credit) but still has a required number to complete for his upper

division work. Thus, he will finish with many more units than are actually needed for graduation.

The University of California offers no specific lower division course work toward the social work education major and little upper division or undergraduate work. They specialize in graduate education. However, the Extension program offers professional credit courses that, on analysis, closely relate to the Community College program. Off-campus and/or part-time campus credit classes have been sporadic in development and have been geared primarily to specific needs of smaller groups in restricted geographic areas. Other than Community College lower division education there are few opportunities for continuing education for the currently employed human services worker seeking either advancement on the job or more advanced education to increase his knowledge and skill. Community College and extension programs could cooperate in offering programs that would be recognized for professional and/or academic credit. In addition, extension schools should be encouraged to offer teacher training programs to train agency personnel, who have years of occupational experiences but no expertise in teaching, as part-time faculty and field supervisors for the Associate degree programs.

Section II: Description of the New Community College "Core" Program

Interdisciplinary or "Team Approach"

The Community College programe which train persons for the social services, should be designed as a cooperative approach to education. Although the coordinator of the program may hold a faculty appointment in the sociology or psychology department, this person may work with faculty from the departments of economics, home economics, business, English, and foreign languates, etc. The Community College program has been designed to be a broad generic program with options for the student's last semester to be in correctional science,

early childhood education, social welfare, mental health, or gerontology. In some colleges broad designation has been stated as "The Human Services Curricula."

Five suggested courses in the core curriculum are:

Helping Services--How People Help People

Introductory course which locates social welfare and the helping services in their key role in modern society, outlining their many aspects, giving a first overview of the multifold programs and activities.

Problems and Issues for the Helping Services

A general education course: an introductory course identifying the problems, issues, and concerns of modern living to which social welfare and the helping professions address themselves; specifies the value base on which social welfare programs are built, with a beginning look at the knowledge, skills, and abilities as well as the ethical elements of the helping professions.

Human Development and the Social Environment

Analysis of the human developmental stages and behaviors associated with the stage, and the way the social environment impedes or helps this development. Examples of disruptive influences on human development and the way human service occupations develop systems and services to minimize these disruptive influences.

Person-to-Person Relationships

A basic course in communication skills and interactions between persons. Includes verbal and non-verbal communication, influence of conflicting or little understood cultures on communication, and practice in the skills of interviewing and reporting. Emphasizes causes for and prevention of breakdowns in communication and ways to achieve satisfactory interactions between persons.

Group Leadership and Social Change

Deals with membership in and leadership of various kinds of groups with emphasis upon the group process. Considers the necessity for social change and the goals and strategies, and importance of value systems in human relationships. Observation of or participation in groups dealing with social change.

Many of the Associate degree level jobs are related to the ability to speak another language. Therefore, students are encouraged to gain communication skills in Spanish if they desire to work in New York among the Puerto Ricans or in California with the Mexican-Americans; or French if they desire work near Canada or near the Gulf.

Although these special courses should be designed cooperatively by those persons active and knowledgeable in the various fields mentioned, the synthesizer in this amalgam called "human services" should be the social work educator--the person concerned with the many-faceted aspects of the lives of human beings on both the material and social levels. College administrators should encourage this interdisciplinary approach to education, as opposed to interdepartmental proliferation of courses.

Cooperation and coordination of effort is not only important at the individual campus level but is equally important between Community Colleges. Students should be assured that the quality of education on one Community College campus equals the quality of education on another. Although this should be true for all of the educational experiences it is very necessary for the program to train persons for the social services. The program is designed to emphasize the basic "building blocks," the philosophy, the goals, the values of social work education. If these are not presented to the student in a uniform and acceptable program, the articulation with the school

of social work baccalaureate program would remain as it is now, on an individual negotiated basis. Therefore, the Community Colleges must be recognized as equal partners with the State College and the University in determining the content of the human/social service program and the sequence of learning experiences within that program. The Associate degree person is now performing tasks that have revealed again and again the exemplary training now offered by some Community College programs. The four-year colleges should build upon this base rather than make a student needlessly repeat courses. This repetition is a waste of both student time and taxpayer money.

Section III: Summary

A review and revision of the BA and MSW social work education programs, to build on the AA program, may seem revolutionary. However, there must be a more effective use made of highly qualified personnel. This, in turn, will create opportunities for additional personnel who have not heretofore been utilized. The focus of attention on training persons for designated levels of work will result in a more effective use of people rather than solely on efforts to increase their supply. Social service agencies will then be able to more efficiently serve the needs of society. The profession of social work will then attract persons who have aspirations to dedicate themselves to serve humanity.

The Ad Hoc Committee finds:

1. More and more of the population are clustering in fewer and larger urban settings. This diversity of cultures and races has produced an increasing urban crises situation. The result is a need for a wider and more unique utilization of services given by social service agencies. In order to provide the many services now demanded by this growing population there is a need for people with different skills and levels of training. Agencies faced with expanded interest and demand for additional and more comprehensive services are constantly seeking replacements as well as new technical and professional personnel.
2. Traditional education and training for social services, at all levels, has generally not concentrated upon the tasks that the students have found required of them in the agencies. Studies suggest that MSW graduates who enter administrative roles within two years of graduation feel their college training had not adequately prepared them for the job requirements. San Diego State School of Social Work reports 80% of their MSW graduates are in Middle-Management positions within two years and do not feel adequately prepared. Therefore, education and

training should be designed in a sequence of graduated experiences that are directly related to the type of job the graduate will be doing. This sequence should then be correlated with the various levels of higher education.

3. There has been an inexorable and burgeoning movement in the past ten years for minority persons to seek admission into higher education. These persons have had life experiences that acquaint them with human needs and social crisis but without translation into educational theory. College programs lack relevance or meaning to them.

4. Although many students elect to enter the Community College career program to train for a job in the human services they find that later transfer into the four year program may be difficult. Those who do continue their education are required to study courses in the Bachelor of Arts social work sequence which are in many instances repetitious at best, and at worst, irrelevant to the tasks that their new career roles require of them.

5. A wide variety of community programs, for instance, mental health, corrections, among others, are employing individuals with Associate of Arts degrees in Social Service to fulfill responsibilities such as identifying persons needing help, providing services to these persons, or assisting communities in launching new services.

6. The political and institutional turbulence generated by the inconsistencies of the present systems has produced a heavy demand for persons having:

   a. A broad knowledge and understanding of problems of human development, social environment, and the respective abilities of various professional contributions; and

   b. Capacity and skill to analyze, evaluate, design, and structure framework to provide the greatest possible results from the investment.

7. Title 5, California Administrative Code, Section 51602, states that California Community Colleges are required to offer majors that have a minimum of 20 semester units. Although the courses in the social services programs are similar since the primary goal is to train a person for employment at the paraprofessional or associate level in a social service agency, there has been no standard or guidelines for their design. The U. S. Office of Education, however, has asked the Office of the Chancellor, California Community Colleges, to write guidelines and course content for such a post-secondary program. These guidelines are to be distributed nationally after July, 1971. Consultants on the advisory committee have used the social work values and philosophy as the basic design for the course content. It is their hope that this document will be a model for all Community College programs of this nature and will be recognized as the "building blocks" of education for social work. Therefore, the four year colleges should accept these courses for transfer credit in the professional major.

8. The structure for higher education tends to be inflexible by attempting to accommodate large numbers of students in a variety of programs. Individual students have not been fully recognized for their special skills and knowledges they may bring on entry into a given collegiate program. Thus, as a result of close adherence to arbitrary numbers of course requirements and specific prerequisites, all students are treated alike regardless of their past achievements and experiences. The schools and departments of social work in California's four-year colleges and universities are urged to begin review at once of their baccalaureate and master's degree programs so that they may be readjusted to the present and future needs of students who will enter supervisorial level employment, be active in the development of social service

policies and planning, and in applied research and developmental programs. Curriculum reviews should take particular note of the developing community college programs and consider the core curriculum of these programs as the basis upon which to build baccalaureate and a graduate professional curricula. Curriculum redefinition should include: 1) the logical progression and continuity of student movement from one level of education to the next; 2) supervised work experience of progressive levels of sophistication; and 3) a curriculum designed to reduce repetition of course and work experience already gained at the lower level and through on-the-job experience.

9. Within given organizations, agencies, or programs, lateral or vertical job mobility for the new worker in the human services without acceptable post-secondary education is blocked. Similarly, transferability from one field of human services to another is impeded by lack of an acceptable, recognized core curriculum applicable to all untrained workers in human services. This deficiency seriously impedes implementation of the career lattice concept and contributes toward ineffective utilization of manpower in the human services.

Section IV: Recommendations

1. The California Community Colleges, in offering programs for the training of persons for employment in the social services, should include a common core of 15 semester units in the major. These courses should be designed according to the U. S. Office of Education Guidelines outlining the basic philosophy, values, and goals of social work education. Appropriate titles would be (titles may vary):

	Units
The Helping Services--How People Help People	3
Problems and Issues for the Helping Services	3
Human Development and the Social Environment	3
Person-to-Person Relationships	3
Group Leadership and Social Change	3

The related field instruction should be an experiential type of learning that enhances the quality of instruction and is related to the educational objectives of social work.

2. The California Community Colleges and the State Colleges should be encouraged to recognize the uniqueness some students bring to the program from their particular cultural background. The uniqueness of these cultures should be utilized and built upon in shaping the content of any of the courses in the human/social services/social work education.
3. The Deans of the Schools of Social Work Education and the California Community Colleges in consultation with the Council on Social Work Education, should immediately begin to review and revise the curriculum. The revision should result in a continuum of education and training that begins at the Associate level and continues through the baccalaureate, master, and doctoral programs. The courses should begin upon, and not duplicate, the courses brought by the student to each level of education. Thus, each level of program should expand upon, give depth to, and make more sophisticated the philosophy, principles and skills of social work education. This continuum of education and training should relate the classroom learning to on-the-job tasks and experiences expected of the graduate of each level of education.
4. Until such time as the baccalaureate curriculum is fully reexamined and redefined, the schools and departments of social work in the four-year institutions should recognize work completed by community college transfers in the above mentioned core curriculum for the social/human services. Such recognition should include appropriate advanced placement and credit within the upper division major.
5. The Deans of Social Work Education of the State Colleges should be encouraged to grant credit toward the major courses, <u>in addition to the core curriculum</u> of the community colleges, considered equivalent in

intent, structure, and content to comparable courses in the baccalaureate program. These courses should be credited through negotiation and agreement between the student and his social work major advisor, with "flexibility" as the key to the agreement.

6. The Trustees of the California State Colleges and the Regents of the University of California should encourage the schools of social work education to grant credit for work experience by examination and other ways of recognizing special achievements of students transferring from the Associate program. This recommendation is consistent with proposals now being considered nationally.

7. The Trustees of the California State College and the Regents of the University should study the feasibility of conferring the bachelor's degree for courses taken through extension credit. Coordination of community college and extension programs should be encouraged so that, where applicable, they will parallel in content and both receive recognition as valid lower division work toward a baccalaureate major in social work education. In addition, the four-year institution should develop teacher training programs for part-time agency personnel to learn teaching methodology and full-time community college faculty to upgrade their skills in cooperation with community college administration.

Section V: Future Committee Structure

Resolved, that the present Ad Hoc Committee on Public Services--Social Work Education become a Standing Committee of the Articulation Conference for the purpose of drafting recommendations to continue study of the articulation of the major course work of social work education based on the Associate program as the lower division or foundation for a career ladder.

U. S. OFFICE OF EDUCATION, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Washington, D. C.

Special Project: Social Service Associate: A Post-Secondary Education and Training Program

Advisory Committee

Project Director

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Leonard Romney, Rockin Community College, Suffern, New York
F. J. Rosati, Chief, Merit Systems Division, California State Personnel Board, Sacramento, California

APPENDIX

4062

STATE OF CALIFORNIA

FRESNO STATE COLLEGE

FRESNO, CALIFORNIA 93726

School of Social Work

January 15, 1969

The Chancellor
California Community Colleges
1507 - 21st Street
Midtown Building
Sacramento, California

Dear Sir:

The deans of the California schools of social work met with Mrs. Mary DeNure, Consultant on Public Service Occupations, California Community Colleges, in Sacramento on November 27, 1968. A significant part of this meeting was given over to a report by Mrs. DeNure on developments in the direction of training programs for Social Service Technicians in the California Community Colleges. The deans were most interested in the program and its likely future development. We, therefore, wish to offer the following statement of support for your consideration.

The deans of the California schools of social wish to express their interest in and support of the development of educational programs in the California Community Colleges to prepare social service technicians as part of the movement to develop new career opportunities and to articulate such education with four year bachelor's degree programs in social welfare. Additionally, the deans wish to indicate their concern for the development of academically sound programs taught by appropriately qualified instructors. We are willing to offer our assistance collectively, or individually at local levels, in the establishment and maintenance of such programs and in helping to meet the faculty needed for these new programs which, among other things, could entail cooperative arrangements with our graduate program.

Sincerely yours,

Thomas M. Brigham

Thomas M. Brigham, Dean
School of Social Work

TMB:ap

Other California Deans of Schools of Social Work:
Dr. Kermit T. Wiltse, University of California, Berkeley
Dr. Nathan E. Cohen, University of California, Los Angeles
Dr. Maurice Hamovitch, University of Southern California, Los Angeles
Mr. Francis P. Purcell, San Francisco State College
Dr. Alan D. Wade, Sacramento State College
Dr. Ernest F. Witte, San Diego State College

cc: Mary DeNure

LIAISON COMMITTEE ON Public Services--Social Work Education

ATTENDANCE RECORD OF MEMBERS AT 1970-71 MEETINGS
Academic Year

Attendance - (X = Present. If represented by alternate, indicate with an X and asterisk.)

Name of Member	Meetings		
	Date: 11-6-70	Date: 1-15-71	Date: 3-26/28-71
High School Representatives			
Junior College Representatives			
Ruth Macfarlane, Pasadena City	X	X	
Will Solomon, American River	X	X	X
Max Sheanin, Los Angeles City		X	
Mary DeNure, Community Colleges	X	X	X
State College Representatives			
Barbara Varley, Fresno State	X		X
Ann Pilcher, San Diego State	X	X	X
Jack Wedemeyer, Sacramento State	X	X	X
John Houk, The Calif. State Colleges			Jack Smart (X)

Attendance Record of Members of Liaison Committees (continued) page 2

Name of Members	Meetings Date: 11-6-70	Date: 1-15-71	Date: 3-26/28-71
University of California Representatives			
Milton Chernin, UCB	X	X	Eleanor Lukins (X)
Charles Collins, UCB			
Harry Kitano, UCLA		X	
Frederick Kintzer, UCLA	X	X	
Independent College Representatives			
Rhoda Sarnat, USC		X	
Agency Representatives			
Names of Official Alternates			
Names of Guests			
Harold Simmons, SDSW		X	
Jack Bloedorn, Technical Assts. and Planning Association		X	
Harriet Kelley, Office of Educ.		X	
Mike Arnold, Inst for Local Self Government	X		
Jess Macias, St. Personnel Bd.	X		
Lou Quint, American River	X		

4065

CHART
SUMMARY OF LEVELS OF SOCIAL SERVICE WORKERS

LEVEL I. Aide or Assistant. Supervised task-oriented level. No educational requirement, or high school graduate.
(Human services trainee is preparing for aide level. Supervised training level--task oriented)

LEVEL II. Direct Service level. Associates of Arts Degree in Social Services, or equivalent.

LEVEL III. Beginning professional practitioner level. Bachelor's degree in social welfare or equivalent.

LEVEL IV. Clinical or community organization specialist or supervisory/administrative level.
Master of Social Work Degree or equivalent.

LEVEL V. Managerial, professorial, or research level. Doctorate or equivalent.

VT 014 451
DAVISON, MILDRED
CAREER GRADUATES: A PROFILE OF JOB EXPERIENCE AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES.

CITY UNIV. OF NEW YORK, N.Y. OFFICE OF COMMUNITY COLL. AFFAIRS.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - AUG71 60P.

DESCRIPTORS - *GRADUATE SURVEYS; *COMMUNITY COLLEGES; INDIVIDUAL CHARACTERISTICS; *VOCATIONAL FOLLOWUP; *ACADEMIC ACHIEVEMENT; *EMPLOYMENT EXPERIENCE; CURRICULUM DEVELOPMENT; PROGRAM EVALUATION
IDENTIFIERS - CITY UNIVERSITY OF NEW YORK

ABSTRACT - BASED ON 869 RETURNED QUESTIONNAIRES, THIS REPORT SUMMARIZES THE EDUCATIONAL AND OCCUPATIONAL EXPERIENCES OF THE 1966 COMMUNITY COLLEGE GRADUATES OF THE CITY UNIVERSITY OF NEW YORK. IN TOTAL SIX COMMUNITY COLLEGES WERE INVOLVED IN THE SURVEY WHICH SOUGHT INFORMATION CONCERNING: (1) DEMOGRAPHIC CHARACTERISTICS, (2) CURRICULUM EVALUATION AND SATISFACTION, (3) PAST COMMUNITY COLLEGE EDUCATIONAL EXPERIENCE, (4) PAST COMMUNITY COLLEGE VOCATIONAL EXPERIENCE, AND (5) SALARY. AMONG THE FINDINGS OF THE SURVEY WERE: (1) THE MALE-FEMALE RATIO (63.3%-37.7%) INDICATED MALE PREDOMINANCE IN A SIGNIFICANTLY LARGER DEGREE THAN AN EARLIER STUDY HAD SHOWN. (2) FEWER THAN 10% OF THE RESPONDENTS INDICATED THEY CHANGED THEIR MAJOR IN THE COURSE OF THEIR COMMUNITY COLLEGE WORK. (3) OVER 85 PERCENT OF THE RESPONDENTS FELT THEIR COMMUNITY COLLEGE TRAINING WAS IMPORTANT AND RELEVANT TO THEIR PERFORMANCE IN THEIR FIRST JOB. (4) OF RESPONDENTS WHO HAVE COMPLETED OR ARE COMPLETING THEIR BACCALAUREATES, 80 PERCENT CHOSE CURRICULA DIRECTLY RELATED TO THEIR ASSOCIATE DEGREE WORK. AND (5) OVER HALF OF THE RESPONDENTS STARTED WITH JOBS IN THE $5,000-$7,500 RANGE. FIELDS OF STUDY OF THE GRADUATES INCLUDED BUSINESS, CHEMICAL TECHNOLOGY, DENTAL HYGIENE, NURSING, AND PRE-PHARMACY. THE EARLIER SURVEY IS AVAILABLE AS ED 028 295 (VT 008 151, ARM SPRING 1970). (JS)

VT 014 451

CAREER GRADUATES: A PROFILE

OF JOB EXPERIENCE
AND FURTHER STUDY OF STUDENTS WITH AAS DEGREES

CITY UNIVERSITY OF NEW YORK / OFFICE OF COMMUNITY COLLEGE AFFAIRS

AUGUST 1971

MILDRED DAVISON / OCCUPATIONAL TRENDS ANALYST

VT014451

4068

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
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TABLE OF CONTENTS

	PAGE NO.
SUMMARY STATEMENT	i
LIST OF TABLES	v
PREFACE	1
BACKGROUND	1
PURPOSE OF THE STUDY	3
METHODOLOGY	4
DEMOGRAPHIC CHARACTERISTICS	6
EDUCATIONAL BACKGROUND	10
CURRICULUM EVALUATION AND SATISFACTION	13
POST COMMUNITY COLLEGE ACTIVITY	27
POST COMMUNITY COLLEGE EDUCATIONAL EXPERIENCE	29
POST COMMUNITY COLLEGE VOCATIONAL EXPERIENCE	35
SALARY DATA	40
GENERAL COMMENTS BY RESPONDENTS	44
APPENDICES A and B	

SUMMARY STATEMENT

This is a report of the educational and occupational experiences of the 1966 graduates of the community colleges of the City University of New York (1) who completed career curricula and were awarded Associate in Applied Science Degrees. An earlier report was issued on the 1965 career graduates.

There was a total of 1220 graduates from six community colleges who were sent questionnaires. Eight hundred and sixty-nine replies were received, for a 71.2% return.

Demographic Characteristics

The male-female ratio (63.3% - 36.7%) indicated male predominance in a significantly larger degree than the earlier study, perhaps due to the student deferment practice and The Vietnam War escalation at that time.

There were no male students in the dental hygiene program, and only one in secretarial science. There were no female students in construction and electrical technology programs. In the earlier study of the class of 1965, there were no females in two additional programs; chemical and mechanical technology, but the 1966 class had a few female students in each of those programs.

Eighty-one per cent of the respondents earned high school academic or general diplomas. The remainder earned technical, commercial, vocational or equivalency diplomas and chose college curricula that related broadly to the vocational training areas offered in the high schools.

Curriculum Evaluation and Satisfaction

Fewer than 10% of the respondents indicated they changed their major in the course of their community college work. When asked which major they would choose today, two-thirds of the group would elect the same, while one-third, in retrospect, would opt for a different major. Of those who would select the same major, over 60% continued their education beyond community college. Of those who would now choose a different major, almost 80% continued their education beyond community college. The rank order of the curricula choices that would in retrospect be the same is: 1. Nursing; 2. Dental Hygiene; 3. Chemical Technology; 4. Commercial Art; and 5. Accounting.

Over 85% of the respondents felt their community college training was important and relevant to their performance on their first job. Almost 40% said they could not have obtained their first job without their community college preparation.

When asked to respond to the question of increased emphasis on skills courses versus liberal arts courses, the consensus appears to be that greater emphasis on skills courses would benefit job performance, while greater emphasis on liberal arts courses would enhance job advancement possibilities.

A series of questions were included seeking information on whether the career training received at the community college provided the respondent with the means to fulfill his goals. Could he earn enough to support himself and implement his educational plans? Would a liberal arts degree have

provided equally viable job opportunity and salary? Of those who answered these questions, over 70% believed that their community college training helped them locate a job sufficiently remunerative to permit furthering their education. Only 25% feel that a liberal arts degree would have served the same function.

Post Community College Educational Experience

Since over 65% of the respondents continued further education after graduation from community college, one can clearly conclude that career programs are not terminal programs.

Of those continuing their education, only 30% attended a 4-year CUNY college, while more than half attended some other 4-year institution.

There are 238 respondents who have already earned their baccalaureate degree representing 42% of those who continued education after community college graduation. There are B.A. degree holders in virtually every curriculum. There are, additionally, 155 graduates currently enrolled in baccalaureate programs (27%).

Of those respondents who have completed or are completing their baccalaureates, 80% chose curricula directly related to their Associate Degree work.

Post Community College Vocational Experience

A college contact, either the placement office or a faculty member helped one-third of the respondents secure their first job. Over one-third of the graduates have remained in the employ of one company only. Approximately 25% have at some time worked in the public sector, mainly the municipal government.

More than 85% of the respondents viewed their first job as directly related to their college training and over 75% of them view their present job similarly.

Salary Data

The respondents were asked to indicate the salary level of their first job and of their current job. Over half started with jobs in the $5000-$7500 range. At present over half are earning between $7,500 - $10,000. The remainder are divided almost evenly between "over $10,000" and "under $7,500."

A cross-tab of salary earned in the first full-time job with education beyond the community college level reveals a relationship perhaps contrary to some expectations. Those who achieved higher initial salaries went on to further education in larger numbers than did those at lower salaries.

General Comments by Respondents

Approximately 50% of the respondents took advantage of the opportunity provided on the last page of the questionnaire to express any comments they wished with respect to their community college experience. Of these replies, 70% were favorable and 30% unfavorable.

LIST OF TABLES PAGE NO.

Table 1
Demographic Characteristics of the Respondents 7

Table 2
Distribution of Degrees by Major 8

Table 3
Distribution of Degrees by Sex 9

Table 4
Date of High School Graduation 11

Table 5
Distribution of High-School Diploma 11

Table 6
Community College Major by High-School Diploma 12

Table 7
Retrospective Choice of College Major Compared with Further Education 14

Table 8
Importance of Community College Training in Obtaining First Job 16

Table 9
Importance of Community College Training in Performing First Job 17

Table 10
For Purposes of Job Performance Should the Emphasis on Skills Courses have been ____ ? 18

Table 11
For Purposes of Job Performance, Should the Emphasis on Liberal Arts Courses Have Been _____? 19

Table 12
For Purposes of Advancement, Should the Emphasis on Skills Courses have Been_____? 20

Table 13
For Purposes of Advancement, Should the Emphasis on Liberal Arts Have Been _____? 21

LIST OF TABLES

PAGE NO.

Table 14
Based on Your Experience, What Do You Now Think Your College Major Should Have Been? 23

Table 15
Did Your Community College Career Training Help You Secure a Job With Sufficient Remuneration to Further Your Educational Goals? 24

Table 16
Would Another Career Program Have Been Just as Useful? 25

Table 17
Would a Liberal Arts Degree Have Served the Same Function? 26

Table 18
Activity Immediately After Community College Graduation 28

Table 19
Present Activity 28

Table 20
Educational Institution Attended Since Community College Graduation 30

Table 21
Earned Baccalaureate Degree 31

Table 22
Now Enrolled in Baccalaureate Program 32

Table 23
Plans for Graduate Work Beyond the Baccalaureate 33

Table 24
Earned High-School Diploma Related to Further Education 34

Table 25
Through Whom was First Position After Graduation Located? 36

Table 26
How Many Employers Since Community College Graduation? 36

Table 27
Have You Ever Been Employed by the Government? 37

Table 28
Relationship of First Job to Community College Training? 38

LIST OF TABLES PAGE NO.

Table 29 39
Relationship of Present Job to Community College Training

Table 30 41
Annual Salary - First Full-Time Job

Table 31 42
Annual Salary - Present Full-Time Job

Table 32 43
Annual Salary on First Full-Time Job Related to Further Education

Preface

The City University presents its second study of community college career graduates. The first study reported the educational and occupational experiences of the 1965 career curricula graduates of the community colleges of the City University of New York (1), three years after graduation. This study is a similar report of the 1966 graduates.

Benefitting from the previous survey, the questionnaire was more detailed and was designed to give us some of the answers to "numerous unaswered questions" that were suggested in the earlier study. Not only did we seek factual information, but attitudinal information as well. How does the graduate perceive his community college experience in relation to subsequent educational and vocational goals and activities?

Background

The two-year college movement in the United States has shown enormous growth and development in the last 10 years. This has been matched by the growth of community colleges within the City University of New York as seen in the following chart.

(1) Under the program of the State University of New York

Community College	Year Formed	Enrollment Full-Time Day Matriculants 1964	1967	1968	1969	1970
NYCCC	1946*	2,743	3,911	4,323	4,085	5.007
SICC	1955	990	1,996	2,726	3,075	4,378
Bronx C.C.	1957	1,617	2,552	2,579	3,555	4,435
Queensborough C.C.	1958	1,211	2,574	3,035	3,889	6,051
Kingsborough C.C.	1963	468	2,028	2,366	2,841	4,352
Bor.of Manhattan C.C.	1963	467	2,172	2,548	2,540	2,881
TOTALS:		7,496	15,233	17,577	19,985	27,104

* Joined the City University System in 1964

Three other colleges offering associate degrees have been approved. Medgar Evers is located in the Bedford-Stuyvesant area and will receive its first students in 1971. Hostos Community College accepted its first students September 1970 and is located in the South Bronx. La Guardia Community College, located in Long Island City, will receive its first students in September 1971.

Several societal trends should be noted. As technological and professional jobs increase in complexity, skills training becomes more specific. Occupational areas unable to train sufficient numbers of professionals are establishing career ladder job opportunities for persons with lesser training. Some groups require broad-based curricula with a larger liberal arts core. Other groups, concerned primarily with acquisition of skills, favor a smaller core of liberal arts.

Under the pressure of conflicting trends, educational planners are seeking all manner of factual input and research information as they evaluate existing curricula, and prepare for future program development.

Purpose of the Study

With universal post secondary education as a stated goal in City University's Master Plan (1) and the implementation of the open admissions plan this year, the incoming freshman class will number 36,000 as compared with 21,000 in September 1969. Within the framework of that total commitment, questions arise as to the kinds of educational opportunities to provide. If the community college is to be an adaptive institution, both socially and economically, responsive to the student body and to the community, we must know what has happened to our graduates so that we can rationally plan for our incoming students.

(1) Master Plan of the Board of Higher Education for the City University of New York (1968), issued pursuant to Section 6202 of the State Education Law.

Methodology

Each of the University's six community colleges in operation when the study was undertaken was asked to provide this office with a list of the names and addresses of students who were awarded an associate in applied science degree in 1966. We received a total of 1365 names and addresses. Each was sent a questionnaire (Appendix A .) The Post Office returned 145 to this office as undeliverable. The individual had moved and left no forwarding address.

A second mailing was sent out in March (Appendix B .) Several weeks later in a concentrated effort to reach as many of the graduates as possible, we conducted a telephone follow-up. Through the use of special street telephone directories, we identified phone numbers for 290 of the 483 graduates from whom we had not heard. Telephone calls were made or at least attempted to each of those 290 graduates on two separate evenings with the aid of a number of graduate students. The telephone caller reminded the graduate of the questionnaire and offered to take the replies to the questions over the telephone. In many cases, this was done. In other cases, we were told that the questionnaire would be answered and returned to us by mail. And some few told us they were too busy to take the time to answer any questions.

To recapitulate, there were 737 replies received after the first and second mailings. The telephone follow-up gave us an additional 132 completed questionnaires for a total of 869, or a 71.2% return on the 1220 questionnaires that were received by the graduates.

The following chart details by college the distribution of and the replies to the questionnaires.

QUESTIONNAIRES
DISTRIBUTION AND REPLIES

College	Q. Sent	Q. Not Del.	Q. Del.	Q. Resp.	% Q. Resp. / Q. Del.
NYCCC	777	37	740	522	70.0
SICC	111	5	106	83	78.0
BCC	247	70	177	123	69.0
QCC	104	9	95	70	73.0
KCC	13	3	10	9	90.0
BMCC	113	21	92	62	67.0
TOTAL:	1365	145	1220	869*	71.2

* Some questionnaires left one or more questions unanswered accounting for the discrepancy in the totals in some of the charts that follow.

Demographic Characteristics

Table 1 details age, sex and marital status of the respondents. Most of the 1966 graduates who replied to this questionnaire are predictably in the 20-24 age bracket. There are, however, more than 15% in the 25-30 age group, while 5% are over 30. The male-female ratio (63.3% - 36.7%) indicates male predominance in a significantly larger degree than the earlier study. This may be due to the student deferment practice and the Vietnam War escalation at that time. About half the respondents are single, half are married, and a very small number are in the "other" category.

The distribution of degrees by major is shown in Table 2. A comparison of the rank order of curricula with that of last year's study shows the following:

Rank Order	1965 Graduates	1966 Graduates
1	Accounting	Accounting
2	Secretarial Studies	Electrical Technology
3	Marketing	Marketing
4	Electrical Technology	Secretarial Studies

The distribution of A.A.S. degrees by sex shown in Table 3, follows a predictable pattern. Although there were two males in nursing and one male in secretarial studies, as compared to none in these areas in the earlier study, one can hardly identify a trend. In spite of the lowering of sex barriers in these fields and the availability of jobs, students perceive these fields as female. To attract males to them will require much additional guidance and counseling of students, community education of their parents, as well as higher salaries.

TABLE I

DEMOGRAPHIC CHARACTERISTICS
OF THE RESPONDENTS

AGE	N.	%
20 - 24	676	77.6
25 - 30	145	16.9
Over 30	48	5.5
	869	100.0

SEX	N.	%
Male	550	63.3
Female	319	36.7
	869	100.0

MARITAL STATUS	N.	%
Single	425	49.0
Married	435	50.2
Other	7	0.8
	867	100.00

TABLE 2

DISTRIBUTION OF DEGREES BY MAJOR

Major	No.	%	Rank Order
Accounting	162	18.6	1
Business Technology	36	4.1	9
Chemical Technology	17	2.0	15
Civil Technology	1	1	17
Pre-Pharmacy	1	1	17
Commercial Art	22	2.5	12
Construction Technology	20	2.3	13
Data Processing	15	1.7	16
Dental Hygiene	45	5.2	6
Dental Laboratory Technician	18	2.1	14
Electrical Technology	96	11.0	2
Graphic Arts	44	5.1	7
Hotel Technology	33	3.8	10
Marketing and Retailing	94	10.8	3
Mechanical Technology	44	5.1	7
Medical Laboratory Technology	43	5.0	8
Nursing	71	8.2	5
Secretarial Studies	82	9.4	4
Other	25	2.9	11
Total:	869	100.0	

TABLE 3

DISTRIBUTION OF A.A.S. DEGREES BY SEX

	N.	% Male	% Female
Accounting	162	77.8	22.2
Business Technology	36	77.8	22.2
Chemical Technology	17	82.4	17.6
Civil Technology	1	100.0	0.0
Pre-Pharmacy	1	100.0	0.0
Commercial Art	22	77.3	22.7
Construction Technology	20	100.0	0.0
Data Processing	15	86.7	13.3
Dental Hygiene	45	0.0	100.0
Dental Laboratory Technology	18	94.4	5.6
Electrical Technology	96	100.0	0.0
Graphic Arts	44	95.5	4.5
Hotel Technology	33	87.9	12.1
Marketing and Retailing	94	83.0	17.0
Mechanical Technology	44	95.5	4.5
Medical Laboratory Technology	43	16.3	83.7
Nursing	71	2.8	97.2
Secretarial Studies	82	1.2	98.8
Other	25	64.0	36.0
Total	869	63.3	36.7

Educational Background

The date of the high school graduation, the kind of high school diploma earned, and an analysis of high school diploma categories within each community college major are cited in Tables 4, 5, and 6.

Table 4 indicates that 90% of the respondents graduated from high school after 1961, and the remaining 10% before then. Some studies of junior college students have shown an older student body on a national sample than attends the community colleges of the City University.

Table 5 reveals that a predictably high percentage of graduates had earned an academic diploma in high school. It is significant that even before "open admissions" almost 30% of the respondents had earned high school diplomas of every variety offered in the public school system.

A cross-tabulation between type of high school diploma earned and community college major is shown in Table 6. Accounting, Graphic Arts and Mechanical Technology areas had every high school diploma category represented. Non-academic high school diploma earners are distributed throughout the other majors as well. There doesn't appear to be a concentration in any one subject area.

TABLE 4

DATE OF HIGH SCHOOL GRADUATION

	N.	%
1931 - 1940	1	0.1
1941 - 1950	12	1.5
1951 - 1960	62	7.9
1961	41	5.2
1962	73	9.3
1963	194	24.7
1964	403	51.3
TOTAL	786	100.0

TABLE 5

DISTRIBUTION BY HIGH SCHOOL DIPLOMA

HIGH SCHOOL DIPLOMA	N.	%
Academic	612	71.5
General	87	10.2
Technical	42	4.9
Commercial	66	7.7
Vocational	38	4.4
High School Equivalency	11	1.3
TOTAL	856	100.0

TABLE 6

COMMUNITY COLLEGE MAJOR BY HIGH SCHOOL DIPLOMA

	Total N.	%A.	%G.	%T.	%C.	%V.	%E.
Accounting	158	70.3	15.8	0.6	10.8	1.9	0.6
Business Technology	36	86.1	13.9	-	-	-	-
Chemical Technology	17	76.5	11.8	11.8	-	-	-
Civil Technology	1	100.0	-	-	-	-	-
Pre-Pharmacy	1	100.0	-	-	-	-	-
Commercial Art	22	77.3	9.1	-	4.5	4.5	4.5
Construction Technology	20	80.0	10.0	10.0	-	-	-
Data Processing	15	60.0	26.7	-	-	6.7	6.7
Dental Hygiene	45	91.1	6.7	-	2.2	-	-
Dental Laboratory Technology	16	75.0	18.8	-	6.2	-	-
Electrical Technology	95	54.7	7.4	29.5	-	7.4	1.0
Graphic Arts	44	54.5	11.4	2.3	2.3	27.3	2.3
Hotel Technology	32	68.8	18.8	-	9.4	-	3.1
Marketing and Retailing	9.2	71.7	8.7	-	17.4	2.2	-
Mechanical Technology	43	62.8	4.7	16.3	2.3	9.3	4.7
Medical Laboratory Technology	43	93.0	4.7	2.3	-	-	-
Nursing	71	71.8	9.9	-	5.6	8.5	4.2
Secretarial Studies	80	73.8	3.7	-	20.0	2.5	-
Other	25	76.0	4.0	-	20.0	-	-
Total:	856	71.5	10.2	4.9	7.7	4.4	1.3

A - Academic
G - General
T - Technical
C - Commercial
V - Vocational
E - Equivalency

Curriculum Evaluation and Satisfaction

Questions 7, 8 and 22 through 32 of the questionnaire were designed to elicit information about the graduate's satisfaction with his community college experience and his evaluation of the curriculum particularly as it relates to his subsequent vocational experiences.

In response to question 7, there were a total of 71 graduates who indicated that they had changed their major in the course of their community college career. Of that number, 12 transferred out of liberal arts to a career area, 10 transferred out of engineering, and the remainder were transferees from sixteen different majors.

Question 8 regarding which college major would the respondent have chosen, if, after graduating from High School there had been free choice, was answered in 254 questionnaires. About one-half of these fell into three categories: Liberal Arts - 44; Business and Accounting - 41; Education - 39. The remainder would have opted from 38 other curricula.

Question 28 asked the respondent what major did he now wish he had chosen. Two-thirds said they would elect the same one while one-third, in retrospect, wished they had chosen some other course.

Table 7 shows the correlation of the replies to question 28 with continuing education beyond community college. Of those who would select the same major if they were starting community college today, over 60% did continue

education beyond community college, while almost 80% of those who would now select a different major sought further education beyond community college. Dissatisfaction seems to have acted as a spur.

TABLE 7

Retrospective Choice of College Major Compared with Further Education

	Total N.	% Further Education	% No Further Education
Similar	509	60.9	39.1
Different	249	77.9	22.1
Total	758	67.2	32.8

Tables 8 through 17 delineate the respondent's assessment of the community college curriculum as it relates to his experience in the world of work. This information was gathered from replies to questions 22 through 25 and 28 through 31 of the questionnaire.

Table 8 charts the responses to the question concerning the importance of Community College training in obtaining the first job and Table 9 asks for evaluation of the importance of community college training in performing the first job. Only a small percentage of the graduates, 11.4% and 13.5% respectively, felt that their training was not relevant to their obtaining or performing the job. Almost 40% said they could not have gotten their job without their community college preparation. Over 85% felt their training important and relevant to their performance on their first job.

Tables 10, 11, 12, and 13 focus on an evaluation of liberal arts courses and skills courses as they affect performance and advancement on the job. In considering job performance, over 53% wished there had been greater emphasis on skills courses while over 30% would have liked greater emphasis on liberal arts courses. About half of the respondents favored no change. Only 2.6% suggested less emphasis on skills courses as compared to 16% who favored less emphasis on liberal arts courses.

When considering skill requirements for job advancement, Table 12 follows the percentages in Table 10 very closely. Both tables indicate that over 95% of the respondents feel the need for the same or greater emphasis on skills courses. Table 13 indicates that for purposes of advancement, more respondents favor an increased emphasis on liberal arts than is needed for job performance. (Table 11)

TABLE 8

IMPORTANCE OF COMMUNITY COLLEGE TRAINING IN OBTAINING FIRST JOB

	Total No.	% Requirement	% Important	% Relevant	% Irrevalent
Accounting	155	32.9	26.5	25.8	14.8
Business Technology	35	28.6	20.0	40.0	11.4
Chemical Technology	16	43.8	18.8	31.3	6.2
Civil Technology	1	0.0	100.0	0.0	0.0
Pre-Pharmacy	1	0.0	0.0	100.0	0.0
Commercial Art	21	28.6	42.9	23.8	4.8
Construction Technology	20	15.0	50.0	20.0	15.0
Data Processing	14	0.0	28.6	50.0	21.4
Dental Hygiene	45	95.6	2.2	0.0	2.2
Dental Laboratory Technology	16	0.0	43.8	43.8	12.5
Electrical Technology	87	40.2	31.0	20.7	8.0
Graphic Arts	43	14.0	32.6	37.2	16.3
Hotel Technology	33	6.1	54.5	24.2	15.2
Marketing and Retailing	88	13.6	26.1	31.8	28.4
Mechanical Technology	44	45.5	31.8	15.9	6.8
Medical Laboratory Technology	42	57.1	31.0	9.5	2.4
Nursing	70	82.9	12.9	4.3	0.0
Secretarial Studies	81	32.1	51.9	9.9	6.2
Other	25	16.0	40.0	28.0	16.0
Total	837	37.3	30.2	21.7	11.4

Table 9

IMPORTANCE OF COMMUNITY COLLEGE TRAINING IN PERFORMING FIRST JOB

	Total No.	% Important	% Relevant	% Irrevalant
Accounting	155	43.2	43.9	12.9
Business Technology	35	28.6	45.7	25.7
Chemical Technology	16	50.0	43.8	6.2
Civil Technology	1	100.0	0.0	0.0
Pre-Pharmacy	1	0.0	0.0	100.0
Commercial Art	21	71.4	23.8	4.8
Construction Technology	20	40.0	35.0	25.0
Data Processing	14	35.7	35.7	28.6
Dental Hygiene	45	100.0	0.0	0.0
Dental Laboratory Technology	17	29.4	41.2	29.4
Electrical Technology	86	45.3	41.9	12.8
Graphic Arts	43	46.5	34.9	18.6
Hotel Technology	33	51.5	33.3	15.2
Marketing and Retailing	88	25.0	39.8	35.2
Mechanical Technology	44	65.9	25.0	9.1
Medical Laboratory Technology	42	83.3	16.7	0.0
Nursing	69	97.1	2.9	0.0
Secretarial Studies	81	76.5	19.8	3.7
Other	25	48.0	32.0	20.0
Total	836	55.9	30.6	13.5

TABLE 10

FOR PURPOSES OF JOB PERFORMANCE
SHOULD THE EMPHASIS ON SKILLS COURSES HAVE BEEN...?

	Total N.	% Greater	% Same	% Less
Accounting	151	50.3	47.7	2.0
Business Technology	34	55.9	38.2	5.9
Chemical Technology	14	50.0	50.0	0.0
Civil Technology	1	100.0	0.0	0.0
Pre-Pharmacy	0	0.0	0.0	0.0
Commercial Art	22	50.0	45.5	4.5
Construction Technology	17	35.3	58.8	5.9
Data Processing	14	85.7	7.1	7.1
Dental Hygiene	45	60.0	40.0	0.0
Dental Laboratory Technology	16	62.5	31.3	6.2
Electrical Technology	85	56.5	42.4	1.2
Graphic Arts	42	59.5	35.7	4.8
Hotel Technology	32	46.9	53.1	0.1
Marketing and Retailing	80	51.2	43.8	5.0
Mechanical Technology	42	47.6	50.0	2.4
Medical Laboratory Technology	42	73.8	23.8	2.4
Nursing	70	84.3	15.7	0.0
Secretarial Studies	79	19.0	78.5	2.5
Other	21	52.4	42.9	4.8
Total	807	53.8	43.6	2.6

TABLE 11

FOR PURPOSES OF JOB PERFORMANCE
SHOULD THE EMPHASIS ON LIBERAL ARTS HAVE BEEN...?

	Total N.	% Greater	% Same	%Less
Accounting	134	24.6	58.2	17.2
Business Technology	30	33.3	50.0	16.7
Chemical Technology	14	42.9	42.9	14.3
Civil Technology	1	0.0	0.0	0.0
Pre-Pharmacy	0	0.0	0.0	0.0
Commercial Art	19	31.6	63.2	5.3
Construction Technology	16	43.8	37.5	18.8
Data Processing	11	27.3	45.5	27.3
Dental Hygiene	42	38.1	52.4	9.5
Dental Laboratory Technology	14	35.7	50.0	14.3
Electrical Technology	71	29.6	50.7	19.7
Graphic Arts	41	48.8	41.5	9.8
Hotel Technology	29	41.4	41.4	17.2
Marketing and Retailing	78	43.6	44.9	11.5
Mechanical Technology	40	32.5	57.5	10.0
Medical Laboratory Technology	34	20.6	61.8	17.6
Nursing	64	6.2	73.4	20.3
Secretarial Studies	72	23.6	54.1	22.2
Other	22	50.0	31.8	18.2
Total	732	30.7	53.1	16.1

TABLE 12

FOR PURPOSES OF ADVANCEMENT
SHOULD THE EMPHASIS ON SKILLS HAVE BEEN...?

	Total N.	% Greater	% Same	% Less
Accounting	151	57.0	41.0	2.0
Business Technology	33	66.7	33.3	0.0
Chemical Technology	14	64.3	35.7	0.0
Civil Technology	1	100.0	0.0	100.0
Pre-Pharmacy	0	0.0	0.0	0.0
Commercial Art	21	52.4	42.8	4.8
Construction Technology	18	50.0	33.3	16.7
Data Processing	14	78.6	14.3	7.1
Dental Hygiene	40	55.0	45.0	0.0
Dental Laboratory Technology	15	80.0	13.3	16.7
Electrical Technology	84	61.9	36.9	1.2
Graphic Arts	41	61.0	34.1	4.9
Hotel Technology	31	61.3	35.5	3.2
Marketing and Retailing	79	50.6	44.3	5.1
Mechanical Technology	41	48.8	43.9	7.3
Medical Laboratory Technology	42	71.4	28.6	0.0
Nursing	67	71.6	28.4	0.0
Secretarial Studies	80	26.2	71.3	2.5
Other	21	47.6	42.9	9.5
Total	793	56.5	40.5	3.0

TABLE 13

FOR PURPOSES OF ADVANCEMENT
SHOULD THE EMPHASIS ON LIBERAL ARTS HAVE BEEN...?

	Total N.	% Greater	% Same	% Less
Accounting	136	34.6	51.4	14.0
Business Technology	29	41.4	41.4	17.2
Chemical Technology	14	50.0	35.7	14.3
Civil Technology	1	0.0	100.0	0.0
Pre-Pharmacy	0	0.0	0.0	0.0
Commercial Art	19	52.6	42.1	5.3
Construction Technology	16	50.0	37.5	12.5
Data Processing	11	45.5	36.4	18.2
Dental Hygiene	39	51.3	43.6	5.1
Dental Laboratory Technology	11	54.5	36.4	9.1
Electrical Technology	69	52.2	37.7	10.1
Graphic Arts	41	63.4	29.3	7.3
Hotel Technology	28	42.9	39.3	17.8
Marketing and Retailing	76	48.7	39.5	11.8
Mechanical Technology	40	47.5	45.0	7.5
Medical Laboratory Technology	31	22.6	64.5	12.9
Nursing	60	35.0	58.3	6.7
Secretarial Studies	74	35.1	54.1	10.8
Other	22	59.1	22.7	18.2
Total	717	43.5	45.2	11.3

Table 14 ranks the college majors by retrospective choice. Nursing is first as the curriculum that, based on post community college experience, would still be chosen. Over 90% of the graduates of nursing programs would again select that major. Dental Hygiene, Chemical Technology, Commercial Art and Accounting are ranked 2,3,4 and 5.

Questions 29, 30, and 31 were designed to provide an insight into the graduate's view of his community college career training as it pertained to job remuneration, and further education. Could he earn enough to support himself and further his educational goals if he has earned an AAS degree in a specific career area or would an A.A. degree in liberal arts have provided equally viable job opportunity and salary?

Some respondents left these questions unanswered. Several reasons come to mind. Those students who continued with their education and did not need to work would not have answered these questions. The phrasing of the question may have been unclear, or the respondent may have had no opinion in these matters. However, between 70% and 80% of the questionnaires did contain responses to these questions, which responses provided the data for Tables 15, 16, and 17.

Table 15 reveals that over 70% of those who replied to question 29, believe that their community college training helped them locate a job sufficiently remunerative to permit furthering their education. Only 25% feel that a liberal arts degree would serve the same function (Table 17) while two-thirds of the respondents did not feel that any career program other than the one they were in would have served them as well (Table 16).

TABLE 14

BASED ON YOUR EXPERIENCE
WHAT DO YOU NOW THINK YOUR COLLEGE MAJOR SHOULD HAVE BEEN?

	Total N.	Same %	Same Rank	Other %
Accounting	148	75.7	5	24.3
Business Technology	30	46.7	16	53.3
Chemical Technology	16	81.3	3	18.7
Civil Technology	1	100.0	-	0.0
Pre-Pharmacy	1	0.0	-	100.0
Commercial Art	21	76.2	4	23.8
Construction Technology	18	55.6	12	44.4
Data Processing	14	57.1	11	42.9
Dental Hygiene	39	84.6	2	15.4
Dental Laboratory Technology	13	53.8	13	46.2
Electrical Technology	83	65.1	8	34.9
Graphic Arts	35	62.9	9	37.1
Hotel Technology	29	41.4	17	58.6
Marketing and Retailing	79	53.2	14	46.8
Mechanical Technology	30	66.7	7	33.3
Medical Laboratory Technology	38	73.7	6	26.3
Nursing	60	93.3	1	6.7
Secretarial Studies	70	61.4	10	38.6
Other	23	47.8	15	52.2
Total	757	67.1		32.9

TABLE 15

DID YOUR COMMUNITY COLLEGE CAREER TRAINING HELP YOU SECURE A JOB WITH SUFFICIENT REMUNERATION TO FURTHER YOUR EDUCATIONAL GOALS?

	Total N.	% Yes	% No
Accounting	111	73.9	26.1
Business Technology	25	68.0	32.0
Chemical Technology	16	68.8	31.2
Civil Technology	1	100.0	0.0
Pre-Pharmacy	0	0.0	0.0
Commercial Art	14	71.4	28.6
Construction Technology	14	71.4	28.6
Data Processing	12	75.0	25.0
Dental Hygiene	22	90.9	9.1
Dental Laboratory Technology	12	58.3	41.7
Electrical Technology	64	68.8	31.2
Graphic Arts	33	63.6	36.4
Hotel Technology	24	50.0	50.0
Marketing and Retailing	57	52.6	47.4
Mechanical Technology	38	73.7	26.3
Medical Laboratory Technology	25	92.0	8.0
Nursing	55	98.2	1.8
Secretarial Studies	44	86.4	13.6
Other	17	52.9	47.1
Total	584	73.1	26.9

TABLE 16

WOULD ANOTHER CAREER PROGRAM HAVE BEEN JUST AS USEFUL?

	Total N.	% Yes	% No
Accounting	124	27.4	72.6
Business Technology	26	57.7	42.3
Chemical Technology	14	57.1	42.9
Civil Technology	1	0.0	100.0
Pre-Pharmacy	1	100.0	0.0
Commercial Art	18	27.8	72.2
Construction Technology	18	38.9	61.1
Data Processing	12	25.0	75.0
Dental Hygiene	26	15.4	84.6
Dental Laboratory Technology	9	33.3	66.7
Electrical Technology	68	35.3	64.7
Graphic Arts	34	41.2	58.8
Hotel Technology	26	30.8	69.2
Marketing and Retailing	67	50.7	49.3
Mechanical Technology	40	32.5	67.5
Medical Laboratory Technology	33	33.3	66.7
Nursing	56	12.5	87.5
Secretarial Studies	53	26.4	73.6
Other	18	50.0	50.0
Total	644	33.2	66.8

TABLE 17

WOULD A LIBERAL ARTS DEGREE HAVE SERVED THE SAME FUNCTION?

	Total N.	% Yes	% No
Accounting	134	16.4	83.6
Business Technology	27	44.4	55.6
Chemical Technology	16	31.3	68.7
Civil Technology	1	0.0	100.0
Pre-Pharmacy	1	100.0	0.0
Commercial Art	19	31.6	68.4
Construction Technology	18	22.2	77.8
Data Processing	13	30.8	69.2
Dental Hygiene	30	0.0	100.0
Dental Laboratory Technology	15	40.0	60.0
Electrical Technology	74	24.3	75.7
Graphic Arts	37	32.4	67.7
Hotel Technology	28	39.3	60.7
Marketing and Retailing	39	50.7	49.3
Mechanical Technology	42	21.4	78.6
Medical Laboratory Technology	36	13.9	86.1
Nursing	60	10.0	90.0
Secretarial Studies	57	14.0	86.0
Other	18	50.0	50.0
Total	695	24.9	75.1

Post Community College Activity

Questions 9 and 12 were directed at determing the impact on the work force, and on educational institutions of community college career graduates.

Tatles 18 and 19 reflect this information. They chart the activity of the respondents both directly after college graduation and at present.

While 57.4% of the respondents accepted employment immediately after graduation., 32.2% continued their education on a full-time basis. Presently 80.9% have joined the working community and 8.9% are still in full-time educational preparation.

TABLE 18

ACTIVITY IMMEDIATELY AFTER COMMUNITY COLLEGE GRADUATION

	N.	%
Accepted a Job	354	40.7
Accepted a Job, Continued Education Part-time	145	16.7
Continued Education Full Time	280	32.2
Entered Armed Forces	45	5.2
Married and Became a Housewife	3	0.3
Other	42	4.9
Total	869	100%

TABLE 19

PRESENT ACTIVITY

	N	%
Working	532	62.4
Working, Continuing Education Full Time	76	8.9
Continuing Education Full Time	43	5.0
Working, Continuing Education Part-Time	82	9.6
Regular Armed Services	35	4.1
Housewife	59	6.9
Other	25	2.9
Total	852	100%

Post-Community College Educational Experience

Over 65% of the respondents continued further education after graduation from community college. [This compares favorably with the 53.9% figure noted in the earlier study of the 1965 graduates.] There are numerous relevant observations that can be made. Most prominent is the fact that career programs should not be viewed as terminal programs.

Table 20 details the types of educational institutions attended by the graduates. Over half of those continuing their education attended a four-year institution outside of CUNY, while 30% attended a four-year CUNY college. This reflects some of the articulation difficulties that have existed between the community and senior colleges within CUNY, many of which are now in the process of being eliminated through the efforts of inter-college committees within the various disciplines.

There are 238 graduates who have already earned their baccalaureate degree; representing 42% of those who continued their education after community college graduation. An examination of Table 21 reveals B.A. degree holders in virtually every curriculum.

In addition, there are 155 graduates now enrolled in baccalaureate degree programs representing an additional 27%. (Table 22.) Of these 393 respondents, 261 (66.4%) indicated they plan to go on to graduate work. (Table 23.) This means that 30% of all the respondents aspire to education beyond the baccalaureate.

TABLE 20

EDUCATIONAL INSTITUTION ATTENDED SINCE COMMUNITY COLLEGE GRADUATION

	Total N.	% Another 2-Yr. Coll.	% 4-Yr. CUNY Coll.	% Another 4-Yr. Coll.	% Prof. School	% Other	% More Than One
Accounting	131	1.5	20.6	74.0	0.0	0.8	3.1
Business Technology	30	6.7	20.0	66.7	3.3	0.0	3.3
Chemical Technology	15	0.0	60.0	13.3	13.3	6.7	6.7
Civil Technology	1	0.0	0.0	100.0	0.0	0.0	0.0
Pre-Pharmacy	1	0.0	100.0	0.0	0.0	0.0	0.0
Commercial Art	14	0.0	21.4	64.3	14.3	0.0	0.0
Construction Technology	17	0.0	35.3	52.9	5.9	5.9	0.0
Data Processing	10	10.0	10.0	60.0	0.0	10.0	10.0
Dental Hygiene	16	0.0	50.0	37.5	0.0	0.0	12.5
Dental Laboratory Tech.	8	0.0	12.5	50.0	12.5	0.0	25.0
Electrical Technology	72	4.2	33.3	29.2	2.8	18.1	72.5
Graphic Arts	20	0.0	30.0	50.0	5.0	15.0	0.0
Hotel Technology	18	0.0	27.8	66.7	0.0	0.0	5.6
Marketing and Retailing	73	0.0	9.6	79.5	2.7	2.7	5.5
Mechanical Technology	32	0.0	28.1	62.5	0.0	3.1	6.2
Medical Laboratory Tech.	22	4.5	40.9	27.3	4.5	0.0	22.7
Nursing	40	5.0	62.5	22.5	0.0	5.0	5.0
Secretarial Studies	32	3.1	62.5	15.6	3.1	12.5	3.1
Other	15	0.0	46.7	33.3	13.3	0.0	6.7
Total	567	2.1	30.7	52.9	2.8	5.1	6.3

TABLE 21

EARNED BACCALAUREATE DEGREE

	Total N. * Respondents	To.N. Con't.d Educa.	N. Earned Degree	% Earned Degree / N. Contd Educ.
Accounting	162	131	87	66.4
Business Technology	36	30	20	66.7
Chemical Technology	17	15	4	26.7
Civil Technology	1	1	1	100.0
Pre-Pharmacy	1	1	0	0.0
Commercial Art	22	14	6	42.9
Construction Technology	20	17	3	17.6
Data Processing	15	10	4	40.0
Dental Hygiene	45	16	3	18.8
Dental Laboratory Technology	18	8	2	25.0
Electrical Technology	96	72	11	15.3
Graphic Arts	44	20	9	45.0
Hotel Technology	33	18	9	50.0
Marketing and Retailing	94	73	43	59.0
Mechanical Technology	44	32	8	25.0
Medical Laboratory Technology	43	22	13	59.1
Nursing	71	40	1	2.5
Secretarial Studies	82	32	6	18.8
Other	25	15	8	53.3
Total	869	567	238	42.0

* Respondents who continued education after community college

TABLE 22

NOW ENROLLED IN BACCALAUREATE PROGRAM

	*N.Total	N. Now Enrolled	% Now Enrolled
Accounting	131	24	18.3
Business Technology	30	4	13.3
Chemical Technology	15	9	60.0
Civil Technology	1	-	0.0
Pre-Pharmacy	1	1	100.0
Commercial Art	14	2	14.3
Construction Technology	17	10	58.8
Data Processing	10	2	20.0
Dental Hygiene	16	2	12.5
Dental Laboratory Technology	8	2	25.0
Electrical Technology	72	36	50.0
Graphic Arts	20	4	20.0
Hotel Technology	18	5	27.8
Marketing and Retailing	73	15	20.5
Mechanical Technology	32	16	50.0
Medical Laboratory Technology	22	4	18.2
Nursing	40	10	25.0
Secretarial Studies	32	6	18.8
Other	15	3	20.0
Total	567	155	27.3

* Respondents who continued education after community college

TABLE 23

PLANS FOR GRADUATE WORK BEYOND BACCALAUREATE

	* Total N.	N. Yes	% Yes
Accounting	111	68	61.3
Business Technology	24	18	75.0
Chemical Technology	13	6	46.2
Civil Technology	1	1	100.0
Pre-Pharmacy	1	-	0.0
Commercial Art	8	6	75.0
Construction Technology	13	7	53.8
Data Processing	6	4	66.7
Dental Hygiene	5	4	80.0
Dental Laboratory Technology	4	4	100.0
Electrical Technology	47	30	63.8
Graphic Arts	13	11	84.6
Hotel Technology	14	9	64.3
Marketing and Retailing	58	35	60.3
Mechanical Technology	24	17	70.8
Medical Laboratory Technology	17	11	64.7
Nursing	11	13	118.2
Secretarial Studies	12	9	75.0
Other	11	8	72.7
Total	393	261	66.4

* Earned Baccalaureate or enrolled in Baccalaureate program

A section in Questions 18 and 19 of the questionnaire asked the respondent to name the area of study of their baccalaureate work. Over 80% of those who replied indicated curricula directly related to their Associate Degree work.

A cross-tab between type of high-school diploma earned and post-AAS degree education (Table 24) reveals a predictable ordering. High school achievement seems to have a bearing on educational aspirations. The open admissions policy now in effect at the University may change this picture.

TABLE 24

EARNED HIGH SCHOOL DIPLOMA RELATED TO FURTHER EDUCATION

	TOTAL N.	% FURTHER EDUCATION	% NO FURTHER EDUCATION
Academic	612	67.3	32.7
General	87	71.3	28.7
Technical	42	66.7	33.3
Commercial	66	50.0	50.0
Vocational	38	52.7	47.3
High School Equivalency	12	41.7	58.3
Total	857	65.3	34.7

Post Community College Vocational Experience

A college contact, either the placement office or a faculty member helped one-third of the respondents secure their first job (Table 25). The State Employment Service seems to be a disappointing source of employment contact for our community college graduates, accounting for only 5.4% of the total.

Over one-third of the respondents have remained in the employ of one company while more than half have had from two to four employers since graduation (Table 26).

Approximately 25% of the respondents have at some time worked for the government, the municipal government having employed more than State and Federal governments together. Nursing and accounting rank 1 and 2 in the number of graduates who have been governmental employees (Table 27).

Tables 28 and 29 show the respondent's opinion of the relationship between job and community college training by college major.

Over 85.8% of the respondents viewed their first job as directly related to their college training as against 75.9% who view their present job so related. The small percentage change is not surprising. Unexpected opportunities, change of interest, and other personal reasons readily account for such a percentage change.

TABLE 25

Through Whom Was First
Position After Graduation Located?

	N.	%
College Contact	255	33.4
State Employment Service	41	5.4
Private Employment Agency	113	14.8
Newspaper Advertisement	102	13.4
Relative or Friend	132	17.3
Own Initiative	82	10.8
Other	37	4.9
Total	762	100%

TABLE 26

How Many Employers Since
Graduation From Community College

	N.	%
None	27	3.2
1	339	40.6
2 - 4	438	52.5
5 or more	31	3.7
Total	835	100%

TABLE 27

HAVE YOU EVER BEEN EMPLOYED BY THE GOVERNMENT?

	Municipal	State	Federal	None	More Than One	Total
Accounting	13	22	13	100	0	148
Business Technology	6	0	3	25	0	34
Chemical Technology	2	1	0	12	0	15
Civil Technology	0	1	0	0	0	1
Pre-Pharmacy	0	0	0	1	0	1
Commercial Art	0	1	1	19	0	21
Construction Technology	1	0	1	17	0	19
Data Processing	1	1	1	11	0	14
Dental Hygiene	3	2	1	36	1	43
Dental Laboratory Technology	0	0	1	13	0	14
Electrical Technology	15	1	2	64	1	83
Graphic Arts	1	1	1	38	0	41
Hotel Technology	3	1	1	26	0	31
Marketing and Retailing	14	0	4	63	1	82
Mechanical Technology	7	0	2	31	0	40
Medical Laboratory Technology	3	2	5	30	1	41
Nursing	25	4	2	37	1	69
Secretarial Studies	5	1	5	65	0	76
Other	4	2	0	15	1	22
Total	103	40	43	603	6	795
	13.0%	5.0%	5.4%	78.8%	0.8%	100%

TABLE 28

RELATION OF FIRST JOB TO COMMUNITY COLLEGE TRAINING

	Total No.	% Related	% Unrelated
Accounting	127	81.9	18.1
Business Technology	32	71.9	28.1
Chemical Technology	14	71.4	28.6
Civil Technology	1	100.0	0.0
Pre-Pharmacy	1	100.0	0.0
Commercial Art	20	95.0	0.5
Construction Technology	18	72.2	27.8
Data Processing	13	69.2	30.8
Dental Hygiene	43	97.7	2.3
Dental Laboratory Technology	14	78.6	21.4
Electrical Technology	77	88.3	11.7
Graphic Arts	40	92.5	7.5
Hotel Technology	30	86.7	13.3
Marketing and Retailing	68	66.2	33.8
Mechanical Technology	38	94.7	5.3
Medical Laboratory Technology	41	95.1	4.9
Nursing	70	98.6	1.4
Secretarial Studies	78	93.6	6.4
Other	20	65.0	35.0
Total	745	85.8	14.2

TABLE 29

RELATION OF PRESENT JOB TO COMMUNITY COLLEGE TRAINING

	Total N.	% Related	% Unrelated
Accounting	137	79.6	20.4
Business Technology	31	58.1	41.9
Chemical Technology	14	78.6	21.4
Civil Technology	1	100.0	0
Pre-Pharmacy	1	100.0	0
Commercial Art	19	84.2	15.7
Construction Technology	17	70.6	29.4
Data Processing	12	66.7	33.3
Dental Hygiene	31	100.0	0
Dental Laboratory Technology	14	57.1	42.9
Electrical Technology	74	82.4	17.6
Graphic Arts	38	81.6	18.4
Hotel Technology	28	50.0	50.0
Marketing and Retailing	74	50.0	50.0
Mechanical Technology	34	79.4	20.6
Medical Laboratory Technology	33	84.8	15.2
Nursing	60	95.0	5.0
Secretarial Studies	65	80.0	20.0
Other	18	55.6	44.4
Total	701	75.9	24.1

Salary Data

The questionnaire asked the graduate to indicate his salary on his first full-time job and on his present full-time job.

Over 57% of the students reported earnings between $5,000 and $7,500 per annum on their first job. The remainder divided rather evenly between salaries under $5,000 and salaries over $7,500. Two percent of the respondents (17 of 807 replies to this question) indicated first job salaries of over $10,000 a year. (Table 30.)

Salaries presently being earned reflect the advancement obviously enjoyed by the respondents after a passage of three years. Only 20% are earning under $7,500, over 53% earn between $7,500 and $10,000 and over 25% earn more than $10,000 annually. (Table 31.)

A cross-tab of the salary earned in the first full-time job with education beyond the community college level reveals a relationship perhaps contrary to some expectations. Those who achieved the higher initial salaries went on to further education in larger numbers than did the lower salaried graduates. Dissatisfaction with the salary level achieved does not seem to be a prime motivator toward further education. (Table 32.)

TABLE 30

ANNUAL SALARY - FIRST FULL TIME JOB

	Total No.	% Under $5,000	% $5,000-7,500	% $7501-10,000	Over $10,000
Accounting	155	15.5	46.5	32.3	5.8
Business Technology	34	5.9	73.5	20.6	-
Chemical Technology	14	7.1	78.6	14.3	-
Civil Technology	1	-	-	100.0	-
Pre-Pharmacy	1	-	100.0	-	-
Commercial Art	22	45.5	40.9	13.6	-
Construction Technology	19	31.6	63.2	5.3	-
Data Processing	12	16.7	50.0	25.0	8.3
Dental Hygiene	45	26.7	62.2	11.1	-
Dental Laboratory Technology	13	84.6	7.7	7.7	-
Electrical Technology	79	11.4	62.0	22.8	3.8
Graphic Arts	41	26.8	48.8	22.0	2.4
Hotel Technology	31	19.4	64.5	16.1	-
Marketing and Retailing	87	24.1	56.3	17.2	2.3
Mechanical Technology	42	16.7	61.9	19.0	2.4
Medical Laboratory Technology	41	36.6	56.1	7.3	-
Nursing	67	3.0	82.1	14.9	-
Secretarial Studies	80	42.5	56.3	1.2	-
Other	23	30.4	34.8	34.8	-
Total	807	22.3	57.0	18.6	2.1

TABLE 31

ANNUAL SALARY PRESENT FULL TIME JOB

	Total N.	Under $5,000	$5,000 -7,000	$7,500 - 10,000	Over $10,000
Accounting	133	2,3	12.8	52.6	32.3
Business Technology	29	3.4	24.1	44.8	27.6
Chemical Technology	13	-	15.4	46.2	38.5
Civil Technology	1	-	-	100.0	-
Pre-Pharmacy	1	-	-	100.0	-
Commercial Art	18	5.6	33.3	27.8	33.3
Construction Technology	16	-	12.5	37.5	50.0
Data Processing	10	-	10.0	40.0	50.0
Dental Hygiene	32	3.1	28.1	62.5	6.2
Dental Laboratory Technology	13	7.7	30.8	38.5	23.1
Electrical Technology	72	1.4	5.6	58.3	34.7
Graphic Arts	34	-	14.7	26.5	58.8
Hotel Technology	25	-	28.0	44.0	28.0
Marketing and Retailing	73	-	20.5	60.3	19.2
Mechanical Technology	36	-	8.3	52.8	38.9
Medical Laboratory Technology	32	-	28.1	65.6	6.2
Nursing	52	-	9.6	75.0	15.4
Secretarial Studies	66	1.5	40.9	57.6	-
Other	21	-	33.3	33.3	33.3
Total	677	1.3	19.2	53.3	26.1

TABLE 32

ANNUAL SALARY FIRST FULL TIME JOB
RELATED TO FURTHER EDUCATION

	Total N.	% Further Education	% No Further Education
Under $5,000	181	48.0	52.0
$5,000 - 7,000	460	63.0	37.0
$7,501 - 10,000	450	85.3	14.7
Over $10,000	17	76.5	23.5
Total	808	64.1	35.9

General Comments By Respondents

The questionnaire provided space on the last page for comments. In all, 416 respondents, (about 50% of the total) availed themselves of this opportunity. Positive feelings about their community college experience were expressed by 289 respondents while 127 had negative comments to make.

An analysis of these comments was made, grouping them into broad descriptive divisions. The following list details the comments made, and the number who made that comment. There were many other comments where the number totalled less than 10, but it did not seem feasible to include them all in this brief study.

Positive Comments	No.
1. Grateful - profitable - enjoyable-basic reason for success - vocationally and personally	120
2. Good Education - stepping stone for further education	68
3. Skills courses excellent - well trained for employment	57

Negative Comments	
1. Transfer difficulties - within and out of CUNY	64
2. Developmentally useful - but must continue for BA degree for it to be educationally and vocationally useful	27
3. Programs should have been more demanding and more comprehensive	17

Appendix A

Bronx Community College
OF THE CITY UNIVERSITY OF NEW YORK
120 EAST 184th STREET, BRONX, N.Y. 10468 • (212) 933-7000

OFFICE OF
THE PRESIDENT

December, 1969

Dear Graduate:

We are conducting a research study of the education and employment patterns of each of our 1966 A.A.S. degree graduates of all the community colleges within the City University of New York.

Please fill out this questionnaire and return it, following instructions on the back, to the City University of New York at 535 East 80th Street, New York City 10021, and not to this college. There it will be analyzed and a report issued. We are seeking this information from all, including those now in the Armed Forces and those who are now housewives.

You are undoubtedly aware of the many new developments at the University. Open Admissions is but one of them. There is much to be learned from your post-college experiences that will be of great value to those students yet to enter college. The data collected from the replies to these questionnaires will be a very important input in the decisions affecting curricula in the community colleges. Future students will benefit from your experience.

No individuals will be identifiable in the report, and all answers will be used for research purposes only.

In order to expedite this study, we would greatly appreciate your cooperation in returning the completed questionnaire within one week.

Sincerely yours,

James A. Colston

James A. Colston
President

mb

The Bronx Community College is administered by the Board of Higher Education under the program of the State University of New York.

PLEASE ANSWER THE FOLLOWING QUESTIONS BY CHECKING ALL THE APPROPRIATE BOXES AND FILLING IN THE BLANKS

SECTION A

1. AGE
   - ☐ 20-25 ☐ 25-30 ☐ Over 30

2. SEX
   - ☐ Male ☐ Female

3. MARITAL STATUS
   - ☐ Single ☐ Married ☐ Other

4. CHILDREN
   - ☐ None ☐ 1-3 ☐ More than three

5. HIGH SCHOOL DIPLOMA: _____ Month _____ Year
   - ☐ Academic
   - ☐ General
   - ☐ Technical
   - ☐ Commercial
   - ☐ Vocational
   - ☐ High School Equivalency

6. AAS DEGREE: _____ Month _____ Year
   - ☐ Accounting
   - ☐ Business Technology
   - ☐ Chemical Technology
   - ☐ Civil Technology
   - ☐ Pre-Pharmacy
   - ☐ Commercial Art
   - ☐ Construction Technology
   - ☐ Data Processing
   - ☐ Dental Hygiene
   - ☐ Dental Laboratory Technology
   - ☐ Electrical Technology
   - ☐ Graphic Arts
   - ☐ Hotel Technology
   - ☐ Marketing and Retailing
   - ☐ Mechanical Technology
   - ☐ Medical Laboratory Technology
   - ☐ Nursing
   - ☐ Secretarial Studies
   - ☐ Performing Arts – Music
   - ☐ Other_____

7. If you changed your major during your community college career, what was your original area of study?_____

8. If, when you graduated from high school, you could have entered any of the colleges in the City University and enrolled in any program you wanted, what would your first choice have been?

   College _____

   Course of Study_____

9. Upon graduation from community college, what did you do?
   - ☐ Accepted a job
   - ☐ Accepted a job and continued my education – part-time
   - ☐ Continued my education–full-time
   - ☐ Entered the Armed Forces
   - ☐ Married and became a housewife
   - ☐ Other: Please explain

     _____

     _____

SECTION B

JOB HISTORY

10. First Position after Graduation Located Through

- ☐ College Placement Office
- ☐ Other College Contact
- ☐ State Employment Service
- ☐ Private employment agency
- ☐ Newspaper advertisement
- ☐ Relative or friend
- ☐ Other: Please explain _____

11. Was your first job after community college graduation

- ☐ In the field for which you were trained at community college?
- ☐ Unrelated to your community college training?

Briefly describe this job.

_____

12. What are you doing now?

- ☐ Working
- ☐ Working and continuing my education — full-time
- ☐ Continuing my education — full-time
- ☐ Regular Armed Services
- ☐ Housewife
- ☐ Other: Please explain _____

13. If you are working, is your present job

- ☐ In the field for which you were trained at community college?
- ☐ Unrelated to your community college training?

Briefly describe this job:

_____

_____

14. Since graduation from community college, how many positions have you held?

☐ None ☐ 1 ☐ 2 - 4 ☐ 5 or more

How many employers have you worked for?

☐ None ☐ 1 ☐ 2 - 4 ☐ 5 or more

15. Have you ever been employed by the:

- ☐ Municipal government?
- ☐ State government?
- ☐ Federal government?
- ☐ None of the above.

If your answer is yes to any of the above, please state:

Name of Agency _____

Job Title _____

- ☐ Provisional appointment
- ☐ Civil Service Examination

SECTION C

EDUCATION HISTORY

16. If you continued your education immediately after community college graduation, were you:

☐ A full-time day student? ☐ A part-time day student? ☐ An evening student?

17. What kind of educational institution have you attended?

☐ Another 2-year college

☐ A 4-year college within the City University system. _____
Name

☐ Another 4-year college. _____
Name

☐ A professional or technical school. _____
Name

☐ Other: Please Explain _____

18. Have you earned a Baccalaureate Degree?

☐ Yes ☐ No

If yes:

Date: _____ _____
Month Year

Area of Study _____

19. Are you now enrolled in a Baccalaureate Degree Program?

☐ Yes ☐ No

If yes:

Expected date of completion: _____ _____
Month Year

Area of Study _____

20. Do you have any plans for graduate work beyond the Baccalaureate?

☐ Yes ☐ No

If yes:

Name the Degree _____

Expected date of completion: _____ _____
Month Year

21. To recap your Job History and Education patterns, in the 36 months or more since graduation from community college, please give the following information. Please answer all that apply.

Activity	Number of months
☐ Full-time work – no study	_____
☐ Full-time work – no evening study	_____
☐ No work – full-time day study	_____
☐ Part-time work – no study	_____
☐ Part-time work – Part-time study	_____
☐ Unemployed – No study, but seeking work	_____
☐ Unemployed – by preference. No study	_____
☐ Armed Forces	_____
☐ Other: Please explain _____	_____

SECTION D

22. How important was your community college training in **obtaining** your first job?

☐ Requirement
☐ Important
☐ Relevant, but not very important
☐ Irrelevant

23. How important was your community college training in **performing** your first job?

☐ Important ☐ Relevant, but not important ☐ Irrelevant

24. For purposes of performing the job, should the emphasis on the following community college courses have been?

Skills courses
☐ greater
☐ same
☐ less

Liberal Arts courses
☐ greater
☐ same
☐ less

25. For purposes of advancement on the job, should the emphasis on the following community college courses have been?

Skills courses
☐ greater
☐ same
☐ less

Liberal Arts courses
☐ greater
☐ same
☐ less

26. What was your annual salary on your first full-time job?

☐ Under $5,000
☐ $5,000 - 7,500
☐ $7,501 - 10,000
☐ Over $10,000
☐ Exact salary if you wish to reveal it. _____

27. What is your annual salary on your present job if full-time?

☐ Under $5,000
☐ $5,000 - 7,500
☐ $7,501 - 10,000
☐ Over $10,000
☐ Exact salary if you wish to reveal it. _____

28. Based on your experience, what do you now think should have been your college major?

_____

29. If working is necessary in order for you to continue further education, has the career program in which you received your AAS degree been instrumental in helping you find a job with the salary you require?

☐ Yes ☐ No

30. Would another career program have been just as useful?

☐ Yes ☐ No

31. Would a liberal arts degree have served the same function?

☐ Yes ☐ No

32. Use this space for any comments about your community college experience.

We would like to follow up this questionnaire with interviews. If you are willing to discuss the areas covered above in greater detail, please sign below.

Name: _____

Address: _____

Phone: _____

INSTRUCTIONS FOR MAILING

Thank you for completing this questionnaire.
Insert in enclosed stamped, addressed envelope and
mail it as soon as possible.

The City University of New York

Appendix B

Office of the Dean for Community College Affairs
535 East 80 Street, New York, N.Y. 10021
212/360-2154

February, 1970

Dear Graduate:

As a 1966 A.A.S. graduate of a community college of the City University of New York, you were recently sent a letter by your college president asking you to complete a questionnaire on your education and employment history after graduation. To date, we have not received your response.

We are, therefore, sending you this duplicate questionnaire, and take the opportunity to explain further its importance to the University, your college, and the students who will be following your educational path through the community colleges.

The University is currently examining its entire structure, and is most eager to be apprised of the opinions and perceptions of its recent graduates. The information contained in these questionnaires will be of major importance in determining future directions for the community colleges. It is vital, therefore, that we hear from as many graduates as we can reach, so that the University, as it makes its plans for the future, is responsive to the ideas and suggestions of the graduates of those colleges. YOUR RESPONSE IS VERY IMPORTANT!

Please fill in the questionnaire now. It will take but a few minutes. We are working toward an early completion of our study, and we will share the findings with you.

Thank you very much for your cooperation.

Sincerely,

Martin G. Moed

Martin G. Moed
Associate Dean for Community College Affairs

MGM:amc
Enclosure

VT 014 452
HUSUNG, WILLIAM T., JR.
DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES. A STUDY SUMMARY.

CALIFORNIA COMMUNITY COLLEGES, SACRAMENTO.
DIV. OF VOCATIONAL EDUCATION.
MF AVAILABLE IN VT-ERIC SET.
PUB DATE - JAN70 56P.

DESCRIPTORS - *DRAFTING; *DRAFTSMEN; *PROGRAM PLANNING; EDUCATIONAL NEEDS; AUTOMATION; *STATE SURVEYS; *COMMUNITY COLLEGES; SCHOOL INDUSTRY RELATIONSHIP; PROGRAM EVALUATION; QUESTIONNAIRES; INTERVIEWS; EMPLOYEE ATTITUDES; EMPLOYER ATTITUDES
IDENTIFIERS - *CALIFORNIA

ABSTRACT - THIS STUDY WAS CONDUCTED TO DETERMINE: (1) THE EFFECTS OF AUTOMATION ON THE NEEDS OF INDUSTRY FOR DRAFTSMEN WITH GENERAL VERSUS SPECIALIZED TRAINING, AND (2) THE CURRICULAR REVISIONS IN VOCATIONAL DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES TO MEET THE NEEDS OF AUTOMATION. A SURVEY QUESTIONNAIRE WAS SENT TO 87 COMMUNITY COLLEGES, AND 35 INDUSTRIES AND PROFESSIONAL OFFICES WERE VISITED TO GATHER DATA. DRAFTSMEN FELT THAT IF THEY NEEDED ANY FURTHER TRAINING FOR DEALING WITH COMPUTER-AIDED DRAFTING THAT IT SHOULD BE DONE ON THE JOB. IT WAS FOUND THAT AUTOMATION AND NUMERICAL CONTROL MACHINING WERE HAVING VERY LITTLE EFFECT ON THE NEEDS FOR DRAFTSMEN. THE RECOMMENDATIONS, IN GENERAL, WERE FOR TEACHERS WHO WERE MORE FAMILIAR WITH CURRENT PRACTICES IN DRAFTING TO BRING THE JOB SITUATIONS INTO THE CLASSROOM OR TO HELP THE STUDENTS OBSERVE THE WORK OF THE DRAFTSMEN AS THEY WOULD FIND IT ON THE JOB. THE NUMBERS OF DRAFTING PROGRAMS FOUND AND THE DIVERSITY OF DRAFTING COURSES SEEMED TO INDICATE THAT THE NEEDS OF INDUSTRY WERE BEING MET. THE RESULTS OF THIS STUDY ARE INTENDED FOR USE BY TEACHERS, ADMINISTRATORS, AND COUNSELORS IN COUNSELING AND PLANNING ON THE HIGH SCHOOL AND COMMUNITY COLLEGE LEVEL. (AUTHOR/GEB)

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DRAFTING PROGRAMS IN CALIFORNIA COMMUNITY COLLEGES

A STUDY SUMMARY

for

The Division of Vocational Education

Office of the Chancellor

California Community Colleges

by

William T. Husung, Jr.

January 1970

VT014452

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4129

FOREWORD

The information presented herein is a summary of the final report of a study entitled: A STUDY OF THE EFFECTS OF AUTOMATION ON THE NATURE OF THE WORK OF THE DRAFTSMAN IN INDUSTRY, AND THE INNOVATIVE PROGRAMS OF INSTRUCTION FOR AUTOMATED DRAFTING IN SELECTED JUNIOR COLLEGES IN CALIFORNIA TO BE USED FOR CURRICULAR REVISION. The original study was performed pursuant to a grant from the U. S. Office of Education, Department of Health, Education, and Welfare.

The opinions expressed herein do not necessarily reflect the position or policy of the U. S. Office of Education nor that of the Office of the Chancellor of the California Community Colleges.

Both the original study and this summary are the work of William T. Husung, Jr., of Citrus College, Azusa, California; and his efforts are greatly appreciated.

The contents of this summary should be of value to Community Colleges and advisory committees in initiating new drafting programs and courses and in up-dating present programs.

Leland P. Baldwin
Assistant Chancellor
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PREFACE

The need to provide quality education and training in the vocational fields is an ever-present problem in a rapidly changing technological society. Vocational instructors in the schools and colleges need to keep abreast of the changing demands of workers in industry in order to keep their programs relevant. Periodic analysis of workers' tasks is needed to determine meaningful revisions in educational objectives and course content. Because individual instructors have time for only local or cursory studies of the needs of industry, periodic studies of greater scope will help schools and instructors evaluate their existing programs and plan new ones which will meet the needs of both the students and the industries they serve.

The concept of automated drafting presents many possibilities for valuable research projects and reports. No attempt was made in this study to describe the various types of automated drafting devices in use today or planned for use in the near future. Recent publications on computer graphics will provide the reader with detailed information on the machines and their capabilities.

This is a study of the draftsmen who are or will be working closely with the machines, a study of their current job needs and functions, and their recommendations for upgrading drafting training. The draftsmen, supervisors, and managers who participated in this study gave their time and knowledge of the present needs of draftsmen and their opinions of the future needs to help those who will be working to establish and maintain the communication links from research and design to documentation and production. These men and women were most eager to cooperate with a study that might help to promote better recognition of the professional technician status of the service occupations which tend to be overlooked in the glamour and excitement of scientific discoveries and advancing technologies.

This is also a study of the present training programs in the community colleges of California. Whether they are referred to as "junior colleges," "community colleges," "city colleges," or any of the other popular names, the public two-year colleges in California represent a facet of education unparalleled in any other state or in any other country of the world. It is hoped that the practices and programs reported by the California Community Colleges will be of value to the study or development of college drafting programs elsewhere.

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TABLE OF CONTENTS

		PAGE
	FORWARD	i
	PREFACE	ii
	ACKNOWLEDGEMENTS	iii
	LIST OF TABLES	v
I.	SUMMARY	1
II.	DRAFTING PROGRAMS IN THE CALIFORNIA COMMUNITY COLLEGES	5
III.	THE CURRENT NEEDS OF DRAFTSMEN IN INDUSTRY	19
IV.	CONCLUSIONS AND RECOMMENDATIONS	41

LIST OF TABLES

TABLE		PAGE
I.	Number of California Community Colleges Offering Drafting Programs of Various Types	6
II.	Enrollments in California Community College Drafting Programs in 1968 as Shown by Number of Colleges Reporting	8
III.	Number and Percentages of Community Colleges Requiring Assorted High School Drafting Courses As Prerequisites to Their Drafting Programs	10
IV.	Percentages of California Community Colleges with Drafting Programs Requiring Specified Number of Units of Each of the Drafting Courses in Selected Drafting Programs	12
V.	Number of Colleges Requiring Specified Ranges of Units of Related Courses for the Selected Drafting Programs	14
VI.	Mean Ratings of the Needs for Blueprint Reading in Selected Fields by Draftsmen, Supervisors, and Instructors	23
VII.	Mean Ratings of the Needs for Design Drafting Skills in Selected Fields by Draftsmen, Supervisors and Instructors	24
VIII.	Mean Ratings of the Needs for Detail Drafting Skills in Selected Fields by Draftsmen, Supervisors and Instructors	26
IX.	Mean Ratings of the Needs for Lettering Skills in Selected Fields by Draftsmen, Supervisors and Instructors	27
X.	Mean Ratings of the Use of Various Sources of Information in Selected Fields by Draftsmen, Supervisors and Instructors	27
XI.	Mean Ratings of the Use of Tools, Equipment and Measurements in Selected Fields by Draftsmen, Supervisors and Instructors	29

4134

TABLE PAGE

XII. Mean Ratings of the Use of Various Drafting Materials in Selected Fields by Draftsmen, Supervisors and Instructors 30

XIII. Mean Ratings of the Use of Mathematics and Geometric Constructions in Selected Fields by Draftsmen, Supervisors and Instructors 32

XIV. Mean Ratings of the Types of Drawings Made by Draftsmen in Selected Fields by Draftsmen, Supervisors and Instructors 33

XV. Mean Ratings of the Use of Computer Print-out Information and Computer Languages in Selected Fields by Draftsmen, Supervisors and Instructors . . 36

XVI. Mean Ratings of the Use of Drawing Reproduction Equipment and Scissors Drafting Techniques in Selected Fields by Draftsmen, Supervisors and Instructors 37

XVII. Mean Ratings of the Need for Related Information and the Related Duties of Draftsmen in Selected Fields by Draftsmen, Supervisors and Instructors . . 39

I. SUMMARY

Purposes

The purposes of this study were to determine:

1. The effects of automation on the needs of industry for draftsmen with general versus specialized training.
2. The curricular revisions in vocational drafting programs in California Community Colleges to meet the needs of automation.

Procedures and Populations

A total of thirty-five industries and professional offices throughout California were visited and 219 draftsmen and 58 supervisors were interviewed. The draftsmen were selected from the fields of architecture, and civil, electronics, mechanical and structural engineering. Included in the interview procedure was the use of a rating scale check list of 173 job skills and functions representative of draftsmen's duties.

A survey questionnaire was sent to eighty-seven public community colleges in California:

1. To determine the general nature of their drafting programs.
2. To identify those colleges that had demonstrated progress in planning for and providing instruction in computer assisted design and drafting for numerical control.
3. To identify those colleges that had established option programs in drafting for the specialized disciplines of architecture, engineering and production.

Personal visits were made to twenty of the most innovative colleges and forty-four instructors were interviewed. The same drafting skills check list was used to compare the emphasis of their programs with the needs expressed by draftsmen in industry.

Results

The draftsmen in industry indicated that they had very little need for skills or knowledge regarding computer-aided drafting at present, and if any training was needed in the future, it would probably best be done on the job to suit the types of equipment installed by the company. There was not any great amount of agreement as to how limited or specialized a draftsman should be. However, most draftsmen seemed to favor flexibility at least to the point of being

capable of working in two related fields such as electronics and mechanical drafting or architectural and structural drafting so that they might be easier to place when work loads required reassignments of personnel.

Automation is not greatly influencing the needs for draftsmen. Draftsmen are still very much in demand, and well-trained draftsmen will be needed for many years to come. In some fields the automated devices are taking over some of the tedious detail drafting previously done by engineers. Some of the lettering operations on drawings and material lists previously done by draftsmen are being performed on typewriters and other type printing devices. Although this procedure may not be considered automated in an electronic sense, it may be thought of as an improvement in the overall system of production of drawings as a result of new equipment in drafting technology.

Numerical control machining operations were found to have little effect on the draftsman's work particularly for those that have been working with a form of base-line or coordinate dimensioning applicable to numerical control. Conventional working drawings made using these systems of dimensioning are satisfactory for current part programming operations.

The draftsmen and supervisors suggested curriculum revisions for the vocational drafting programs that would include more emphasis on:

1. Related technologies with shop work or laboratory demonstrations of industrial practices.
2. Instruction in basic drafting techniques according to industrial standards and professional practices.
3. Professional and office practices in documentation.
4. Work experiences or field trips to observe drafting practices.
5. Mathematics--generally through trigonometry.

The recommendations in general were for teachers who were more familiar with current practices in drafting to bring the job situations into the classroom or to help the students observe the work of the draftsmen as they would find it on the job.

Of eighty-seven public community colleges in California, eighty-one responded to the survey, and sixty-seven reported some type of drafting program. The drafting programs offered by the community colleges in the order of frequency named were: general drafting 53, architectural drafting 45, mechanical drafting 44, electronics drafting 31, civil drafting 20, and structural drafting 15. Nine other specialized drafting options were reported, but none of them by more than one college.

Only one college reported having a computer aided cathode ray tube for the use of drafting students. Two colleges reported having digitizers, and two others reported having plotters for the use of students on campus. Several colleges added that they were hoping to obtain some type of automated drafting equipment in the near future. Only eight of the colleges indicated that they offered courses in data processing or computer programming that were required or recommended for draftsmen.

The question of college programs meeting the needs of industry would seem to be answered by the numbers of drafting programs and the diversity of drafting courses being offered. The wide range of specialized courses in drafting supplementing the broad, general fields of engineering and production indicate an attempt to satisfy local needs and desires as expressed by local advisory committees. It might be pointed out that this factor of specialized drafting courses to meet the needs of local industries identifies the two-year college in California as a community college, unstructured by state or parent university requirements, and flexible enough to initiate innovative courses or programs to meet the changing needs of a rapidly advancing technological society, whichever way the development progresses in the environment of the particular college.

Definition of Terms

Draftsman's needs: as used in this study included the skills, functions and tasks required by the draftsman in the usual performance of his job. These skills were grouped under eighteen general titles:

Reading Blueprints	Mathematics You Use
Design Drafting	Geometric Constructions
Detail Drafting	Types of Drawings You Make
Lettering	Printout Information
Sources of Information	Languages
Tool and Equipment	Reproduction Equipment
Measurements	Scissors Drafting
Materials You Draw On	Related Information
Materials You Draw With	Related Duties

Draftsmen, detailers, and designers: technicians whose major functions are drafting. The term, draftsmen, is usually understood to be a more general classification of both detailers and designers. The distinction is often made between detail draftsmen and design draftsmen. Some examples of the classifications of draftsmen will help to demonstrate the various levels of detailers and designers and their corresponding pay rates and required education and experience. Neither the job titles nor the numbers of classifications of detailers or designers will be found consistent throughout the industry, and the pay rates and education and experience do not represent the policies of any particular firm. However, the examples should be of value in distinguishing the various levels of classifications.

Classifications of Draftsmen

General Classification	Pay Range $ per hr.	Education - Experience
Detailers		
C. Tracers or Apprentices	2.00 - 2.50	High School Mechanical Drawing
B. Detailers or Jr. Draftsmen	2.40 - 2.90	2 yrs. H.S. M.D. + 1 yr. exp. or Jr. Col.
A. Sr. Draftsmen	2.80 - 3.30	H.S. M.D. + 3 yrs. exp. or Jr. Col. + 1 yr.
Designers		
C. Jr. Designers	3.20 - 4.10	H.S. M.D. + 5 yrs. exp. or Jr. Col. + 2 yrs.
B. Designers	4.00 - 4.80	Jr. Col.+ 4 yrs. exp.
A. Senior Designers	4.50 - 5.00	Jr. Col. + 5 yrs. exp. or B.S. + no exp.

As the classifications of draftsmen are not consistent throughout industry and each firm or professional office used its own system, the drafting managers responsible for the selection of participants were asked to identify "middle level designers" and "middle level detailers" for the two levels of draftsmen to be sampled. This method of identifying draftsmen for the sample seemed to present less difficulty than selection on the basis of one of the systems with finer classifications; and yet it provided participants that were sufficiently consistent in their levels and functions.

Review of the Purposes

The purposes of this study were to provide drafting instructors, and others who might be interested, with information regarding the needs of draftsmen as they were being affected by automation in various fields, and to provide better understanding of the existing programs in general and specialized drafting in the Community Colleges of California.

II. DRAFTING PROGRAMS IN THE CALIFORNIA COMMUNITY COLLEGES

Types of Drafting Programs Reported

As shown in Table I, of the 67 California Community Colleges that reported that they offered some form of vocational drafting program in 1969, general drafting was offered by 52 colleges, mechanical drafting by 45, structural drafting by 16, architectural drafting by 46, civil drafting by 21, electronics drafting by 31, and other specialized areas of drafting were offered by 13 colleges. The "other" drafting programs mentioned by the colleges were, "tool design," "aerospace design," "marine technology," "Naval drafting," "industrial-mechanical engineering," "technical design," and "piping."

In the past it was common practice to offer as a drafting program the first year or even both years of the engineering transfer program. This approach was reasonable when the engineering transfer program included eight to ten units in drafting, technical courses in machine shop and foundry practice, surveying, building construction or practical laboratory courses in electricity and electronics.

However, as the engineering transfer program has been modified to eliminate the practical courses and emphasize theory, the desirability of using many engineering courses for draftsmen becomes questionable. To complicate matters, programs with such titles as drafting technology, engineering technology and industrial technology have been introduced with various suggestions and recommendations for the types of courses to be included in such type of program.

Eighty-eight programs were reported as offering certificates of completion. Some of these may be the two-year programs identical to the A.A. degree requirements. Usually, however, they are thought of as the technical core of the A.A. degree program that might be completed in one year for technical competency, sacrificing the general education and other A.A. degree requirements in order to gain occupational skills sooner.

Trade related courses may vary from a few units of electronics drafting for an electronics technician or general mechanical drafting for a forestry major to an extensive map drafting and photogrammetry course for civil technicians, or considerable machine drafting for tool designers. These programs and courses are not primarily designed for draftsmen. Technicians who complete the courses may have many other duties other than drafting. However, in many cases the technicians may be employed as draftsmen for some time on the strength of these courses. Therefore, these related courses may be the only introduction a student will get to the drafting skills that may later comprise a large part of his on-the-job duties, and as such they might well be included in a discussion of vocational drafting programs.

TABLE I

NUMBER OF CALIFORNIA COMMUNITY COLLEGES OFFERING
DRAFTING PROGRAMS OF VARIOUS TYPES
N = 67 COLLEGES*

Options	A.A. Degree Program Only	Cert. Prog. Only	Trade-Related Program Only	A.A. and Cert.	A.A. and Trade-Related	Cert. and Trade-Related	All 3 Types of Programs	Total (One Type or Another)	Available Days	Available Nights
Gen. Draft.	19	1	8	9	3	3	9	52	46	36
Mech. Draft.	15	0	6	10	2	4	7	44	40	31
Struct. Draft.	7	1	5	2	0	1	0	16	10	5
Arch. Draft.	22	1	2	13	3	2	3	46	39	25
Civil Draft.	7	0	6	3	2	2	1	21	16	8
Elect. Draft.	7	3	13	2	1	2	3	31	22	21
Others	7	2	4	5	1	0	2	21	11	8

* Of 81 responding colleges, 67 reported some type of vocational drafting program.

At the present time, there seems to be no widely followed plan for vocational drafting programs. In some colleges it appears to be considered only as a second choice for those who drop out of engineering programs. In other colleges drafting is a part of a specialized technology program and represents only a part of the responsibilities of a technician in that field. Under still different organizational structures, drafting technology is considered to be a program in itself providing general drafting skills as common to all engineering and architectural practice and incorporating sufficient specialized drafting and related shop or laboratory experience to produce cognizant design technicians in one or more specific engineering fields.

Enrollments in Drafting Programs

Information on enrollments as shown in Table II can be helpful not only in studying the attrition of students in the drafting programs, but also in roughly defining the comparable sizes of programs in the various fields. The largest programs reported were in general drafting, and only one college reported having over 50 students complete the program in that field in Spring of 1968.

The programs in mechanical drafting and architectural drafting were slightly smaller both in number of colleges offering the programs and in the number of students enrolled. Structural, civil, and electronics drafting were considerably smaller in both categories.

The data shown in Tables I and II would indicate that relatively few colleges offer vocational drafting programs in specialized fields. Even in the more general areas drafting enrollments are small. Only one college reported more than thirty students completing the program in June, 1968.

Specialized Drafting Courses Recently Added

At the time of the study 33 of the 67 colleges had added new drafting courses within the previous three years. Only one college reported the addition of computer drafting, and none reported any course in drafting for numerical control.

The courses reported as having been added in the previous three years and the number of colleges reporting each were as follows:

Electrical or electronics drafting	7
Technical illustration	6
Tool drafting	4
General drafting technology	4
Civil drafting	3
Mechanical drafting	3
Computer drafting	1
Structural drafting	1
Specifications writing	1
Aircraft master layout	1
Blueprint reading for marine technicians	1
Sheet metal drafting	1
Optics drafting	1

TABLE II

ENROLLMENTS IN CALIFORNIA COMMUNITY COLLEGE DRAFTING PROGRAMS IN 1968
AS SHOWN BY NUMBER OF COLLEGES REPORTING
ENROLLMENTS IN SPECIFIED RANGES
N = 67 COLLEGES*

	APPROXIMATE NUMBER OF STUDENTS ENROLLED IN SPRING 1968								APPROXIMATE NUMBER OF STUDENTS WHO COMPLETED IN JUNE 1968			
	1st Year Program				2nd Year Program							
Options	1-14	15-29	30-50	Over 50	1-14	15-29	30-50	Over 50	1-14	15-29	30-50	Over 50
	Number of colleges				Number of colleges				Number of colleges			
Gen Draft.	5	15	10	17	15	9	3	6	20	12		1
Mech. Draft.	14	14	6	6	16	8	8	2	22	4		
Struct. Draft.	5	6			8	1			6	1		
Arch. Draft.	8	13	12	8	16	12	3	1	15	15		
Civil. Draft.	7	7			10	2	1		11	1		
Elect. Draft.	5	5	2	2	8	3	1		6	3		
Others	1	11			3	7	1		9	2		

* Of 67 colleges reporting drafting programs, 7 colleges had no figures available for enrollments in specific options.

Mathematics Prerequisites

One of the characteristics often used to distinguish technical education from vocational education or to distinguish engineering technology from industrial technology has been the level of mathematics required in the training. The work of the draftsman is sometimes assumed to be a technical job, requiring mathematics through trigonometry and even by some to require some calculus. At the same time other drafting positions require greater emphasis on the techniques of line work and lettering, more understanding of materials and processes of manufacturing and competency with mathematics only as far as simple algebraic calculations with fractions and decimals.

The seemingly rigorous prerequisite of trigonometry as a requirement for entering a drafting program probably reflects the position of those community colleges that offer drafting as a part of the engineering transfer program only. At these colleges a student would take descriptive geometry or graphics in his first year and trigonometry would be a reasonable prerequisite. The same attitude is observable in the architectural drafting requirements as schools set up their programs to include enough transfer work to enable students to continue to the four-year colleges with as much credit as possible.

Approximately half the programs required technical mathematics with little less than half requiring trigonometry. There did not appear to be any great differences in the requirements for the various fields of drafting except that civil and electronics drafting require trigonometry by a larger proportion of colleges and calculus is required for structural drafting more than it is for other fields. It might be of interest to note that analytic geometry and calculus were required in a very small percentage of the programs although some current writers are stressing the need for mathematics at these levels for computer graphics and numerical control.

Some college drafting programs are described as mechanical drafting, 15 units, or architectural drafting, 12 units, and the entire drafting program in one area is taught as a block. Within this block there may be many experiences in such topics as geometric constructions, right-angle trigonometry, or problems applicable to structural or civil engineering without the identification of these experiences as courses. For this reason it is difficult to compare programs or generalize about them on the basis of traditional course titles. Moreover, as some schools are offering mathematics courses designed to incorporate more modern mathematics concepts the more analytical theories for science and engineering and de-emphasizing the applications and constructions so meaningful to the draftsman, it is not always possible to identify the mathematical concepts to which a drafting student has been exposed by reviewing the cataiog course names and course descriptions. Further analysis of the course objectives, content and emphasis would be needed to adequately describe a school's offering.

TABLE III

NUMBER AND PERCENTAGES OF COMMUNITY COLLEGES REQUIRING ASSORTED HIGH SCHOOL DRAFTING COURSES AS PREREQUISITES TO THEIR DRAFTING PROGRAMS

Options	N^1	No Response	N^2	PREREQUISITES					
				None	1 yr. H. S. Mech. Draw.	2 yr. H. S. Mech. Draw.	H. S. Arch. Drafting	H. S. Elect. Drafting	Other
Gen. Draft.	52	2	50	27 54%	20 40%	3 6%			
Mech. Draft.	44	6	38	16 42%	16 42%	6 16%			
Struct. Draft.	16	2	14	7 50%	4 28%	3 22%			
Arch. Draft.	46	3	43	13 30%	17 40%	10 23%	2 5%		1 2%
Civil Draft.	22	3	19	8 42%	8 42%	3 16%			
Elect. Draft.	31	5	26	10 38%	11 42%	4 15%		1 4%	

N^1 = Number of colleges reporting the specified community college drafting programs, see Table I.

N^2 = Number of colleges responding to question 6.

Prerequisite Drafting Courses

Approximately 40 percent of the colleges required one year of high school mechanical drawing as prerequisite to the various drafting programs. About 20 percent required two years of high school mechanical drawing. Only 10 percent of the architectural programs had a prerequisite of high school architectural drawing and only one college required high school electronics drafting.

This question is important from the standpoint of articulation with high schools as students who have had one or two years of valuable drafting experience in high school should not be made to start with beginning drawing in college. However, many students may be unable to take mechanical drawing in high school for various reasons including the following: courses not offered or not included in an academic program for college preparation, or student's lack of interest or knowledge of the importance of the subject. These students should have the opportunity to take the beginning drafting courses without college credit; but to complete the program they should expect to need more than the two years required of students who come into the program with the better preparation.

The responses shown in Table III would indicate that colleges tend to require some high school preparation for the vocational-technical program in drafting. This practice not only assumes a higher level approach to the college program, but it recognizes the merits of high school drafting programs, and encourages high school vocational drafting students to continue their training with college level drafting technology.

Drafting Courses Included Under Specific Programs

The colleges were asked the number of units of specific drafting courses required in the six most common drafting programs. The responses to this question show the tendencies to specialize and offer training in depth in certain fields such as mechanical and architectural drafting and the tendencies to provide broader training in other fields such as civil and structural drafting.

Table IV should be read as follows: twenty-five percent of those colleges with general drafting programs required 1 to 2 units of mechanical drawing, twenty percent require 3 to 5 units, twenty-eight percent required 6 to 9 units and eight percent of the colleges required 10 to 15 units of mechanical drawing.

Mechanical drafting and architectural drafting were the only fields in which colleges reported offerings of over 15 units in a specialized area. This would indicate considerable specialization in these areas at the particular colleges. However, the mechanical drafting option might well include instruction in some of the other areas even though specific courses were not defined as part of that option.

TABLE IV

PERCENTAGES OF CALIFORNIA COMMUNITY COLLEGES WITH DRAFTING PROGRAMS REQUIRING SPECIFIED NUMBER OF UNITS OF EACH OF THE DRAFTING COURSES IN SELECTED DRAFTING PROGRAMS

Options and Ranges of Units		N[1]	Mech. Dr.	Eng. Dr.	Desc. Geom.	Adv. Eng.	Arch. Dr.	Str. Dr.	Civ. Dr.	El. Dr.	Tech. Ill.	Art
			COURSES									
Gen. Dr..	1-2	41	25	25	38	13	5	18	18	18	5	10
	3-5		20	40	30	25	8	5	15	15	8	8
	6-9		28	3	3	13	15			5	5	
	10-15		8				3				3	
	Over 15											
Mech. Dr.	1-2	26	11	11	19	3		3	3	3	3	
	3-5		20	17	20	8	5	3	3	11	8	
	6-9		14	8		5	3					
	10-15		5			3						
	Over 15		14									
Str. Dr.	1-2	6	33	33	17					17		
		33		17	33		50	33				
	6-9		17			17		17				
	10-15											
	Over 15											
Arch. Dr.	1-2	31	10	3	10			7	3			
	3-5		16	7	22	3	22	13			10	13
	6-9		13			3	25					3
	10-15		3				29					
	Over 15		3				22					
Civ. Dr.	1-2	14	29	7	29		14	14	14	7		
	3-5		29	29	3	7	14	7	36			
	6-9		7			7	7		14			
	10-15											
	Over 15											
El. Dr.	1-2	14	14	21	14					14		
	3-5		50	7			14	7		36	21	
	6-9		7							36		
	10-15											
	Over 15											

N[1] = Number of colleges reporting the units of specified courses required in drafting programs under the various options.

The application of the traditional courses in engineering drawing, descriptive geometry, and advanced engineering drawing to the specialized options might indicate the appreciation of fundamentals and theory applicable to the various disciplines. It might also be indicative of the hopes of colleges to provide as many units of transferable work as possible to encourage students to continue on to the four-year college.

The relatively few specialized drafting programs offering more than nine units in a specific area together with the large number of programs offering courses in several areas for a specific option would indicate an emphasis on breadth rather than depth or at least breadth as well as depth.

Related Courses in the Drafting Programs

The efficiency of a draftsman is often as dependent upon his knowledge of the mathematics, science, and technologies related to his field as it is upon his skill in drafting. The incorporation into a drafting program of enough related course work will help make it an effective one for training competent draftsmen. Table V shows the number of colleges that included courses in various related subjects and the distribution of units required in each related subject for the specified options.

It will be noted that the related courses were required most in the general drafting programs. Mechanical drafting options and structural drafting options required machine shop or metals courses and physics to a greater degree than they required any of the other related courses. Architectural drafting and civil drafting options made greater use of related courses in materials and surveying than other options did, and showed an interest in more units of physics. In electronics drafting programs, physics was required more than any other related course.

Chemistry was required in a drafting program by less than twenty percent of those reporting. Therefore, chemistry seems to be the least required of any of the related courses suggested. The only "other" related courses written in for more than one program were "technical mathematics," by 7 colleges; and "strength of materials," by 4 colleges. (The requirements of technical mathematics were covered under a separate question.)

Drafting Courses for Numerical Control and Computer Graphics

One of the questions regarding offerings in "drafting for numerical control," "computer-aided drafting," "data processing," or other specialized courses was posed in an attempt to learn of any specific courses related to automation being offered for draftsmen. Only eight of the colleges stated that they offered such a course, fifty-nine

TABLE V

NUMBER OF COLLEGES REQUIRING SPECIFIED RANGES OF UNITS OF RELATED COURSES FOR THE SELECTED DRAFTING PROGRAMS
N = 67 COLLEGES

Options and Ranges of Units		N[1]	COURSES Mach. Shop or Metals	Matls. Lab.	Survey-ing	Phys-ics	Chem.	Indus. Pro-cesses	Others
Gen.	1-2	34	3	5		1	1	4	2
Dr.	3-4		13	11	9	13	7	6	1
	5-6		5	1	1	5			
Over	6		1			4			3
Mech.	1-2	24	3	2				3	2
Dr.	3-4		7	5	3	9	3	4	1
	5-6		5			4		2	1
Over	6		2	1		4			2
Str.	1-2	5	1					1	
Dr.	3-4		1	1	1	2		1	3
	5-6		2		1		1		1
Over	6								
Arch.	1-2	26	1	4	2			1	1
Dr.	3-4			5	10	6	1	2	2
	5-6		2	2	2	1			1
Over	6					5			1
Civ.	1-2	22	1	2				1	
Dr.	3-4		1	2	4	5	2	2	1
	5-6		1	1	4	2	1		1
Over	6				4	4			
El.	1-2	8	1	2		1		1	
Dr.	3-4		2	1		3	2	2	
	5-6		1		1	1	1		1
Over	6					1			1

N[1] = Number of colleges reporting the units of specified related courses required in drafting programs under the various options.

indicated they did not. Those courses that were listed or offered are shown below with the number of times each was mentioned:

Introduction to data processing	5
Computer programming (Fortran)	3
Computer graphics	1
Numerical Control for the Technician program	1

Seven of the colleges that stated they did not offer such a course, stated that they did, however, include numerical control in advanced drafting courses. Two of the colleges indicated that they were developing plans to offer a course in computer graphics.

Work Experience and Work Study Programs

Work experience or work study programs for training draftsmen on the job is being used by the two-year colleges to some extent. Of the sixty-seven respondents, seventeen replied that they had some program of this type. Of the seventeen colleges that indicated they had such a program, twelve gave figures on the number of students participating in them, five did not. Nine colleges indicated that less than 10 students participated in their programs, one said 12 students, one said 50, and one said 60 students participated in the program at that college. The results of this question would indicate that while only three colleges have work experience programs that might involve as many students as a class, other colleges are experimenting with this form of training with smaller numbers of drafting students.

Several respondents indicated that although they had no formal work programs, many students did work part-time in drafting jobs. To the question about time spent on the job, nine reported 20 hours or more per week. The others suggested a variety of lesser times or failed to give any figures. A variety of times was also given for the number of hours spent in the classroom accompanying the work experience programs. The majority of the responses indicated a program of ten to fourteen hours per week in the classroom.

Advisory Committees for Special Drafting Options

The use of advisory committees is one measure of a college's efforts toward meeting the needs of industry and keeping its vocational programs up to date. For this reason an attempt was made to determine the number and kind of drafting committees currently established by colleges to assist them with their drafting programs.

Of the sixty-seven colleges reporting, nineteen had no drafting advisory committee. Some of the thirty-five that had general advisory committees also reported one or more special drafting advisory committees or special sub-committees. The areas listed most frequently for special drafting advisory committees were: architecture, 9; electronics, 5; mechanical drafting, technical illustration and engineering, each 4; and

engineering technology, structural drafting and civil drafting each by 3 colleges. Those special drafting advisory committees mentioned by only one college each were: specification writing, tool design, and marine technology.

Student Use of Automated Drafting Devices

Of the sixty-seven colleges offering drafting programs, thirty-eight indicated that they currently provided none of the experiences in automated drafting. Several, however, added that they were hoping to obtain computer assisted plotters or some piece of numerical control equipment in the near future.

One college reported having students use a light pen and digitizer, and see a plotter used on campus. Two other colleges reported that on campus the students used the plotters only. Two colleges reported some use of digitizers and plotters by students off campus. An additional nine colleges reported that students saw one or another of these computer graphic items used off campus.

Regarding the use of numerically controlled machine tools, seven colleges reported that students used this type of equipment on campus and another seven reported that students saw it used on campus. Eight other colleges reported that students saw this type of equipment used only off campus.

Two colleges reported student use of microfilm cameras, readers and printers on campus. Five other colleges reported that students used one or two of the items on campus. Two colleges reported that students saw microfilm readers used on campus; five others reported that students saw microfilm equipment used off campus.

Computer graphics equipment was reported to be used by students at only one or two colleges. Numerically controlled equipment was used by students in roughly ten percent of the colleges. Microfilm equipment was used a little less.

Some effort was reported to enable students to see this equipment or use it off campus, but generally only ten to fifteen percent of the colleges were providing this type of experience.

Undoubtedly the cost of automated graphics equipment is a significant factor in its use for college drafting programs. As the equipment becomes less expensive, more schools will no doubt include some of it in their programs. The extent to which this equipment is used by draftsmen in industry may be as significant a factor since there does not seem to be a great demand for it as was seen in the suggestions from advisory committees shown in other questions.

Plans for New Drafting Courses

Up to this point the questionnaire dealt exclusively with programs currently in practice. With the thought that due to automation there may be some new programs or changes to existing programs being planned for the near future, the colleges were asked, "What plans do you have for new offerings in drafting?" Twenty-eight of the colleges reported that they had plans for changes in the drafting program.

Among the more specific responses, three colleges indicated plans to add a course in computer aided graphics, and two colleges plan to add drafting for numerical control. These responses may be viewed as the amount of effect that automation is having on the plans for new courses or programs in drafting in the two-year colleges. However, it must be kept in mind that there may be changes in the contents of particular courses now being taught to include instruction in or about automated drafting as was suggested in the responses to other questions.

A review of the specific areas of changes planned showed that colleges intend to add the specialized areas that are listed below with the number of colleges indicating plans for each type of change.

Structural drafting	4
Architectural drafting	3
Civil technology	2
Industrial Drafting Practices	2
Electronics drafting	1
Electro-mechanical drafting	1
Map drafting	1
Oceanographics	1

Suggestions of broader changes in the drafting programs included plans for initiating a drafting technology major by three colleges and a first year "core" program with second year options in specialized fields by two other colleges.

Placement and Follow-up

Early in the consideration of criteria for the evaluation of vocational drafting programs, the question of placement and follow-up was suggested as significant in that these activities might indicate some practices used in contacting industries and keeping up with their needs. If the instructor is regularly communicating with industries as to their employment needs and getting information returned from the former students that have been placed in drafting jobs, he should be able to obtain valuable suggestions on the effectiveness of his training program.

To the first part of this question, "Is the instructor expected to contact industries for placement of students," 35 of the 67 colleges replied, "Yes," 32 replied, "No." To the question, "Do you have a

placement counselor other than instructors or education counselors who work with industry personnel to place students," 45 colleges replied, "Yes," 22 replied, "No."

The third and fourth questions in this group asked who had the most responsibility for placement and follow-up of students. The following list shows the general categories of replies with the number of colleges so responding.

	Responsibility for: Placement	Follow-up
Instructor	33	18
Placement counselor	12	14
Students	11	--
Department chairmen or Deans	5	21
General counselors	3	5
Visiting industrial personnel	3	--
No answer	3	1

In response to the questions about follow-up cards and letters, 31 colleges indicated that they used such a form; 34 indicated that they did not; 2 respondents did not answer this question. Of those 31 colleges that used follow-up forms, 28 replied that they also received some information on the effectiveness of their programs in this way.

A review of the responses to this question would indicate that in about one-half of the colleges that have drafting programs the instructor has the major responsibility for placement of the drafting students. In approximately one-fourth of the colleges the instructor has the responsibility for follow-up of the students. If the information obtained by the counselors, department heads or others is forwarded to the instructor, it would seem that he might be able to receive valuable suggestions for the up-dating of his program. It appears that placement and follow-up contacts with industry are used sufficiently by the instructors to warrant the consideration of such contacts by other instructors interested in program evaluation.

III. THE CURRENT NEEDS OF DRAFTSMEN IN INDUSTRY

Characteristics of the Draftsmen

An insight into the characteristics of the draftsmen interviewed was obtained from the compilation of the responses to the personal information on the cover sheet of each check list used in the interviews. The distribution of ages of the draftsmen interviewed was found to be as follows:

Age Range	Number of Draftsmen
Under 20	1
20-24	23
25-29	46
30-34	40
35-39	43
40-44	32
45-49	15
50-54	8
55-59	4
Over 59	0
Ages not given	7
Total	219

Responses to the personal information by the draftsmen interviewed revealed that 210 were male, and 9 were female. In response to the question asking the number of years the draftsmen had held his present classification, the data indicated that the lengths of time ranged from less than one-half year to twenty-five years. The mean of the lengths of time reported was 4.3 years in the present classification.

Training for the Present Job

The high school majors of the draftsmen in this study were reported as follows: general, 22%; Academic, 21%; Drafting, 15%; Mathematics or Science, 14%; Industrial Arts, 9% Engineering, 4%; Vocational Technology, 3%; and Art, 3%. The number of years of high school drafting taken by the participants were as follows: no drafting in high school, 23%; ½ year, 2%; 1 year, 21%; 2 years, 27%; 3 years, 12%; 4 years, 12%; 5 years, .5%; and 6 years, 1%.

The draftsmen indicated the extent to which the preparation for their present job consisted of courses in junior colleges, community colleges or technical institutes. Seventy percent had attended junior or community colleges; thirty percent had attended technical institutes, some had attended both; and a few stated that their only training had been in high school, military service or on the job.

Draftsmen's Majors When In College

Major	Majors in Junior or Community Colleges Percent of Respondents	Majors in Technical Institutes Percent of Respondents
Engineering	37	27
Drafting	20	21
Science or Mathematics	8	--
General or Liberal Arts	7	--
Architectural Drafting	5	12
Electronics	3	9
Tool Design	--	8

The Supervisors' Responses on Automated Drafting

Of the 35 companies visited, supervisors at 14 reported some type of computer or automated drafting device in the firm. At 21 companies, the supervisors reported none. Other contacts made it known that at some of these 21 companies there was some type of automated equipment, but it was not used in the drafting function sufficiently for the supervisors to know about it or feel that it is a part of their plant. For example, terminals for time-shared computer work in administration may in one firm be known and be considered a part of the firm by the drafting supervisors, and considered part of the company's facilities.

The types of automated equipment reported by the fourteen companies are shown with the number of companies reporting each type. Also included in this display are the data regarding the use by draftsmen and the equipment expected to be added within the year.

Numbers of Firms Reporting Automated Drafting Equipment
Number of firms visited = 35

	Presently In Use	Used by the Draftsmen	Expected Within The Year
Plotter	7	3	5
Digitizer	5	1	2
Computer	4	1	1
Diagrammer	3	2	2
Electrostatic Copier	3	1	-
Time Shared Computer	1	-	1
Cathode Ray Tube and Light Pen System	1	-	2

The automated drafting equipment was reportedly used by draftsmen in eight out of twenty-four cases. Those supervisors that reported the use of equipment by other than draftsmen, described the operators' classification in many different terms and with indications of varying

levels. Computers were reportedly operated by engineers, programmers and computer operators. Plotters were operated by computer graphics operators, plotter technicians, and engineers. Digitizers were operated by machine operators, some of whom were reported to be one or two pay grades below the draftsmen. Electrostatic copiers were operated by blueprinters if not by the draftsmen. Diagrammers were operated by draftsmen with special training. Light pen systems were operated by computer graphics operators.

The training reported for the automated devices consisted of on-the-job training in the operation of the particular devices, conducted by the vendor or by company employees who had been trained by the vendor.

There were no cases reported in which the automated equipment had reduced the number of draftsmen needed. Two companies reported that the automated drafting equipment had increased the need for draftsmen by ten percent at both firms, even though they both reported that the draftsmen did not use the equipment. One drafting manager stated that the increased design capability brought on by the introduction of computer aided design required more follow-up drafting for development, working drawings and documentation, thus requiring a greater service staff of draftsmen.

The information on retraining of draftsmen was sparse and varied, as eight supervisors at the fourteen companies said that some retraining for the use of automated equipment was necessary and six said that no retraining was needed. The number of draftsmen involved in the training reported varied from 4 to 50 men per plant, and the time for retraining varied from 8 to 20 hours per man.

The Ratings of Drafting Duties

The compilations of findings from the interview survey forms completed by the draftsmen and instructors are displayed in Tables VI through XVII. These figures represent the computer print-out of the mean ratings of each task by each of the sub-groups of draftsmen and instructors. The importance of this information will vary with each reader. As a general approach to the study the findings have been classified according to the meaningfulness the results would have for those interested in an overall appreciation of the needs of draftsmen. For this reason the responses that were found to have a mean rating of 3.0 or higher were underlined. This would mean that three out of four draftsmen classified this particular skill as very important with a rating of 4.0 or that the draftsmen in any one group gave that item an average rating of 3.0 indicating that it took a major portion of their time or was a major part of their work.

The fact that these responses are considered most meaningful in a general way does not mean that responses of lower ratings are less meaningful. For example, it would be expected that an architectural draftsman would perceive the need to read blueprints of floor plans as a major part of his job and rate this question with a response of 4.0 on the survey form. However, it might be more meaningful to learn that architectural design draftsmen expressed a need for reading of

blueprints of plumbing, heating and air conditioning plans with a rating as high as 2.0 particularly to those who might have thought of architectural design draftsmen as having responsibility only for artistic or aesthetic design. Therefore, the ratings of each item by each group have been presented in the original computer print-out of mean ratings in order to make it possible to compare ratings between groups or between items as the interests of the reader might direct him.

The meaningfulness of the ratings will be appreciated best if the instructions to the draftsmen and instructors are kept in mind. The draftsmen were instructed to rate those things that were more or less important to their jobs as follows: from 0 for "things you do not do" to 4 for the "things which take all, or almost all, your time, or things at which you are normally a full-time specialist." The instructors were asked to rate the same items and to indicate the importance of them in their particular drafting course or program from 0 for "things that are not a part of your program," to 4 for "things that all students who complete the program must know or be able to do."

It would seem, then, that if these two scales were kept in mind as the tables are studied, those items that received a mean rating of 0.0 - 1.0 would be the least important on the job and would be only lightly introduced by the drafting instructor; those items receiving a mean rating of 1.0 - 2.0 would be of minor importance on the job and would be given less than average emphasis by the instructor. Those items receiving mean ratings between 2.0 - 3.0 would be of major importance on the job and would be given more than average emphasis by the instructor. Those items receiving mean ratings between 3.0 and 4.0 would be of highest importance on the job and would receive the most emphasis in the drafting programs.

Blueprint Reading. It would be expected that the various draftsmen would give a higher rating to the reading of blueprints in their own fields than they would to any other blueprints. Those types of blueprints readily identifiable with a particular field would be used more by draftsmen in that field than any other types. In reviewing Table VI it might be of more interest to note the types of blueprints that are needed to a lesser degree but to some degree by draftsmen in all five fields. Such types of blueprints as "piping diagrams," "flow charts and diagrams," "sheet metal drawings" and "welded fabrication," would seem to have some importance to draftsmen in every field and their ratings might suggest to instructors that they try to incorporate at least an introduction to these types of drawings in whatever program they teach. (See Table VI.)

Design Drafting. In the areas of architectural and civil engineering, the design or layout work is performed by architects and engineers. Some non-degree draftsmen are assigned to do the design and lay-out

TABLE VI

MEAN RATINGS OF THE NEEDS FOR BLUEPRINT READING IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

01 READING BLUEPRINTS OF -	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					Gen. Instr.
	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	
1-01 MECHANICAL DETAILS	0.9	1.4	1.5	3.0	1.2	0.7	0.8	1.0	1.0	1.0	1.8	2.3	2.5	2.4	3.3	2.6	2.9	3.1	3.2	3.4	1.4	1.4	1.0	2.0	1.5	3.0
1-02 MECHANICAL ASSEMBLIES	0.8	1.3	0.6	1.0	1.2	0.4	0.7	0.3	0.8	1.8	1.8	2.3	2.3	2.1	2.8	2.5	2.9	2.9	3.3	3.3	0.9	1.4	0.7	1.6	1.3	3.0
1-03 TOOL DRAWINGS	0.0	0.1	0.1	0.0	0.2	0.0	0.0	0.3	0.3	0.0	0.7	0.8	0.5	0.8	1.2	0.6	1.4	0.6	1.9	2.2	0.1	0.2	0.0	0.2	0.0	1.5
1-04 INSTALLATION DRAWINGS	0.9	1.3	1.1	1.0	1.1	0.4	0.7	0.0	1.0	0.3	1.2	1.7	1.4	1.8	1.7	1.4	1.9	1.7	2.2	2.1	1.4	1.5	0.3	2.4	1.8	1.5
1-05 WIRING DIAGRAMS	0.3	1.2	0.5	1.0	2.1	0.4	0.2	0.0	0.8	0.8	2.2	2.4	2.8	2.5	3.2	1.0	1.3	1.4	1.2	1.4	0.1	0.5	0.3	0.6	1.5	1.5
1-06 ELECTRICAL SCHEMATICS	0.3	1.2	0.3	1.0	1.0	0.2	0.0	0.0	0.5	0.0	2.2	2.2	3.1	3.3*	2.3	0.9	0.9	1.3	1.3	1.3	0.3	0.3	0.0	0.2	0.8	1.5
1-07 ELECTRONIC SCHEMATICS	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.3	0.0	2.5	2.9	2.6	3.1	4.0	0.9	0.9	1.3	1.1	1.4	0.0	0.1	0.0	0.0	0.3	1.5
1-08 PRINTED CIRCUIT BOARDS	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0	2.4	2.7	2.5	3.4*	3.3	0.8	0.7	1.4	1.0	1.4	0.1	0.1	0.0	0.0	0.3	1.0
1-09 WELDED MODULES	0.6	0.0	0.0	0.0	0.8	0.1	0.5	0.0	0.0	0.3	0.8	1.7	1.5	1.5	2.0	0.6	0.8	1.0	1.0	1.2	0.1	0.7	0.0	0.6	0.3	1.8
1-10 LOGIC DIAGRAMS	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.0	1.3	2.5	2.3	2.3*	2.3	0.3	0.4	0.8	0.8	1.0	0.1	0.3	0.0	0.4	0.5	1.0
1-11 BLDG. PLANS, SINGLE STORY	2.9	3.3	3.0	4.0*	3.9	1.1	0.7	2.0	2.0	1.5	0.1	0.1	0.0	0.3	1.2	0.0	0.2	0.2	0.0	0.2	1.5	2.2	3.7	2.8	3.3	1.3
1-12 BLDG. PLANS, MULTI-STORY	2.9	3.2	3.1	4.0*	3.2	1.0	0.3	1.7	1.0	1.5	0.1	0.0	0.3	0.0	0.8	0.0	0.2	0.1	0.0	0.2	1.9	1.9	3.7	2.8	3.3	0.3
1-13 ARCHITECTURAL DETAILS	3.5	3.6*	3.6*	4.0*	3.9	1.1	0.5	1.7	1.3	1.5	0.1	0.1	0.3	0.0	1.0	0.1	0.2	0.2	0.0	0.2	1.4	2.0	2.7	2.6	3.0	1.3
1-14 STRUCTURAL STEEL DETAILS	2.0	2.3	1.5	3.0*	3.0	1.3	1.2	1.3	1.5	1.0	0.1	0.3	0.3	0.3	0.7	0.3	0.8	0.8	0.6	1.2	3.1	3.7	3.7	3.0*	3.5	1.0
1-15 STRUCTURAL STEEL DIAGRAMS	1.4	1.6	1.0	2.0	2.6	1.1	1.0	1.0	1.5	1.0	0.1	0.2	0.0	0.3	0.3	0.1	0.5	0.3	0.1	1.1	2.8	3.4	3.7	3.0	3.3	1.0
1-16 MAPS OR SITE PLANS	1.8	2.4	2.3	3.0	3.8	3.5	3.2	3.7	3.8*	4.0	0.2	0.1	0.3	0.1	0.5	0.1	0.1	0.4	0.2	0.9	1.1	1.3	2.0	2.6	3.0	1.3
1-17 PIPING DIAGRAMS	0.6	1.0	0.9	1.0	1.3	1.3	0.5	1.0*	2.0	1.3	0.3	0.3	0.1	0.1	0.8	0.7	0.9	1.0	0.6	1.6	1.9	1.3	1.7	1.8	1.3	2.0
1-18 PIPING PARTS, ASSEMBLIES	0.1	0.7	0.3	1.0	1.2	0.8	0.7	0.3	1.3	0.5	0.2	0.3	0.1	0.1	0.2	0.8	0.9	1.2	0.7	1.6	1.5	1.0	1.0	1.4	0.8	1.8
1-19 FLOW CHARTS AND DIAGRAMS	0.3	1.0	0.4	0.0	0.8	0.9	1.3	1.0	1.5	0.5	1.0	1.3	1.3	0.6	1.5	1.1	1.1	1.4	1.7	1.1	0.5	0.7	0.0	1.0	0.8	1.3
1-20 PNEUMATIC, HYDRAULIC DWGS.	0.0	0.4	0.0	0.0	0.1	0.1	0.2	0.7	0.8	0.3	0.2	0.5	0.5	0.5	0.3	0.6	1.1	1.1	1.1	1.1	0.4	0.3	0.0	0.4	0.3	0.8
1-21 PLUMB., HEAT., A/C PLANS	1.4	2.0	1.1	3.0	3.8	0.3	0.2	0.7	0.5	0.5	0.0	0.1	0.3	0.4	0.3	0.3	0.5	0.4	0.4	0.6	0.7	1.1	1.3	1.4	2.3	0.5
1-22 SHEET METAL DRAWINGS	0.9	1.2	1.6	2.0	1.0	0.0	0.3	0.3	0.3	0.3	1.0	1.9	1.4	1.5	2.0	1.8	2.3	2.4	2.6	2.1	1.2	1.0	1.3	1.2	2.0	2.0
1-23 WELDED FABRICATION DWGS.	1.3	0.7	1.0	0.0	0.7	0.2	0.7	0.0	1.0	0.8	0.7	1.7	1.1	1.5	1.7	1.8	2.2	2.1	2.9	2.4	2.3	2.7	2.0	2.8	1.8	1.3
1-24 /OTHER/	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	1.0	1.0	0.1	0.3	0.0	1.3	0.3	0.1	0.4	0.0	0.4	0.3	0.0	0.9	0.0	2.0	0.0	0.0
1-25 /OTHER/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.1	0.0	0.0	0.4	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.4	0.0	2.0	0.0	0.0

TABLE VII

MEAN RATINGS OF THE NEEDS FOR DESIGN DRAFTING SKILLS IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

02 DOING DESIGN DRAFTING OF -	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					Gen.Instr.
	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	
2-01 MECHANICAL DETAILS	0.0	0.9	0.3	0.0	0.4	0.1	0.3	0.3	0.8	1.0	1.2	2.2	1.0	2.3	2.7	2.2	3.1	2.0	3.3	3.5	0.5	0.9	0.3	1.3	1.3	4.0
2-02 MECHANICAL ASSEMBLIES	0.0	0.8	0.0	0.0	0.4	0.1	0.2	0.0	0.0	1.0	1.3	2.2	0.6	2.3	2.7	2.1	3.1	2.0	3.4	3.4	0.5	0.7	0.0	1.3	1.3	4.0
2-03 TOOL DRAWINGS	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.5	0.4	0.6	0.3	0.8	0.5	0.6	1.0	0.4	1.8	2.5	0.0	0.0	0.0	0.8	0.0	1.5
2-04 INSTALLATION DRAWINGS	0.3	0.8	0.9	0.0	0.6	0.0	0.3	0.0	0.8	0.3	0.8	1.5	0.3	1.5	2.0	1.0	1.8	1.1	2.1	2.1	0.5	0.9	0.0	1.8	2.3	2.5
2-05 WIRING DIAGRAMS	0.0	0.3	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	1.6	2.1	1.6	2.6	3.7	0.8	0.7	0.9	1.2	1.4	0.0	0.1	0.0	0.0	1.5	1.5
2-06 ELECTRICAL SCHEMATICS	0.0	0.6	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.5	1.5	2.1	1.6	2.8	2.5	0.7	0.5	1.1	1.1	1.5	0.0	0.0	0.0	0.0	1.3	2.0
2-07 ELECTRONIC SCHEMATICS	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	1.8	2.6	1.6	2.5	3.8	0.5	0.5	1.2	0.9	1.3	0.0	0.0	0.0	0.0	0.0	2.0
2-08 PRINTED CIRCUIT BOARDS	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	1.9	3.0	2.1	2.4	3.8	0.6	0.5	1.1	0.7	1.2	0.0	0.1	0.0	0.0	0.5	2.0
2-09 WELDED MODULES	0.3	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.0	0.5	0.4	1.7	1.1	1.0	1.8	0.5	0.7	0.8	0.9	1.4	0.0	0.9	0.0	0.3	0.0	2.3
2-10 LOGIC DIAGRAMS	0.0	0.2	0.0	0.0	0.1	0.1	0.5	0.0	0.0	0.0	1.0	2.2	1.1	2.0	2.0	0.1	0.4	0.8	0.6	0.9	0.0	0.1	0.0	0.3	0.0	1.3
2-11 BLDG. PLANS, SINGLE STORY	1.6	3.6	3.1	4.0	3.6	0.4	0.8	1.3	1.8	0.8	0.0	0.0	0.0	0.0	1.0	0.0	0.1	0.0	0.0	0.2	0.5	1.9	2.0	2.8	3.3	0.8
2-12 BLDG. PLANS, MULTI-STORY	1.5	3.3	3.5	4.0	3.0	0.4	0.5	1.3	0.8	0.8	0.0	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.2	0.5	1.8	1.3	2.8	3.3	0.3
2-13 ARCHITECTURAL DETAILS	2.6	3.4	3.5	4.0	3.7	0.3	0.7	1.0	0.3	0.8	0.0	0.0	0.1	0.0	0.3	0.0	0.2	0.0	0.0	0.1	0.7	1.5	1.7	1.0	3.0	0.8
2-14 STRUCTURAL STEEL DETAILS	0.6	1.3	0.8	1.0	3.2	0.6	1.3	0.3	1.5	1.0	0.2	0.2	0.1	0.0	0.2	0.1	0.6	0.6	0.4	1.0	2.0	3.5	2.7	3.0	3.3	1.0
2-15 STRUCTURAL STEEL DIAGRAMS	0.4	0.9	0.4	0.0	2.7	0.6	1.3	0.7	1.3	1.0	0.1	0.1	0.0	0.0	0.2	0.0	0.2	0.2	0.1	0.9	1.2	3.3	2.7	2.8	3.3	0.8
2-16 MAPS OR SITE PLANS	1.0	2.2	2.0	1.0	3.7	2.3	2.7	2.7	3.8	2.8	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.7	0.1	0.7	1.3	1.8	3.3	0.8
2-17 PIPING DIAGRAMS	0.0	0.3	0.0	0.0	1.3	0.2	0.7	0.7	2.0	0.5	0.0	0.2	0.1	0.1	0.2	0.3	0.8	0.9	0.2	1.5	0.0	0.2	0.3	1.0	1.3	1.0
2-18 PIPING PARTS, ASSEMBLIES	0.0	0.3	0.1	0.0	1.2	0.3	0.3	0.0	1.5	0.5	0.1	0.2	0.1	0.3	0.2	0.5	0.9	1.1	0.4	1.5	0.0	0.2	0.0	0.8	1.3	0.8
2-19 FLOW CHARTS AND DIAGRAMS	0.3	1.3	0.0	0.0	0.6	0.5	1.0	0.7	1.8	0.5	0.6	1.0	0.4	1.0	1.5	0.7	0.7	1.1	1.0	0.9	0.0	0.2	0.0	0.5	0.8	0.8
2-20 PNEUMATIC, HYDRAULIC DWGS.	0.0	0.2	0.0	0.0	0.1	0.3	0.2	0.3	1.0	0.3	0.1	0.3	0.3	0.4	0.0	0.5	0.7	0.8	1.0	1.2	0.0	0.3	0.0	0.3	0.5	1.0
2-21 PLUMB., HEAT., A/C PLANS	0.1	0.4	0.6	0.0	2.4	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.1	0.0	0.1	0.5	0.3	0.0	0.5	0.0	0.3	0.3	0.3	1.3	1.0
2-22 SHEET METAL DRAWINGS	0.0	0.7	1.3	2.0	0.8	0.0	0.0	0.0	0.3	0.3	0.6	1.8	0.8	1.6	1.7	1.4	2.0	2.0	2.8	2.4	0.2	0.9	1.0	0.8	0.3	2.0
2-23 WELDED FABRICATION DWGS.	0.0	0.0	0.0	0.0	0.3	0.1	0.7	0.0	1.0	0.3	0.5	1.4	0.5	1.5	1.5	1.3	2.1	1.7	2.7	2.6	1.3	2.1	1.0	3.3	1.0	1.3
2-24 /OTHER/	0.0	0.4	0.0	0.0	0.0	0.2	0.0	0.0	1.0	0.0	0.0	0.2	0.0	0.9	0.3	0.2	0.4	0.0	0.4	0.0	0.0	0.3	0.0	1.8	0.0	0.0
2-25 /OTHER/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	0.0	0.0

work but to a lesser extent than draftsmen are in other fields. As shown in Table VII, design drafting is more restricted to a specialized field and design draftsmen are not expected to perform design duties in other fields.

Each person studying this table will find different data meaningful according to his own interest. For example, it might be of interest to one person to note that electronics design draftsmen appear to be doing design work on mechanical details and assemblies as much as they are on wiring diagrams, printed circuits, and electrical schematics. Another person reviewing the data might note that design drafting in welding fabrication is uniformly not considered a part of the architect's job but falls under the responsibilities of the mechanical and structural designers.

Detail Drafting. A review of the data on detail drafting in Table VIII will show considerable flexibility in the skills needed by electronics and mechanical detailers in order to work in both fields. Similarly, for the architectural and structural draftsmen there appears to be considerable overlapping of responsibilities. These data would support the suggestions made elsewhere in the interviews that draftsmen should be flexible enough to work in two related fields but probably not more than two.

A study of this table will also show the amount of detail work done by the designers. This data would indicate that levels of responsibility are not as well defined as some would try to classify them. In many situations designers are required to do their own detail drafting and be able to complete a finished working drawing as well as to "rough out" the designs for others to complete. This would mean, then, that the designers, at present, are still in need of good drafting techniques and should not be encouraged to skip lightly over the development of these skills during their training.

Lettering. Freehand lettering is shown in Table IX to be the most widely used form by all levels of draftsmen in all the fields studied, generally well above the 3.0 level. Typing was shown to be the least important of the four methods presented with only five of the groups rating it as high as the 1.0 level. No methods other than those presented were rated any higher than the 0.5 level. Mechanical lettering devices and transfer lettering were used about equally by all classifications, generally between the 1.0 and 2.0 levels. Transfer lettering as found to have a slight preference by architectural draftsmen and the mechanical devices were preferred slightly in the other fields.

Sources of Information. Drafting instructors as well as those from many other areas of vocational-technical education are often criticized for requiring the students to work too much from the textbook and for not bringing in practical problems from industry. In an attempt to learn what uses draftsmen made of various sources of information and what emphasis instructors placed upon these sources in their course

TABLE VIII

MEAN RATINGS OF THE NEEDS FOR DETAIL DRAFTING SKILLS IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

03 DOING DETAIL DRAFTING OF -	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					Gen.Instr.
	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	
3-01 MECHANICAL DETAILS	0.3	0.6	0.5	0.0	0.3	0.2	0.3	0.0	0.5	0.0	1.8	1.8	2.1	2.3	2.8	2.9	2.3	3.3	2.9	3.9	0.5	0.9	1.0	1.3	1.0	4.0
3-02 MECHANICAL ASSEMBLIES	0.1	0.4	0.4	0.0	0.3	0.1	0.0	0.0	0.0	0.0	1.9	1.8	2.1	2.0	2.7	2.7	2.2	3.1	2.9	3.7	0.5	0.8	0.7	1.5	1.3	4.0
3-03 TOOL DRAWINGS	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.1	0.8	0.7	0.8	0.8	0.8	1.8	2.2	0.0	0.1	0.0	0.3	0.0	1.5
3-04 INSTALLATION DRAWINGS	0.5	0.4	1.0	1.0	0.3	0.2	0.3	0.0	0.8	0.0	1.1	1.3	1.0	1.3	2.0	1.4	1.5	1.6	1.8	1.7	0.8	0.9	0.0	1.5	1.3	2.0
3-05 WIRING DIAGRAMS	0.1	0.1	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	2.2	1.8	2.4	2.6	3.5	1.0	0.7	1.2	1.0	1.5	0.0	0.1	0.0	0.0	0.8	1.8
3-06 ELECTRICAL SCHEMATICS	0.1	0.4	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	2.0	1.8	3.0	2.6	2.3	0.9	0.5	1.3	1.0	1.5	0.0	0.1	0.0	0.0	0.8	2.0
3-07 ELECTRONIC SCHEMATICS	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	2.1	2.1	2.5	2.3	3.5	1.0	0.6	1.3	0.8	1.4	0.0	0.0	0.0	0.0	0.0	2.0
3-08 PRINTED CIRCUIT BOARDS	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	2.4	2.3	2.8	2.4	3.3	0.8	0.5	1.4	0.6	1.3	0.0	0.1	0.0	0.0	0.0	2.0
3-09 WELDED MODULES	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.8	1.3	1.6	1.4	2.0	0.8	0.6	0.9	0.8	1.5	0.3	0.6	0.0	0.3	0.3	1.8
3-10 LOGIC DIAGRAMS	0.1	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	1.5	1.9	1.8	1.8	2.3	0.3	0.3	0.8	0.6	1.1	0.0	0.1	0.0	0.3	0.3	1.5
3-11 BLDG. PLANS, SINGLE STORY	3.5	3.2	3.1	4.0	3.9	0.8	0.2	1.0	1.5	0.5	0.0	0.1	0.3	0.0	0.3	0.1	0.0	0.0	0.0	0.2	1.5	1.9	3.7	2.3	3.5	1.0
3-12 BLDG. PLANS, MULTI-STORY	2.6	3.3	3.1	4.0	3.9	0.7	0.0	1.0	0.8	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.9	1.7	3.7	2.3	3.5	0.5
3-13 ARCHITECTURAL DETAILS	3.9	3.6	3.4	4.0	3.9	0.7	0.2	0.7	0.5	0.5	0.1	0.0	0.1	0.0	0.3	0.0	0.1	0.1	0.0	0.2	0.5	1.2	2.3	1.5	3.3	0.8
3-14 STRUCTURAL STEEL DETAILS	1.4	1.4	0.9	1.0	2.9	1.1	0.8	0.7	1.5	0.5	0.2	0.2	0.1	0.0	0.5	0.1	0.4	0.8	0.6	1.1	3.1	3.3	3.7	3.0	3.3	1.5
3-15 STRUCTURAL STEEL DIAGRAMS	0.8	0.9	0.4	0.0	2.3	0.8	0.8	0.7	1.3	0.5	0.0	0.1	0.0	0.0	0.3	0.0	0.2	0.3	0.1	1.1	2.6	3.3	3.7	2.8	3.0	0.7
3-16 MAPS OR SITE PLANS	1.8	2.3	1.8	1.0	3.9	3.4	2.3	3.7	2.8	2.5	0.2	0.0	0.3	0.0	0.2	0.1	0.1	0.1	0.1	0.8	0.2	0.8	2.0	1.0	3.3	1.0
3-17 PIPING DIAGRAMS	0.3	0.4	0.0	0.0	1.6	0.7	0.3	0.7	1.3	1.3	0.2	0.1	0.1	0.1	0.3	0.4	0.6	1.0	0.3	1.5	1.2	0.4	1.0	0.8	0.8	1.0
3-18 PIPING PARTS, ASSEMBLIES	0.0	0.1	0.0	0.0	1.3	0.4	0.2	0.0	0.8	0.5	0.1	0.2	0.1	0.3	0.2	0.6	0.6	1.2	0.7	1.6	1.1	0.5	0.0	0.8	0.8	0.7
3-19 FLOW CHARTS AND DIAGRAMS	0.6	1.3	0.0	0.0	0.7	0.8	0.7	1.0	1.0	0.5	0.6	0.8	0.8	0.6	1.5	0.7	0.6	1.2	0.7	1.0	0.0	0.4	0.0	0.5	0.3	0.7
3-20 PNEUMATIC, HYDRAULIC DWGS.	0.0	0.2	0.0	0.0	0.6	0.4	0.2	0.3	0.5	0.0	0.2	0.2	0.4	0.3	0.0	0.5	0.7	0.9	0.4	1.2	0.0	0.3	0.0	0.0	0.0	1.0
3-21 PLUMB., HEAT., A/C PLANS	0.1	0.3	0.6	0.0	1.9	0.1	0.0	0.0	0.0	0.5	0.0	0.0	0.1	0.1	0.3	0.2	0.4	0.4	0.0	0.5	0.0	0.3	0.3	0.3	0.5	1.3
3-22 SHEET METAL DRAWINGS	0.3	0.7	1.3	1.0	1.1	0.0	0.0	0.0	0.3	0.0	1.0	1.3	1.8	1.6	1.7	1.9	1.7	2.6	2.3	2.3	1.0	0.8	1.0	0.8	0.3	2.0
3-23 WELDED FABRICATION DWGS.	0.6	0.0	0.0	0.0	0.8	0.0	0.2	0.0	1.0	0.5	0.7	1.2	1.4	1.5	1.5	1.4	1.5	2.2	2.6	2.7	2.1	2.3	1.7	3.0	1.0	1.3
3-24 /OTHER/	0.0	0.0	0.0	0.0	0.4	0.3	0.7	0.0	1.0	0.0	0.0	0.1	0.0	0.4	0.3	0.1	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.8	0.0	0.0
3-25 /OTHER/	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.8	0.0	0.0

41161

TABLE IX

MEAN RATINGS OF THE NEEDS FOR LETTERING SKILLS IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

04 LETTERING YOU DO -	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					
	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Gen. Instr.
4-01 FREEHAND	3.6	3.6	4.0	4.0	3.9	3.1	3.3*	3.7	3.8*	4.0	3.4	3.4	3.4	3.5	3.8	3.6	3.5	3.7	3.4	4.0	3.6	3.9	2.7	3.8	4.0	3.8
4-02 TYPEWRITER	0.3	0.7	0.1	0.0	0.4	0.1	0.3	1.3	0.5	0.5	0.4	0.5	0.6	1.3	0.0	0.4	0.5	1.1	1.0	0.6	0.7	0.2	0.7	0.0	1.0	1.0
4-03 LE ROY OR SIMILAR	0.8	1.3	1.0	0.0	2.4	2.4	1.8*	3.3	2.3	3.3	1.2	1.1	1.4	1.1	2.0	1.3	0.8	1.0	1.3	2.4	0.3	0.8	1.7	1.4	3.0	2.3
4-04 PRES-TYPE OR SIMILAR	1.1	1.8	1.8	1.0	3.1	0.9	0.2	2.7	0.8	1.5	0.5	1.1	1.0	0.9	2.8	0.4	0.3	1.2	0.3	1.4	0.1	0.4	0.3	0.6	0.8	1.3
4-05 /OTHER/	0.1	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.1	0.1	0.0	0.5	0.0	0.1	0.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE X

MEAN RATINGS OF THE USES OF VARIOUS SOURCES OF INFORMATION IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

05 SOURCES OF INFORMATION	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					
	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Gen. Instr.
5-01 SKETCHES BY OTHERS	3.1	3.0	2.8	4.0	3.2	2.9	2.5	3.7	2.5	2.8	3.0	3.2	3.0	3.3	2.2	3.0	2.3	3.3	3.0	2.5	2.7	2.7	2.7	3.4	4.0	2.3
5-02 ORAL INSTRUCTIONS	3.3	3.1	2.8	4.0	3.9	2.9	2.8	2.7	3.0	3.0	2.9	3.2	2.8	3.3	3.0	2.8	2.9	2.7	2.8	3.8	2.6	2.7	3.0	3.4	4.0	2.5
5-03 VENDOR CATALOGS	2.1	3.2	2.5	4.0	3.8	1.3	1.3	0.3	1.3	1.8	2.4	2.8	2.1	2.4	3.2	2.4	2.5	2.6	2.7	3.1	2.1	1.7	2.0	2.4	3.8	3.5
5-04 MILITARY STANDARDS	0.4	0.7	1.0	1.0	0.7	0.6	0.8	0.7	1.0	2.3	2.0	2.6	2.8	2.4	3.2	2.0	1.9	1.7	2.4	2.9	0.7	1.4	0.7	1.2	1.0	3.5
5-05 CORP. SPECIFICATIONS	1.1	2.1	1.6	1.0	1.9	1.3	1.7	0.7	2.3	2.0	2.5	2.7	2.6	2.3	2.8	2.5	2.4	3.3	3.3	2.5	2.2	1.9	1.3	2.4	1.5	3.0
5-06 TRADE STANDARDS	2.4	3.0	2.8	2.0	3.8	1.8	1.8	1.0	2.0	2.3	1.4	2.0	1.6	1.5	3.3	1.5	2.1	2.2	2.0	3.1	2.3	2.5	1.0	2.6	3.5	3.0
5-07 COUNTY, NATL. CODES	2.3	3.1	2.6*	4.0	3.9	3.4	2.7	2.0	2.5	3.0	0.3	0.5	0.5	0.5	2.0	0.4	0.8	0.8	0.3	1.1	1.5	2.3	2.0	3.2	3.5	1.8
5-08 /OTHERS/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.1	0.1	0.0	0.4	0.5	1.2	0.3	0.0	0.0	0.0	0.0

4162

work as well as to determine if the sources had any implications for automation, one group of questions was designed to determine the needs for some common types of reference materials.

Table X shows that information obtained through "sketches by others" and from "oral instructions" were both rated very highly by draftsmen and supervisors in all fields and by the instructors as well.

It has been generally assumed that many companies not required to use military standards for their drawings would be using them as the basis for an industry-wide standard. This assumtpion was not substantial to any considerable degree by the data in Table X. Military standards were rated only slightly above average by electronics draftsmen, (2.0 - 2.8) about average by mechanical draftsmen, (1.7 - 2.4) and lower by draftsmen in other fields. Corporate and trade standards were generally rated higher.

Tools and Equipment Used by the Draftsmen. An important indicator of the effects of automation on the work of the draftsmen would be the use he makes of automated equipment. The data in Table XI would substantiate other expressions throughout the interviews that the draftsmen have little need for skills related to the computer at this time.

The civil designers expressed the most need for computer aided design as they rated "prepare work for the computer," at the 2.2 level, and the feeding of cards and typing into the computer at the 1.0 and 1.2 levels respectively. Drafting machines appear to be replacing T-squares and parallel rules in all areas except architectural and civil drafting where the traditional equipment is still in use. Slide rules and calculators were both rated about average in use by all participants with both slide rules and calculators being given a higher rating by the civil draftsmen: generally 2.5 and 3.0 respectively.

Measurements Used in Drafting. A review of the types of measurements needed by draftsmen in the five fields of this study as presented in Table XI, shows that fractional dimensions were used more in the architectural and structural fields, and decimal dimensions were used more in the civil, electronics and mechanical fields. However, both systems were reported to be needed by all draftsmen with sufficient emphasis to assure instructors that general understanding beyond familiarity would be needed in each system. Metric measurements were given low ratings by all groups indicating that the need for this system was not great at the time of the study.

Coordinate dimensioning and true position tolerancing have been considered to be some preparatory steps toward computer aided drafting. Digitizing of drawings depends heavily upon a working knowledge and use of these systems. The low ratings placed on these two items would indicate that the draftsmen in this study did not feel a need for this type of preparation for automated drafting.

TABLE XI

MEAN RATINGS OF THE USE OF TOOLS, EQUIPMENT AND MEASUREMENTS IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					
06 TOOLS, EQUIPMENT YOU USE -	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Gen. Instr.
6-01 DWG. BOARD, T-SQUARE	1.0	1.4	1.4	4.0	1.4	1.8	1.2	0.3	2.8	2.8	0.7	0.8	0.3	0.0	1.0	1.5	0.7	0.0	1.2	1.1	1.9	1.1	2.0	1.2	2.3	2.8
6-02 PARALLEL RULE	2.9	3.4	3.0	4.0	2.2	2.0	2.5	2.0	1.5	2.0	0.6	0.9	0.6	0.4	0.8	0.8	0.4	0.7	0.2	0.5	1.0	1.4	2.3	0.2	2.0	0.0
6-03 DRAFTING MACHINE	1.4	0.8	2.0	0.0	2.3	1.4	0.5	1.7	2.3	4.0	3.5	3.6	3.5	3.6	3.5	3.6	3.6	3.8	3.9	3.6	2.5	3.3	2.3	2.6	4.0	3.5
6-04 SLIDE RULE	1.0	1.8	1.6	1.0	2.2	1.1	2.5	2.3	3.0	2.8	0.8	1.7	1.0	1.1	1.8	1.0	2.1	1.6	2.1	2.5	1.0	3.0	2.0	1.8	3.5	3.3
6-05 CALCULATOR	1.5	0.8	1.0	2.0	1.3	2.5	3.0	3.0	3.0	4.0	0.6	1.4	1.3	1.0	1.0	0.8	1.4	1.2	1.8	1.5	1.7	2.1	1.7	2.0	2.8	1.0
COMPUTER, WORK YOU DO																										
6-06 /1/ PREPARE WORK	0.0	0.0	0.4	0.0	0.3	0.9	2.2	1.7	2.0	1.5	0.6	0.3	1.4	0.9	0.0	0.4	0.4	1.3	0.9	0.5	0.5	0.5	1.0	1.0	0.8	1.0
6-07 /2/ PUNCH THE CARDS	0.0	0.0	0.0	0.0	0.3	0.1	0.7	0.3	0.3	1.5	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.0	0.0	0.5	1.0
6-08 /3/ FEED THE CARDS	0.0	0.0	0.0	0.0	0.4	0.1	1.0	0.3	0.5	1.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	1.0
6-09 /4/ TYPE INTO COMPUTER	0.0	0.0	0.0	0.0	0.4	0.3	1.2	0.3	0.8	1.3	0.1	0.1	0.0	0.8	0.0	0.1	0.1	0.0	0.7	0.0	0.0	0.0	0.3	0.0	0.3	1.0
6-10 ARCHITECTS SCALE	3.1	3.2	3.4	4.0	4.0	1.9	2.7	2.0	2.0	3.3	0.7	0.5	0.9	0.9	2.3	1.1	0.9	0.8	0.9	2.4	3.3	3.7	3.7	3.6	4.0	2.0
6-11 MACHINISTS SCALE	0.3	0.0	0.5	0.0	1.1	0.0	0.0	0.3	0.0	1.5	2.2	2.3	3.3	2.4	4.0	2.2	2.4	2.9	3.2	3.1	0.2	0.3	0.0	0.4	1.8	2.5
6-12 CIVIL ENGINEERS SCALE	2.5	3.1	2.6	3.0	2.3	3.8	3.8	4.0	4.0	4.0	0.6	0.2	0.9	0.3	1.8	0.7	0.7	0.8	0.4	1.8	1.8	2.5	2.7	3.2	4.0	2.3
6-13 TEMPLATES	3.0	2.7	2.1	4.0	3.6	2.8	2.7	3.3	2.0	3.5	2.6	3.1	3.8	2.9	4.0	3.1	2.8	2.9	3.0	3.6	1.8	2.7	3.7	3.2	4.0	2.5
6-14 PLANIMETER	0.6	0.9	0.5	0.0	1.3	1.7	1.8	1.7	1.5	3.3	0.3	0.1	0.4	0.1	0.5	0.1	0.2	0.0	0.2	0.9	0.5	0.9	0.7	2.0	2.0	1.3
07 MEASUREMENTS YOU USE -																										
7-01 FRACTIONAL DIMENSIONS	3.1	3.6	3.1	4.0	4.0	1.8	2.8	2.7	3.0	3.0	1.8	2.0	1.1	1.3	2.5	2.1	2.2	1.8	1.4	3.0	3.4	3.9	3.7	3.6	3.5	2.8
7-02 DECIMAL DIMENSIONS	2.6	2.7	1.5	4.0	2.4	3.3	3.5	4.0	4.0	4.0	3.3	3.4	3.4	3.6	4.0	3.4	3.5	3.8	3.6	3.9	2.5	2.9	2.0	2.0	4.0	3.5
7-03 INCH-FOOT MEASUREMENTS	3.8	3.7	3.5	4.0	4.0	2.4	3.2	3.0	3.0	3.3	1.6	1.3	1.1	1.8	2.0	1.4	1.7	2.2	1.9	1.8	3.9	3.7	3.7	3.6	4.0	2.8
7-04 METRIC MEASUREMENTS	0.9	0.6	0.0	1.0	0.6	0.3	0.7	0.0	0.5	1.8	0.6	0.5	0.8	0.5	1.8	0.5	0.6	1.0	0.4	0.9	0.5	0.8	1.7	1.0	1.3	0.5
7-05 COORD. DIMENSIONS FOR N/C	0.3	0.7	1.1	0.0	0.3	0.8	0.0	1.3	0.5	0.5	0.8	1.3	2.4	2.1	2.5	1.3	1.1	2.3	1.6	1.9	0.3	0.5	0.7	0.2	1.0	1.8
7-06 TRUE POS. TOLERANCING	0.0	0.1	0.6	0.0	0.7	0.1	0.5	0.0	0.3	0.5	1.6	2.2	1.3	2.0	2.5	1.5	2.1	1.7	2.4	2.3	0.3	0.3	0.3	0.4	0.3	3.5
7-07 SURFACE QUALITY SYMBOLS	0.1	0.1	0.1	0.0	0.8	0.1	0.5	0.0	0.5	0.5	1.5	1.7	1.5	1.3	2.0	1.8	2.4	2.7	2.9	2.9	0.9	0.9	0.3	0.8	0.3	3.5
7-08 FORM TOLERANCE SYMBOLS	0.0	0.1	0.0	0.0	0.8	0.1	0.2	0.0	0.0	0.5	1.2	1.5	1.3	1.5	2.2	1.5	2.0	2.2	2.4	2.5	0.5	0.2	0.3	0.2	0.3	3.5
7-09 /OTHER/	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

4164

TABLE XII

MEAN RATINGS OF THE USE OF VARIOUS DRAFTING MATERIALS IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

08 MATERIALS YOU DRAW ON -	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					
	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Gen. Instr.
8-01 OPAQUE PAPER	1.3	2.2	2.0	4.0	2.6	1.0	0.8	3.0	2.3	3.0	0.4	0.9	0.1	0.8	1.3	0.7	0.7	0.6	1.0	1.0	1.5	1.5	1.0	0.6	2.3	1.5
8-02 VELLUM	3.6	3.6	3.1	3.0	3.9	2.4	2.2	2.7	3.5	4.0	3.1	3.0	2.8	3.1	4.0	3.4	3.3	3.3	3.4	4.0	2.3	2.9	3.0	3.6	4.0	3.8
8-03 MYLAR OR SIMILAR	2.0	2.4	1.8	3.0	1.7	3.0	3.3	4.0	3.3	4.0	2.8	3.0	3.6	2.3	3.0	2.3	1.9	2.7	1.7	2.1	1.5	2.1	3.0	3.2	2.5	1.8
8-04 /OTHER/	0.0	0.3	0.0	0.0	0.0	1.3	0.5	0.0	1.0	2.0	0.0	0.0	0.5	0.4	0.0	0.2	0.1	0.4	0.8	0.3	1.1	0.8	0.0	1.4	0.0	0.0
09 MATERIALS YOU DRAW WITH -																										
9-01 LEAD PENCIL OR LEAD HOLDER	3.8	3.7	3.5	4.0	4.0	3.3	3.7	3.7	3.5	4.0	3.1	3.5	3.3	3.4	3.8	3.4	3.7	3.6	3.9	3.9	3.9	3.8	3.7	3.8	4.0	4.0
9-02 PLASTIC PENCIL	1.4	1.6	1.5	0.0	0.3	2.2	2.7	0.7	1.5	2.3	1.7	1.6	2.3	1.5	1.2	1.3	1.0	1.8	0.9	1.7	0.7	1.7	1.3	1.2	1.8	1.0
9-03 INK	1.0	2.0	1.0	0.0	3.1	3.1	2.2	4.0	2.8	4.0	1.8	1.5	1.5	1.1	2.2	1.4	0.8	1.0	0.8	2.3	0.2	0.6	1.0	1.2	2.8	2.3
9-04 TAPES AND PADS	1.3	1.2	1.1	1.0	1.4	1.4	1.0	3.0	1.3	1.5	2.0	2.2	2.5	2.4	3.3	1.3	0.8	1.6	1.3	1.4	0.5	0.9	1.0	0.2	1.5	2.0
9-05 SCRIBER	0.5	0.6	0.5	0.0	0.3	1.6	0.2	2.3	0.3	2.8	0.5	0.4	0.3	0.4	0.5	0.5	0.2	0.0	0.1	0.8	0.2	0.2	0.3	0.0	0.5	1.3
9-06 /OTHER/	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Materials Currently Used by Draftsmen. Drafting instructors are often critized for not teaching the use of materials that are up-to-date with the needs of industry. As shown in Table XII, opaque paper is used by designers in architectural and civil drafting with ratings from 2.0 to 3.0, but its use was rated between 0.5 and 1.5 by other groups. Opaque paper was reportedly being used in drafting departments of various fields where microfilms are made from the opaque drawing and used for further distribution and filing.

The development of special skills for drafting on both vellum and Mylar were rated highly by all the draftsmen in this study with architectural and mechanical draftsmen rating vellum higher than Mylar. Instructors' ratings compared very favorably with those of the draftsmen indicating an awareness of the materials and emphasis in instruction comparable to the needs of industry.

Drafting with lead whether in pencils or mechanical holders was rated highest of any media by all fields of draftsmen. As shown in Table XII, some use of plastic pencil was needed by draftsmen in all fields, although not to a very high degree. The use of ink was rated higher by civil draftsmen than by any other field but they all expressed some need for its use. The electronics draftsmen rated tapes and pads higher than any other group of draftsmen did, but all groups expressed some need for these newer forms of drafting materials.

Mathematics Used by Draftsmen. The needs for mathematics by draftsmen is shown in Table XIII. As rated by the participants of this study, the use of algebraic formulas was needed less than the use of trigonometric formulas which was rated above average by every group except the architectural draftsmen.

The architectural draftsmen rated only the use of handbooks of mathematics tables as above average and along with the draftsmen in other fields expressed a very low rating for logarithms, calculus, nomograms and analytic geometry.

The use of algebraic and trigonometric formulas and handbooks of tables were the needs that were rated highest by the draftsmen indicating perhaps that a technical mathematics course based on practical applications of these items would satisfy the needs of most draftsmen.

Geometric Constructions. It will be noted in Table XIII that the only participants rating any geometric constructions above 3.0 were the instructors. The construction of tangent arcs and irregular curves were rated above average by the civil and structural draftsmen. Although the draftsmen in other fields rated these skills lower, they did, however, all express some need for them. Constructions of conic sections were rated with very little need by the architectural and civil draftsmen and slightly higher, but less than average, by all the others.

Types of Drawings Draftsmen Make. The question of the types of drawings that draftsmen in various fields make was asked in order to learn of any suggestions for automated drafting and specialization in the work of the draftsmen. As shown in Table XIV draftsmen in all fields rated one-view

TABLE XIII

MEAN RATINGS OF THE USE OF MATHEMATICS AND GEOMETRIC CONSTRUCTIONS IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

10 MATHEMATICS YOU USE -	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					Gen. Instr.
	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	
10-01 ALGEBRAIC FORMULAS	1.1	1.6	1.4	1.0	1.8	1.8	2.0	1.7	3.0	3.5	1.0	2.0	0.6	1.5	3.3	1.5	2.1	2.2	2.8	3.3	2.9	2.6	1.7	2.0	3.8	3.3
10-02 TRIGONOMETRIC FORMULAS	1.5	1.7	1.9	1.0	2.4	3.1	3.2	2.3	3.3	4.0	0.7	2.2	1.5	2.0	2.5	1.6	2.6	2.6	3.0	3.0	2.7	3.0	2.0	3.2	3.8	3.3
10-03 TRIGONOMETRIC IDENTITIES	0.6	1.2	0.8	1.0	1.1	1.7	1.8	1.0	2.5	2.8	0.2	1.1	0.8	1.1	0.8	0.8	1.8	1.7	1.9	1.1	1.7	2.0	0.7	1.8	1.3	1.0
10-04 LOGARITHMS, BASE 10	0.6	0.1	0.3	0.0	0.4	0.7	1.3	0.7	2.3	2.0	0.2	0.9	0.5	0.6	0.5	0.5	1.1	1.6	1.4	1.8	2.2	2.1	2.0	1.6	2.5	1.7
10-05 LOGARITHMS, OTHER BASES	0.3	0.0	0.3	0.0	0.0	0.2	0.8	0.3	0.5	1.0	0.1	0.5	0.3	0.4	0.2	0.1	0.3	0.2	0.4	0.8	0.1	1.0	0.3	1.0	2.0	1.5
10-06 CALCULUS	0.0	0.0	0.3	0.0	0.4	0.2	0.7	0.0	0.5	0.5	0.0	0.6	0.3	0.3	0.0	0.1	0.3	0.2	0.6	0.4	0.7	0.7	0.3	0.2	0.5	0.5
10-07 NOMOGRAMS	0.0	0.0	0.1	0.0	0.8	0.3	1.0	0.0	1.5	1.5	0.0	0.4	0.3	0.4	0.7	0.1	0.4	0.3	0.9	1.2	0.1	0.4	0.7	1.6	1.8	1.5
10-08 ANALYTIC GEOMETRY	0.6	0.4	0.5	1.0	0.3	0.6	1.0	1.0	1.8	1.0	0.5	1.0	0.5	1.3	0.7	0.6	1.0	0.9	0.7	0.9	0.7	1.3	0.7	0.8	0.8	1.0
10-09 DESCRIPTIVE GEOMETRY	1.6	1.1	1.3	2.0	2.3	1.3	0.8	1.0	2.0	2.3	1.0	1.3	0.8	1.8	2.0	1.3	1.8	1.7	1.9	3.2	2.0	2.1	2.0	2.4	1.3	3.3
10-10 HANDBOOKS OF MATH. TABLES	1.1	2.2	2.1	3.0	2.4	2.4	2.5	1.0	2.5	3.0	1.0	2.3	1.9	2.0	2.5	1.8	2.6	2.7	2.8	2.8	2.9	3.1	2.3	3.6	2.3	2.3
10-11 /OTHER/	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	0.0	0.0
11 GEOM. CONSTRUCTIONS -																										
11-01 CONSTRUCTIONS OF POLYGONS	0.4	1.6	1.0	1.0	1.8	1.3	1.7	1.7	1.0	2.8	0.4	0.8	0.8	1.3	2.0	0.7	1.2	1.7	1.3	2.9	2.1	1.8	1.0	2.4	3.0	3.3
11-02 CONST. OF TANGENT ARCS	0.6	1.1	1.6	1.0	1.8	2.6	2.2	2.0	2.3	3.3	0.4	1.2	0.6	1.4	2.5	1.4	1.8	1.9	1.9	3.6	2.1	2.1	2.0	2.4	3.0	3.3
11-03 CONST. OF CONIC SECTIONS	0.0	0.6	0.9	0.0	0.9	0.7	0.7	0.3	0.3	2.0	0.4	0.6	0.6	1.1	1.2	0.5	1.1	1.3	0.9	2.6	1.9	1.3	1.0	1.6	2.0	2.3
11-04 CONST. OF IRREG. CURVES	0.5	1.2	1.3	1.0	1.8	2.3	2.0	2.3	1.8	3.3	0.8	1.1	0.8	1.4	1.2	1.1	1.4	1.1	1.9	3.0	2.1	1.8	1.7	1.6	2.3	3.0
11-05 /OTHERS/	0.1	0.3	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.0

4167

TABLE XIV

MEAN RATINGS OF THE TYPES OF DRAWINGS MADE BY DRAFTSMEN IN SELECTED FIELDS
BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

12 TYPES OF DWGS. YOU MAKE -	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					Gen. Instr.
	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	
12-01 ONE VIEW DRAWINGS	1.5	2.2	2.3	3.0	1.1	2.3	2.8	3.7	1.3	2.8	2.8	2.3	3.4	3.1	3.0	1.5	1.4	2.0	2.4	2.1	1.9	0.9	2.3	1.8	1.8	2.8
12-02 ISOMETRIC SKETCHES	1.3	1.1	1.1	2.0	3.0	0.5	0.5	0.7	0.5	2.5	0.9	1.2	1.6	1.3	2.8	1.4	1.4	1.4	1.8	3.4	0.5	1.5	1.7	1.4	2.8	2.8
12-03 SCALED ISOMETRIC DRAWINGS	0.9	1.0	1.1	2.0	2.1	0.6	0.3	0.7	0.5	2.5	0.8	0.8	1.6	0.6	2.2	0.9	0.7	1.2	0.4	3.3	0.5	1.0	1.3	0.6	2.0	1.5
12-04 PERSPECTIVE SKETCHES	1.1	1.9	1.5	1.0	3.9	0.3	0.0	0.7	0.8	1.5	0.7	0.8	0.6	0.9	1.2	0.8	1.1	0.8	1.1	1.4	0.1	1.2	1.3	0.8	2.3	1.8
12-05 SCALED PERSPECTIVE DWGS.	0.3	1.2	0.9	0.0	3.9	0.3	0.0	1.3	1.3	1.0	0.7	0.5	0.4	0.1	1.0	0.6	0.6	0.4	0.6	1.6	0.2	0.9	0.3	0.6	2.5	1.0
MULTI-VIEW PROJECTIONS																										
12-06 /1/ LAYOUT PROJECTIONS	0.9	1.4	0.8	2.0	1.8	0.8	2.7	0.7	0.8	1.5	1.0	2.1	2.5	1.8	3.8	2.4	2.8	2.8	2.2	3.9	2.1	2.3	3.0	2.8	3.0	3.5
12-07 /2/ SECT. VIEWS OF PARTS	1.1	2.3	1.3	3.0	2.2	1.0	2.5	0.3	0.5	2.3	1.8	2.2	2.3	2.0	2.8	2.8	2.9	3.0	3.1	4.0	3.3	2.7	3.0	3.2	4.0	2.8
12-08 /3/ SECT. VIEWS OF ASSYS.	1.0	1.4	1.3	3.0	2.2	0.8	1.7	0.3	0.3	1.5	1.9	2.3	2.1	2.4	2.7	2.7	2.8	3.0	2.2	4.0	2.7	2.7	3.0	3.0	3.8	2.8
12-09 /4/ SINGLE AUXILIARY VIEWS	0.8	1.4	1.3	1.0	1.2	0.7	1.7	1.3	0.3	1.5	1.5	1.9	1.9	2.1	1.8	2.1	2.5	2.1	2.8	3.9	2.3	1.9	3.0	3.2	3.5	3.5
12-10 /5/ AUX. VIEWS OF AUX.	0.5	0.7	0.9	1.0	0.8	0.5	1.0	1.0	0.3	1.5	0.6	1.0	1.6	0.9	1.8	1.0	1.8	1.1	2.1	3.3	1.5	1.5	1.3	1.2	3.0	3.5
12-11 /6/ REMOVED, ROTATED VIEWS	0.5	0.8	0.4	1.0	0.8	0.4	0.8	0.0	0.3	1.3	1.5	1.3	1.8	1.8	2.2	1.6	2.1	1.3	2.8	3.6	1.5	1.5	2.0	1.6	2.5	3.5
INTERSECTIONS + DEVELOPMENTS																										
12-12 /1/ PRISMS AND PYRAMIDS	0.0	0.8	0.3	0.0	0.4	0.2	0.2	0.0	0.3	0.8	0.2	0.2	0.6	0.3	0.7	0.3	0.6	0.7	0.8	2.6	0.9	0.6	0.3	1.2	1.0	1.8
12-13 /2/ CYLINDERS AND CONES	0.1	1.0	0.3	0.0	0.4	0.2	0.3	0.0	0.3	0.8	0.4	0.6	0.9	0.9	1.0	0.9	1.1	1.3	1.0	2.6	1.8	1.5	0.3	1.4	1.0	2.5
12-14 /3/ TRIANGULATION	0.1	0.4	0.3	0.0	0.4	0.3	0.7	0.7	0.5	0.8	0.2	0.3	0.3	0.6	0.5	0.4	0.7	0.3	0.9	1.8	1.0	0.9	0.0	1.0	1.0	2.0
GEARS AND CAMS																										
12-15 /1/ MAKE DETAIL DRAWINGS	1.3	1.8	1.6	0.0	1.6	1.5	1.3	1.0	1.8	1.0	1.4	1.5	1.5	1.4	1.8	1.6	1.4	2.6	1.3	3.5	1.5	1.6	1.3	0.8	0.3	3.0
12-16 /2/ LAYOUT ASSEMBLY DWGS.	0.4	0.2	1.5	0.0	0.7	0.6	0.5	0.3	1.0	1.0	1.4	1.8	1.1	1.9	1.3	1.7	1.7	2.3	1.7	3.4	1.1	1.3	0.7	1.0	0.3	3.0
12-17 /3/ CALCULATE SIZES	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.4	0.0	0.5	1.0	0.5	0.8	0.3	0.9	2.6	0.1	0.3	0.0	0.2	0.3	2.7
SCREW THREADS AND FASTENERS																										
12-18 /1/ SYMBOLS OF THREADS	0.1	0.4	0.4	0.0	0.4	0.3	0.7	0.3	0.0	1.0	1.2	1.5	1.9	0.9	2.5	2.1	1.7	2.1	2.7	3.8	1.1	0.8	2.0	1.6	1.5	3.5
12-19 /2/ DETAILS OF THREADS	0.1	0.3	0.3	0.0	0.4	0.3	0.0	0.3	0.0	0.5	0.8	0.7	0.8	0.4	1.2	0.9	0.8	1.1	1.1	3.2	0.7	0.4	0.7	0.8	0.5	1.5
FOR N/C MACHINES OR ASSEMBLY																										
12-20 /1/ DWGS. WITH SPEC. DIM.	0.0	0.4	0.9	0.0	0.6	0.6	0.0	0.7	0.0	0.5	1.0	1.1	2.1	2.0	0.5	0.8	0.9	1.0	1.2	1.7	0.5	0.5	0.3	0.4	0.8	0.0
12-21 /2/ PROGRAMS FOR N/C	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	1.0	0.0	0.3	0.1	0.0	0.8	1.1	0.0	0.1	0.3	0.0	0.3	0.0
PREPARE DWGS. FOR INPUT TO																										
12-22 /1/ COMPUTER	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.7	0.0	0.0	0.6	0.5	0.6	0.6	0.0	0.3	0.3	0.9	0.1	0.5	0.2	0.4	1.0	0.0	0.3	0.7
12-23 /2/ DIGITIZER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	1.6	0.6	0.2	0.1	0.1	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.3	0.0
12-24 /3/ DIAGRAMMER	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.3	0.2	0.1	0.0	0.0	0.1	0.3	0.0	0.1	0.0	0.0	0.3	0.0
12-25 /4/ /OTHER/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

drawings higher than average. Only the instructors expressed a rating higher than 2.0 for any of the types of pictoral drawings. When studied separately the architectural, mechanical and structural draftsmen were found to express some need (between 1.0 and 2.0) for isometric and perspective sketches but very little need, (generally less than 1.0) for scaled isometric or scaled perspective drawings.

The generally high ratings of multi-view projections by participants in all areas and levels would indicate the need for basic projections by all draftsmen. It would illustrate, for example, that the electronics draftsmen are not simply specialists in schematics, wiring diagrams, printed circuit layouts and other one-view drawings. As many expressed during the interviews, they can not specialize to that extent, but must be able to make drawings of assemblies and installments and, in many instances, make any type of mechanical drawing required of general mechanical draftsmen.

Some readers might be surprised to note the uniformity of need for making detail drawings of gears and cams. The need for this area of drafting was rated between 1.0 and 2.0 by almost every group of participants. The layout of assembly drawings of gears and cams was rated between 1.0 and 2.0 by the mechanical and electronics draftsmen but not as high by those in the other fields. The need for calculating the sizes for cams and gears was rated very low (less than 1.0) by all draftsmen probably indicating that this work is the responsibility of the engineers.

As shown in Table XIV, the preparation of drawings with special dimensions for Numerical control was rated above 2.0 by only the electronics draftsmen. The mechanical draftsmen rated it only 1.0; the others rated it lower. The even lower ratings for the need to write programs for numerical control would indicate that they are written by programmers who have more responsibility for the scheduling of tools and machines than do the draftsmen.

In an attempt to determine the skills needed for automated drafting, the participants were asked to rate the preparation of drawings for input to the computer, digitizer, and diagrammer. Only the supervisors of structural detailers rated the need for the preparation of drawings for the computer as high as 1.0; all other groups rated it much lower. The preparation of drawings for the digitizer was rated 1.6 by the supervisors of electronics detailers; but 0.6 was the highest rating given to this type of work by any other group. A rating of 0.4 was the highest given by any group for the preparation of drawings for the diagrammer; 14 groups rated it zero.

The ratings of the types of drawings the draftsmen are making produced no more evidence of need for specialized drafting for automation than the responses in other parts of the check list or the answers to questions asked in other parts of the interview.

<u>The Use of Printout Information</u>. As draftsmen work within the team structure of research, engineering, documentation and production,

automated devices used in related areas will exert some influence upon their activities. Information presented to the draftsmen representing design data, calculations, test results and other necessary parameters may be in the form of printout sheets from the computer or other automated drafting devices. The use of the printout materials whether in alpha-numeric or graphic mode might require some special training in the interpretation of the data as they are received by the draftsmen.

One aim of the study was to determine the draftsmen's use of information produced by automated devices. If the use of this information requires special training, there may be some implications for curriculum revisions in the drafting programs in the community colleges.

The data presented in Table XV shows that the use of printout information from the computer was rated 3.0 and 2.3 by the supervisors of civil detailers and designers respectively, and 2.2 by supervisors of structural designers. Supervisors of electronics and mechanical draftsmen rated this item from 1.1 to 1.9. Only the architectural group rated it uniformly as low as 0.1, indicating very little need for the use of computer printouts at this time. No other source of automated information, either listed or written in by the participants, was rated above 0.9 on this question.

The Use of Computer Languages. Recent developments in the use of computer systems have produced special languages for calculations in various fields of engineering. The use of these languages by draftsmen would be one indication of the extent of their involvement in automated drafting.

As shown in Table XV the need for Fortran was rated 1.8 by supervisors of design draftsmen in civil engineering and 1.3 by supervisors of detail drafting in structural engineering. Instructors in civil drafting rated the need for this language at the 2.8 level. All other groups of draftsmen and instructors rated the need for Fortran below the 1.0 level. The write-in responses to this question suggested only various forms of basic programming were needed. Supervisors of civil detail draftsmen rated these forms of language at the 1.3 level.

Of the 130 possible responses from all groups to all parts of this question 87 responses were 0.0, indicating that there was little or no need at the time for any language by any of the groups in the study. Only instructors and supervisors rated the need for any language above the 1.0 level, which might be indicative of prediction by them rather than expressions of current needs of the draftsmen in their fields.

Reproduction Equipment Used by Draftsmen. The ratings of the use of reproduction equipment by the draftsmen as shown in Table XVI would indicate a general need for blueprinting and electrostatic copying equipment to about the same degree. Approximately one-third of the

TABLE XV

MEAN RATINGS OF THE USE OF COMPUTER PRINT-OUT INFORMATION AND COMPUTER LANGUAGES IN SELECTED FIELDS BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					
13 USE PRINTOUT INFO. FROM -	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Gen. Instr.
13-01 COMPUTER	0.1	0.1	0.1	0.0	0.0	1.5	1.2	3.0	2.3	2.5	0.8	1.1	1.9	1.1	0.0	0.6	0.9	1.9	1.4	0.3	1.4	1.0	1.7	2.2	0.5	0.5
13-02 DIGITIZER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.5	0.9	0.6	0.0	0.1	0.2	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0
13-03 DIAGRAMMER	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.1	0.1	0.5	0.3	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
13-04 /OTHER/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 LANGUAGES YOU USE -																										
14-01 FORTRAN	0.0	0.0	0.3	0.0	0.0	0.3	0.5	0.0	1.8	2.8	0.1	0.2	0.4	0.6	0.0	0.2	0.2	0.1	0.4	0.4	0.2	0.2	1.3	0.2	0.5	0.5
14-02 ALGOL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
14-03 COBOL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5
14-04 ADAPT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
14-05 /OTHER/	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.3	0.0	0.0	0.1	0.2	0.9	0.0	0.0	0.1	0.1	0.0	0.4	0.2	0.0	0.1	0.3	0.0	0.0	0.0

41171

TABLE XVI

MEAN RATINGS OF THE USE OF DRAWING REPRODUCTION EQUIPMENT AND SCISSORS DRAFTING TECHNIQUES IN SELECTED FIELDS BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					
15 REPRODUCTION EQUIPMENT -	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Gen. Instr.
15-01 BLUEPRINTER/WHITEPRINTER	0.9	0.8	2.1	3.0	3.9	0.2	0.7	2.3	0.3	2.8	1.9	1.7	2.8	1.9	2.8	2.4	1.2	1.2	1.1	3.6	2.3	1.3	1.7	1.8	4.0	3.5
15-02 XEROX COPIERS OR SIMILAR	1.4	1.8	2.4	3.0	1.9	1.6	0.7	3.3	2.5	2.8	1.5	2.0	2.1	1.8	1.7	1.8	1.8	1.9	1.7	1.9	2.5	1.9	2.0	1.6	2.8	1.7
15-03 MICROFILM CAMERAS	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.3	0.5	0.0	0.3	0.4	0.4	1.9	0.0	0.4	0.4	0.0	0.2	0.4	0.0	0.8	0.0	0.2	0.0	0.0
15-04 /OTHERS/	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
16 SCISSORS DRAFTING -																										
16-01 W/BLUEPRINTS/WHITEPRINTS	1.4	1.3	0.6	1.0	1.0	1.3	0.8	2.0	1.5	2.3	1.3	1.2	1.6	0.8	1.5	1.0	1.1	1.4	1.2	0.5	0.5	1.6	0.7	0.6	1.0	1.5
16-02 WITH BROWNLINES	1.5	1.2	1.3	2.0	0.9	1.3	0.5	2.0	1.8	2.3	0.6	1.1	0.5	0.8	2.2	0.8	0.9	0.8	0.7	1.0	0.5	1.0	0.7	1.2	1.3	1.5
16-03 WITH XEROX OR SIMILAR COPY	0.9	1.6	1.3	2.0	0.1	1.2	0.7	2.0	1.5	1.5	0.8	1.1	1.5	1.0	2.0	0.7	1.0	1.9	0.9	0.7	0.5	0.9	0.3	0.8	1.0	1.0
16-04 WITH PHOTO PRINTS	0.5	1.4	1.1	1.0	0.0	0.8	1.0	1.7	1.5	1.5	0.6	1.1	0.5	1.8	1.7	0.5	0.5	1.2	1.2	0.5	0.3	0.6	0.3	0.2	0.8	0.5
16-05 WITH ADHESIVE SYMBOLS,ETC.	1.0	1.8	1.8	2.0	1.1	0.7	0.5	1.0	1.5	2.3	0.8	1.4	2.9	1.8	2.7	0.8	0.4	1.7	1.2	1.0	0.5	0.6	1.0	1.0	1.0	1.5
16-06 /OTHERS/	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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participating groups rated both items higher than 2.0 level, and more than fourth-fifths of the groups rated them both higher than the 1.0 level. The use of microfilm cameras was rated 1.9 by the supervisors of electronics designers but less than 1.0 by all other groups.

"Scissors" Drafting. The methods of making new drawings from prints of older but similar projects is known as "cut and paste" or "scissors" drafting. The draftsman cuts the usable parts from an existing drawing, modifies them, pastes them on a new drawing, adds new information and makes a new reproducible master. A variety of techniques may be employed using "bluelines," "brownlines," electrostatic copies, and many types of full-size and reduced-size photo prints.

While these techniques may not be considered "automated" in any electronic sense, the object of using them is to reduce labor costs and time required for production and distribution of drawings. If the use of reproduction equipment is expected of the draftsmen as part of his work in scissors drafting, for making check prints, reference copies or for any other purpose more emphasis in the training in the use of reproduction equipment might be desirable in drafting programs.

The use of the various techniques generally required for scissors drafting was rated about equally as shown in Table XVI. There were no ratings over 3.0 for needs of any of the techniques, and the only ratings above 2.0 were by supervisors and instructors. These ratings of above average importance may be more predictive of future needs than indicative of present needs. Each of the techniques was rated 1.0 or above by more than half the participating groups. While this rating indicates below average importance to the draftsman's needs, it does suggest sufficient need for consideration of these techniques in any drafting curriculum. The fact that all groups rated their needs about equally would indicate that instruction in these techniques would not be part of a specialized option in drafting but more representative of the typical objectives of a cluster core for all draftsmen.

Related Information Needed by Draftsmen. The draftsmen as a technician needs to know more than "how" to draw. He needs to know what to show on a drawing and often how the worker who reads the drawing will interpret the information he is attempting to communicate. The draftsman needs to understand the problems of fabrication that will be encountered by those who read his drawings. Some of the related areas commonly associated with the fields of drafting were selected for the draftsmen to rate as necessary to their job. Their ratings of these related areas are shown in Table XVII.

"Machine shop practices" were rated to be of major importance to the mechanical draftsmen, (2.2 - 2.9) of minor importance to the electronics draftsmen, (1.4 - 2.5) and of little importance to the others. "Building construction" was rated very high by architectural draftsmen (2.4 - 4.0), above average by the structural draftsmen (2.0 - 3.2), below average by the civil draftsmen, and of little importance to others. "Surveying procedures" was rated as of major importance to civil draftsmen (2.0 - 3.0),

TABLE XVII

MEAN RATINGS OF THE NEED FOR RELATED INFORMATION AND THE RELATED DUTIES OF DRAFTSMEN IN SELECTED FIELDS BY DRAFTSMEN, SUPERVISORS AND INSTRUCTORS

	ARCHITECTURAL					CIVIL					ELECTRONICS					MECHANICAL					STRUCTURAL					
17 RELATED INFORMATION -	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Detail	Design	Sup. Det.	Sup. Des.	Instr.	Gen. Instr.
17-01 MACHINE SHOP PRACTICES	0.5	0.4	1.0	1.0	0.0	0.4	0.2	0.0	0.0	0.5	1.7	2.5	1.4	2.1	2.8	2.2	2.9	2.3	2.9	3.3	1.5	0.9	0.3	1.2	0.8	3.0
17-02 BUILDING CONSTRUCTION	2.4	3.3	3.4	4.0	3.3	1.4	0.8	1.0	2.0	2.3	0.0	0.1	0.9	0.1	0.7	0.1	0.3	0.1	0.1	0.3	2.3	3.0	2.0	3.2	3.5	0.8
17-03 SURVEYING PROCEDURES	0.9	2.2	1.5	1.0	2.2	2.7	2.0	3.0	2.8	3.8	0.1	0.0	0.0	0.0	0.3	0.2	0.3	0.0	0.4	0.8	1.5	1.5	0.3	2.2	2.8	1.8
17-04 ELECTRONICS LAB WORK	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	2.0	1.3	1.6	2.3	0.4	0.9	1.1	1.3	1.1	0.0	0.0	0.0	0.0	0.3	1.3
17-05 COLOR AND DESIGN	1.5	2.2	2.1	3.0	2.2	0.7	0.3	1.0	0.0	0.8	0.6	0.7	1.1	0.6	0.2	0.3	0.7	0.2	0.6	0.5	0.0	0.6	0.0	0.4	1.0	1.3
17-06 DATA PROCESSING	0.0	0.6	0.4	0.0	0.0	0.6	1.0	1.0	1.3	2.3	0.2	0.6	1.4	0.6	0.2	0.2	0.3	0.7	1.1	0.5	0.5	0.5	0.0	0.2	0.8	0.5
17-07 STRENGTH OF MATERIALS	0.8	1.6	1.5	2.0	2.8	0.4	1.2	0.7	1.0	2.0	0.4	1.4	1.0	1.4	1.7	0.7	2.2	1.1	2.4	2.2	1.7	2.9	1.0	1.6	3.5	2.7
18 RELATED DUTIES -																										
18-01 CHECK DRAWINGS OF OTHERS	1.6	1.9	3.1	4.0	2.2	1.8	2.2	2.3	2.5	2.8	1.2	2.2	1.5	2.6	1.8	1.1	2.1	2.2	2.3	2.2	3.0	3.1	2.3	3.2	3.3	3.7
18-02 WRITE SPECIFICATIONS	1.1	0.6	1.1	1.0	2.2	0.4	1.0	0.7	2.0	1.0	0.5	0.9	0.4	1.3	1.7	0.4	0.8	0.3	1.4	1.5	0.7	1.3	0.7	1.6	2.3	2.0
18-03 MAKE DRAWING CHANGES	2.9	3.1	2.3	4.0	3.2	2.7	2.8	1.7	2.8	3.0	2.0	1.9	2.9	1.9	2.5	2.4	1.8	3.6	2.8	2.5	2.8	2.7	2.0	3.0	2.0	2.5

4174

of minor importance to architectural and structural draftsmen and very low by the others. "Electronics laboratory work" was rated as of minor importance to electronics draftsmen, of little importance to mechanical draftsmen, and of no importance to the architectural, civil and structural draftsmen. "Color and design" were rated as of little or no importance to the draftsmen in all the groups studied except the architectural draftsmen.

It might be interesting to note, at this point, that all levels of architectural drafting participants rated "color and design" below "building construction" and only slightly above "surveying procedures." This would agree with the data in Table XVII and tend to identify the architectural draftsman's responsibilities as more related to the drawing of multiview of structural details than to the drawing of pictorial views and finished renderings.

The need for "data processing" was rated as very low by participants in all fields with strongest need, still only slightly above the 1.0 level, expressed by the civil draftsmen. These ratings would indicate little use of computer aided drafting on the part of the draftsmen at this time. Even though these firms were the ones most identified with automated drafting equipment, it would appear that any data processing needed for its use was not the responsibility of the draftsmen. "Strength of materials" was uniformly needed by all the fields studied. The designers and design supervisors all rated it above the 1.0 level and four out of ten rated it above 2.0 level. From the expressions of need shown in Table XVII it would seem that all draftsmen would benefit from a course in strength of materials and that it should be included in a core cluster of subjects for a drafting technology program.

Related Duties of Draftsmen. In addition to the basic job duties of making drawings, the draftsmen is often confronted with other responsibilities necessary to the function of the department. The need to "check the drawings of others" was rated above average in importance by all fields of draftsmen, as shown in Table XVII. It was rated the highest level, above 3.0 by those in architectural and instructural fields. The design draftsmen and supervisors in all fields rated it above the 2.0 level. The need for specification writing was not rated as high (generally between 1.0 and 2.0) but some need for it was shown by all fields of draftsmen. Designers and supervisors of design draftsmen expressed a slightly higher need than did detailers indicating that this is a function of more experienced draftsmen.

The need for making changes on drawings was shown to be high for all the fields studied. This need was rated close to or above the 2.0 level by all the participants. The importance of making drawing changes and working with the accompanying engineering orders and change notices should be understood by all drafting trainees so that they will be prepared for this phase of the work as well as for the making of new drawings.

IV CONCLUSIONS AND RECOMMENDATIONS

Conclusions Regarding the Effects of Automation on the Needs of Draftsmen

The results of the community college survey showed some minor implications for curriculum revisions due to automation. Only one college reported adding a course in computer drafting within the last three years. No other mention was made of automated drafting in either the titles of new drafting courses or the titles of related courses for draftsmen.

The review did show, however, that eight colleges offered some type of course in drafting for numerical control, data processing, or computer graphics that would be at least recommended for the drafting students. Some colleges indicated that these topics were included in advanced drafting courses. Four colleges reported having automated drafting devices on campus at the time of the study and more indicated an intention to provide some in the near future. Three colleges expressed plans to offer courses in computer aided graphics; two planned to offer drafting for numerical control.

The survey would indicate that the colleges were carefully considering the need for course revisions. With the assistance of their advisory committees they seemed to be studying the use of automated equipment and the needs of draftsmen for training in the various devices. There did not appear to be any overt action toward new programs or courses for automated drafting, but rather the incorporation into existing courses of whatever changes were deemed advisable and feasible by all concerned.

A review of the interviews with draftsmen in industry revealed little need for new skills or knowledge for the use of automated devices. The supervisors stated that whatever need for training the draftsmen had for automated equipment would be done on the job.

Conclusions Regarding the Need for Specialization in Drafting

Aside from general drafting the five fields of specialized drafting listed in the questionnaire were those most frequently reported by the community colleges. Other specialized drafting programs were listed by seven of the colleges but none by more than one college.

New drafting courses added within the last three years suggested courses in "tool drafting," "aircraft drafting," "sheet metal drafting," and "optics drafting" as well as specialized offerings in the five major areas. Considerable generalization of program content was suggested by the colleges that included in their drafting programs courses in the traditional engineering drawing and descriptive geometry with additional specialized courses for the options. The study showed that it was not uncommon for the California Community Colleges to make use of special

drafting advisory committees in the major fields. In response to the new drafting courses planned by the colleges, courses in all the major options were listed as well as courses in "map drafting" and "oceanographics."

There appears to be a wide spread practice of reliance on the traditional courses of engineering drawing and descriptive geometry for the basic preparation of draftsmen with selections of specialized courses in various technologies to form option programs. Considering the community college's function of providing transfer courses for the four-year engineering and technology program, and considering the appreciation and acceptance of these traditional courses on the part of drafting managers, there would seem to be sufficient reason to continue this practice in those situations where it satisfied the needs of local industries and suited the policies of the particular college.

A review of the interviews with draftsmen in industry revealed some need for specialization. However, the draftsmen expressed a need to be flexible enough to meet the demands for labor when reassignments of personnel are required for new projects or departmental changes.

Few indications of need for specialized skills were found in the responses concerning lettering methods, measurements or mathematics. The itemized requirements were needed by all groups in generally comparable proportions. None of the responses given suggested any need for specific skills by one group or patterns of skills that would represent a need for specialized training in these subjects.

The need for training in fundamentals of projection, good drafting technique, and the use of tools, materials, and sources of information was expressed by draftsmen in all areas. The common need for these skills would support the rationale of the programs that offer a common core for the first year and specialized option courses during the second year.

The greatest amount of specialization noted in the responses to questions on blueprint reading, detail and design drafting was in the field of civil drafting. There would appear to be some specialists in mapping who have little need for other fields of drafting. The ratings of needs by electronics draftsmen and mechanical draftsmen compare more favorably with each other than either group does with any of the other groups in the study. The ratings by architectural draftsmen compare more closely to the ratings by structural draftsmen than do the ratings of either group with any of the other groups.

Specialization in drafting, then, might well be limited to training in combinations of two related major fields such as electro-mechanical, civil-structural or architectural-structural as would suit the interests and abilities of the draftsman. Many draftsmen stated that the student

who would try to limit his training so as to specialize in only one area would be handicapped in finding a job and in being placed during times of reassignment.

Conclusions Based on Informal Discussions

Informal discussions were invariably held with managers, supervisors, and draftsmen at the time of the arrangements for visits to industries and professional offices and during the less structured portions of the interviews. These discussions lead to many conclusions or speculations, regarding automation in drafting. While much of the information offered at these times was based upon opinions, many of the opinions were the results of ideas and plans expressed by persons in administration, engineering and drafting management and constitute the best educated guesses available. These conclusions then, form a summary of informal responses that may be applicable in some situations, and may have no meansing whatever in others. Some of the conclusions will find support from the draftsmen and supervisors in their responses to the formal parts of the interviews. Others will be outside the topics of the directed questions, but will be more or less related to the needs of draftsmen and the nature of drafting work now and in the future as well as the needs can be foreseen by those in drafting positions at this time.

The Effects of Automation on the Various Fields

The effects of automation on drafting will be seen in some fields sooner than others largely due to the nature of the work that may or may not lend itself to programming. Considerable work has been done in the electronics field with programmed designs for printed circuit layouts, integrated circuits, and logic diagrams. The computer's ability to solve complex problems is being used in civil engineering to plan roads with maximum economy of cut and fill operations and maximum safety in design for high speed travel. In mechanical engineering the computer has been used effectively in designing impellers and other complex shapes and in digitizing loft lines and planning dies for automotive body production and tire tread molds.

Less use of the computer was seen in the structural and architectural fields. Although it has been found effective in planning, scheduling, and recording progress on projects and in various applications of administration of the business it has not had any considerable impact on the nature of the work of the draftsman. Some of the applications that might be expected soon in architectural and structural work will be the storage of data for greater accessibility and more range in research of products and structural practices. The design work in architecture seems at this time to be about the last possible use of computer aided design. Architects explained that because of the uniqueness of each project and freedom of selection of building materials and the infinite arrangements and compositions for designs of single buildings and complex systems and with the ever present objective of aesthetic appeal that it will be some

time before these variables can be effectively programmed for computer aided design. The computer will be valuable for complex structural problems and routine office work but not readily adapted to creative design.

Drafting Operations Performed by the Engineers

The effects of automation will be most noticeable in the near future in regard to the drafting work performed by the engineers. Less drafting will be done by engineers as their training will not include the highly developed skills they needed in the past. Their time will be too valuable to perform the graphical solutions of problems that can be programmed for the computer, when it can solve and produce a printout of the data in alphanumeric form or graphic plots and with greater speed and accuracy. Much of the fine line work and lettering techniques used in civil drafting and formerly done by engineers can be done by technicians with improved pens and materials so that the training needed to develop mastery of technique will not need to be a part of the engineer's education.

The computers can experiment with numbers of slight variations for design studies so much faster than humans can that increased exploratory studies leading to optimization is possible. The computer aided plotters will relieve the engineer of much of his layout drafting and design duties and enable him to devote more of his time to problem analysis and conceptual design, leaving the functional design and development of working drawings for the technician.

The graphics training for engineers will be devoted to problem solving techniques that will be suited to automated processes. Their graphics knowledge will serve them for the purposes of communications and documentation more than for the development of drawings.

Drafting Work Performed by the Beginning Draftsmen

In the future less copy work and tracing will be done by the junior draftsmen. In the past much use has been made of apprentice draftsmen with little or no formal schooling in drafting to trace worn-out, torn or otherwise unusable vellums on which the information was still valuable. Modern reproduction equipment makes it possible to produce new transparent masters of drawings omitting much of the dirt, fractures, stains and other blemishes that make the old vellums unusable. Future improvements in reproduction equipment will reduce the need for the time-consuming tedium of copying drawings.

The new equipment and processes used in the "cut-and-paste" or "scissors" drafting applications will reduce the amount of work done by apprentices in preparation of new drawings which incorporate much of the design and information of existing drawings. Instead of tracing copying selected views or notes from old drawings, new techniques of cutting up previously made drawings, to get usable parts, combining them with the new information to compose a new drawing, and mechanically making a reproducible

master will save considerable time and produce drawings for more immediate use at a lower cost. The modifications of brown lines and other intermediates and the use of preprinted adhesive materials and typewritten notes will also reduce the amount of tedius copy work and tracing for the apprentice draftsmen.

It might be pointed out in passing, however, that this use of beginners to trace old drawings and copy usable information from existing drawings has been of value for the training of inexperienced personnel. The tracing of drawings has helped not only in the development of technique and appreciation of drafting room standards and practices required on the job but also as an orientation to the company's products, operations, and practices elsewhere in the preparation and use of the drawings. If drafting managers make it a policy of hiring more experienced draftsmen, the new men will need less time to familiarize themselves with the idiosyncrasies of the new company, new department, or project. However, the time that is needed for a break-in period will be purchased at a higher rate for the more experienced draftsman. It might be well to note also that if less training is to be done on the job it might be expected that more will have to be done by the schools.

Scissors drafting may not be considered as automatic drafting since it is not electronically controlled, but it enables the draftsman to make drawings at a faster rate, so it might be grouped with labor-saving devices that speed up the system of drawing production, and it may have considerable effect on industry's needs for beginning draftsmen.

Drafting Work Performed by the Technician

With fewer engineers doing their own layout and detail drawing and fewer apprentices employed for routine copying and tracing, it would be reasonable to expect that the drafting work will be done in the near future by a more highly trained middle-level technician. Less computational work will be done with logarithms and slide rules; more will be done by calculators and computers. The draftsman will be expected to use handbooks of mathematics formulas and engineering data to solve drawing board problems. More draftsmen will have the use of a calculator even if shared by several others. At present the calculation requiring the capabilities of the computers are almost entirely the responsibility of the engineers. The draftsmen do not operate the computer or even prepare work for it to any great extent. It would appear from the interviews in this study that the use a draftsman might make of the computer would not be complicated enough to require him to know a programming language. Some use was observed of predesigned problem sheets which require the user to simply fill in the blanks with variables for the particular problem. These were very useful in solving problems that were typical in the company's operation and used frequently enough to warrant the cost of prepared programs and routines.

The drafting technician of the future will need a better understanding of basic production processes. He will find it most helpful to have worked in the shops for mechanical and electronics production and in the field for architecture, civil and structural projects. The informal remarks of drafting personnel as well as the responses on the survey indicated a need for instruction in applied technologies in college shops and laboratories.

Advancing technologies will bring new products and processes to the attention of the draftsmen. Knowledge of existing materials and methods will help him appreciate the new ones and enable him to keep up-to-date in the application of them on the drawings he makes. Advanced techniques of data acquisition will make the search of source material more extensive and more rapid. The use of the information thus found will require a more thorough understanding of the materials, processes and professional practices in the field in which the draftsmen are employed.

Recommendations

From the conclusions of this study there would appear to be little need for revisions to the curriculums of those drafting programs that are up-to-date in every other way to make them suited to the training of draftsmen for automation. The recommendations that would seem most important at this time would be for instruction that would provide the student with an understanding of the place of computer-aided design and automated drafting in the total scheme of research, development, documentation and production along with the draftsman's responsibilities in these areas.

The basic skills and knowledges of drafting, mathematics, science, and related technologies as taught by most colleges would seem to be adequate for the draftsman to begin work and make progress on the job. The more specific skills and knowledges of the operation of any automated device or the language of man-machine communications can be learned when it is known what systems will be needed for the equipment used in a particular firm or department.

Recommendations for Curriculum Revisions. There appeared to be strong recommendations for continued emphasis on the basic skills of drafting from all levels of drafting personnel. The fundamentals of layout and projection of views, sectional and auxiliary views, dimensioning and notes, materials and processes, will all be as important to the draftsman's work whether he is using a T-square and triangle, a drafting machine, or a light pen and cathode ray tube.

The need for mathematics expressed by the draftsman supports the recommendations that all drafting programs should include mathematics through trigonometry. Whether the traditional course pattern of algebra, geometry, advanced algebra, and trigonometry, or a technical mathematics course including applied trigonometry that would satisfy the needs of the

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technician should be offered might be subject to other considerations of needs at the particular college. The offering in physics or physical science, in a similar way, might consist of the regular courses offered for other programs in the college, or it might be taught as part of a multi-unit block of drafting technology. The recommendation, here would not be for any particular plan, but instead, for the instructor to be certain that the drafting student is neither required to take the mathematics and physics courses offered in the engineering transfer program, nor be allowed to complete a vocational drafting program without the exposure to the mathematics and physics needed by the draftsman.

Recommendations concerning specialization would favor a broad base of general drafting in the first year with special courses forming the option program during the second year. The specialization of the option should be broad enough to train a student in two major disciplines as electro-mechanical, architectural-structural, or other combinations of related fields.

The recommendations of draftsmen that instructors should be vocationally oriented and they should make instruction as much like the job situation as possible are some that the teachers should consider in their regular self-evaluation. The need to keep up with industry and bring industry into the classroom cannot be overemphasized in vocational programs. Part-time and summer employment, visits to industries, institutes, in-service training programs, and guest speakers all help to keep the course work consistent with industrial practices. Other recommendations on this subject might be to those colleges that do not have active advisory committees to investigate this plan for possibilities of coordinating their programs with the needs of local industries. Educators will find rewarding experiences in the associations with members of professional organizations for architecture, drafting, engineering, and specialized technical societies for the mutual assistance of industrial and professional offices and educational institutions.

The drafting technician of the future will need a better understanding of basic production processes. He will find it most helpful to have worked in the shops and laboratories for mechanical and electronics production, and in the field for architectural, civil, and structural projects. The informal remarks of drafting personnel as well as the responses on the survey indicated a need for instruction in applied technologies in college shops and laboratories. Advancing technologies will bring new products and processes to the attention of the draftsman. Knowledge of existing materials and methods will help him appreciate the new ones and enable him to keep up-to-date in the application of them on the drawings he makes. Advanced techniques of data acquisition will make the search of source materials more extensive and more expeditious. The use of the information thus found will require a more thorough understanding of the materials, processes and professional practices in the field of work. Some suggestions from drafting personnel have indicated that the schools and colleges may be able to do more in preparing the draftsman for the

expanding use of information. Drafting managers and others have recommended that draftsmen should be instructed more in the methods of researching information, using various forms of tables and charts, catalogs of products, standards, and specifications. With more information available, draftsmen will need to know how to make better use of it.

Recommendations for Further Studies. From the acceptance of this project and the interest in practical research expressed by the deans and instructors in colleges, the managers and draftsmen in industry, and the advisors on the design and procedures of this study, it would seem that there remains a great need for further investigation in this area. Additional studies should be made to learn in greater detail the needs of the draftsmen in the various specialized areas. It would be helpful to have more discriminating data on the needs of draftsmen in the major fields and to determine the needs of those in the newer or lesser known areas. Such discriminating data would be more useful in course content evaluation if the behavioral objectives of the courses could be compared with the levels of skills and the extent of competency required for the various functions of the draftsmen.

The fact that this study found little use of automated equipment on the part of the draftsmen does not mean that they will not be using some of the devices in the near future. Much of the work currently done on automated equipment is for the purpose of research and investigation into the best applications of it and the development of soft-ware to prepare it for the needs of the particular company or department. As the equipment becomes more plentiful, less expensive, and more versatile, more use of it will be made. Whether the expanded use will include the operations of the drafting room or be more effective for functions of the engineers and administrators remains to be seen. Continued study of the developments of new types of plotters, digitizers, diagrammers, and systems of computer-assisted cathode ray tubes and light pens, and their applications in the drafting functions will be needed. If they become available in quantities and at costs commensurate with their capabilities, their use will no doubt increase. Drafting instructors would want to be informed on the developments and uses of the new equipment whether it is used by the draftsmen themselves or by other members of the team of research, administration, design, documentation, and production, so as to know how to adapt the new information to their drafting courses.

Further research should be conducted perhaps as joint projects of the professional societies and educational institutions or coordinating offices. These research projects should provide more information to instructors who are unable to obtain personal experience in as many fields as they might want to, and to provide information to drafting managers regarding training programs available to their apprentices, and regarding sources of newly trained personnel. Most of all, however, the information should be useful to students who want to know more about the training requirements and job needs of draftsmen as an aid to making their decisions on which courses to pursue for a challenging and profitable entry into the world of work.

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MYERS, RANDOLPH L.
QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES, 1969.

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ABSTRACT - THE PRIMARY OBJECTIVE OF THIS STUDY, CONDUCTED BY PROGRAM SPECIALISTS, WAS TO AID IN THE DEVELOPMENT, REFINEMENT, AND COORDINATION OF QUALITY CONTROL PROGRAMS FOR THE EDUCATION AND TRAINING OF TECHNICIANS AT THE COMMUNITY COLLEGE LEVEL IN CALIFORNIA. THE DATA WERE COLLECTED THROUGH THE USE OF A QUESTIONNAIRE RETURNED BY 107 INDUSTRIES AND THROUGH FORMAL INTERVIEWS. RESPONSES INDICATED THAT 211,000 PEOPLE WERE EMPLOYED BY THE 107 FIRMS, WITH A TOTAL OF 13,400 ENGAGED IN QUALITY CONTROL TECHNICIAN WORK. IT WAS INDICATED THAT THERE WAS A NEED FOR PRACTICAL CLASSROOM EXPOSURE AND, AS A RESULT, THE FOLLOWING SUGGESTED CORE COURSES WERE DEVELOPED: (1) AN INTRODUCTION TO THE PHILOSOPHY OF QUALITY CONTROL, (2) MECHANICS AND ELECTRONIC MEASURING TECHNIQUES, (3) BASIC QUALITY CONTROL STATISTICS, (4) SPECIFICATION AND DRAWING INTERPRETATION, (5) APPLIED PHYSICS, (6) TECHNICAL MATHEMATICS, AND (7) TECHNICAL REPORT WRITINGS. THE RESULTS OF THIS STUDY ARE INTENDED FOR USE BY TEACHERS, ADMINISTRATORS, AND COUNSELORS IN COUNSELING AND PLANNING FOR NEW PROGRAMS ON THE HIGH SCHOOL AND COMMUNITY COLLEGE LEVEL. (AUTHOR/GEB)

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QUALITY CONTROL

PROGRAM STUDY FOR

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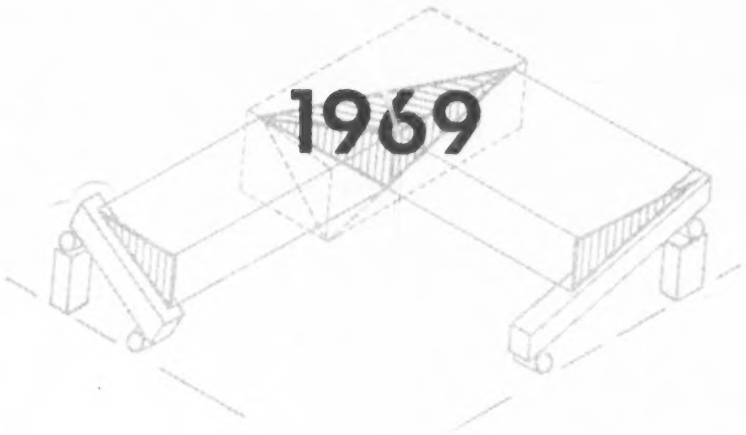
CALIFORNIA



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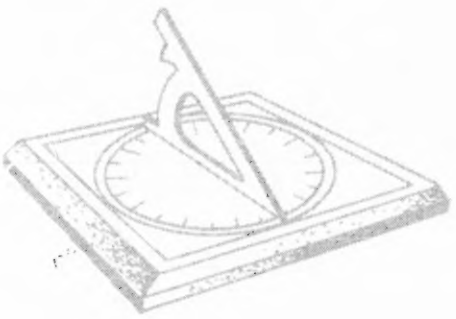
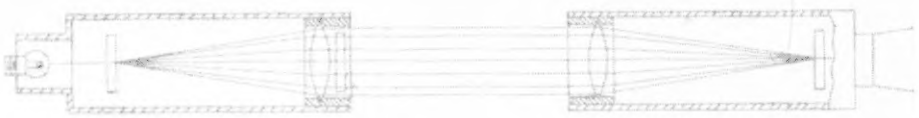


by Randolph L. Myers



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QUALITY CONTROL PROGRAM STUDY FOR CALIFORNIA COMMUNITY COLLEGES 1969

by Randolph L. Myers

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FOREWORD

The Community Colleges of California have long recognized the need to provide vocational-technical education programs that are designed to meet the demands of business and industry. It is essential to the economy that the knowledge and skills required by industry be brought to those seeking jobs for the first time; to those seeking up-grading or promotion within their present field of employment; and to those who, for various reasons, require retraining.

For some years, various Community Colleges throughout the State have offered one or more courses per semester in Quality Control, and some have established Certificate or Associate Degree Programs. These were aimed principally at persons seeking up-grading or retraining. It has become apparent that the time has arrived or is fast arriving when these colleges should offer programs which prepare the student to enter the occupation as Quality Control Technicians. It has also become apparent that some standardization of course offerings is needed on a statewide basis.

With the aid of funds provided through Title III of the George-Barden Act, Rio Hondo Junior College in cooperation with the Division of Vocational Education, Office of the Chancellor of the California Community Colleges, conducted a survey to investigate the needs and demands of industry as related to the education and training of Quality Control Technicians at the Community College level. This was accomplished with the counsel and advice of a Statewide Advisory Committee.

In addition to reporting the results of the survey, this publication is intended for use as "Guidelines" for Community Colleges and local advisory committees in the development, refinement, and coordination of Quality Control and Reliability programs, and for the promotion of better relations and cooperation between education and industry.

Leland P. Baldwin

Leland P. Baldwin
Assistant Chancellor
Vocational Education
The California Community Colleges

PREFACE

QUALITY CONTROL TECHNOLOGY STUDY

Rio Hondo Junior College has been pleased to serve as the contractor and home base for this pioneering study of Quality Control Technology programs in the California community colleges. Mr. Randolph Myers, quality control executive for TRW Systems and a part-time instructor at Rio Hondo Junior College, was employed by the college to conduct the study under a contract with the Division of Vocational-Technical Education, Office of the Chancellor of the California Community Colleges.

Although the need of industry, government and agriculture for control of quality of product and product assurance has been critical for many years, it has been only in the past fifteen years that specific courses in Quality Control Technology have begun to emerge in public community colleges, mostly in response to the needs of California aerospace industries. Quality Control is a discipline which cuts across a whole body of manufacturing and production processes, ranging all the way from the manufacture of the incredibly complicated space vehicles for the Apollo moon shot to the whimsical potato chip inspection process of the television commercial. Quality control is rapidly developing as a discrete discipline and it is inevitable that it will continue to grow in importance as a vital element in manufacturing and production processes.

It is our hope at Rio Hondo Junior College that this study will assist other community colleges in developing or modifying quality control programs as much as it already has helped us at this institution.

Walter M. Garcia

Walter M. Garcia
President – Superintendent

ACKNOWLEDGEMENTS

Meaningful suggestions, directions, and constructive critiques proved invaluable in preparing the pattern for this study in quality control technology. Industry and education, the United States Defense Contract Administration Services, the American Society for Quality Control, and student response all influenced the final results. Recognition of any particular individual or group could inadvertently neglect others who extended themselves during the study period. Yet, the opportunity afforded this writer to devote words and suggestions to an important technical field of education seldom arises, personal acknowledgements to those providing direction, form and general validity seem to be appropriate.

The study supervisor, Bill Gordon, encouraged the author's efforts and ventures throughout the study period. He emphasized the importance of an independent work and genuinely appreciated the difficulty of defining the subject of quality control technology.

The Defense Contract Administration Services, as represented by the activities of John Calvey and John Mraz, showed great concern for meaningful education efforts in the subject field, and offered valuable guidance toward promoting these efforts.

Industry leaders, such as Walt Hurd, Herb Rogers and Bob Pinschmidt at Lockheed Missile and Space Division, as well as Steve Kozich at Atlantic Research and Arvan Kent at Chrysler Motors, provide much of the current strength and substance to quality control education in the State of California. Continued leadership by individuals of this stature can only provide increasing value to quality control courses and programs at the community college level.

All of the educational leaders were anxious to participate and contribute toward the study objectives. Many of the educators, such as Ken Fawcett, Nate Boortz, and Bill Whelan, had excellent programs already instituted at their colleges. Despite this, they encouraged the conceptual approach taken in the study and provided valuable course and program information in the subject area.

It was evidenced from all personal contacts that quality control technology enveloped most all of the work and service disciplines and, as such, the need to place this important technology in its true perspective was voiced by all. Hopefully, these voices were heard and are echoed, to a certain extent, in the report content.

R L Myers

R. L. Myers

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CONTENTS

FOREWORD ii

PREFACE iii

ACKNOWLEDGEMENTS iv

CALIFORNIA STATEWIDE ADVISORY COMMITTEE ON QUALITY CONTROL TECHNOLOGY, THE CALIFORNIA COMMUNITY COLLEGES v

SUMMARY OF STUDY 1

INTRODUCTION 3

Definition of Technical Education
Definition of the Quality Control Technician

SURVEY PROCEDURES AND METHODOLOGY 5

QUALITY CONTROL, AN OVERVIEW 6

Industry Applications
Quality Control Functions with the Individual
Advisory Committees
Methods of Training the Quality Control Technician

THE COMMUNITY COLLEGE STUDENT 13

EMPLOYMENT OPPORTUNITIES AND TRENDS 14

Job Descriptions
- Industry
- Small Firm
- United States Government

Availability and Projection of Quality Control Technology Occupations
Industry Sources for Quality Control Technicians
Job Advancement Potentials

THE SPECIALIST AND QUALITY CONTROL 35

Metallurgical Testing
Drug Processing
Environmental Control
Nondestructive Testing (Radiographic)

THE GOVERNMENT AND QUALITY CONTROL 39

EQUIPMENT AND FACILITY REQUIREMENTS FOR QUALITY CONTROL TRAINING 41

CALIFORNIA COMMUNITY COLLEGES OFFERING QUALITY CONTROL COURSES OR PROGRAMS 45

SUGGESTIONS FOR QUALITY CONTROL TECHNOLOGY CURRICULUMS 48

Suggested Basic Core and Certificate Curriculum
Typical Course Descriptions for Suggested Core Requirements
Suggested Curriculum Patterns for the Associate Degree
Developing Technical Education Programs
Consultant Services
Coordination and Supervision

QUALITY CONTROL TECHNOLOGY INSTRUCTORS 59

APPENDICES

A. First questionnaire to industry 62
B. Results of initial questionnaire 65
C. Cover letter and follow-up questionnaire to responding industries 66
D. Results of follow-up questionnaire 69
E. Growth-rate trends for quality control personnel 71
F. Results of community college responses 72

SOURCES CONSULTED 75

SUMMARY OF STUDY

The primary objective of this study is to aid in the development, refinement and coordination of quality control programs for the education and training of technicians at the community college level in California. Equally important is the promotion of better relations and cooperation between education and industry.

The procedures used to promote these objectives included the gathering of data on a statewide basis and collating this information in a manner useful for developing and improving curriculums for technician training in the field of quality control. The curriculums are suggested for use by the community colleges in California as modified by the needs of industry, Government, and local communities.

The curriculums presented in the study include a suggested core of courses that should be meaningful to post high school students entering vocational-technical education programs. Completion of the program at the community college level would permit the student-graduate to seek and obtain gainful employment as a quality control technician. The core of suggested courses would also provide those already employed an opportunity to increase their job knowledge and skills as well as to receive lower-division college credit. The suggested courses emanate from responses to questionnaires as well as interviews with industry, Government, professional society members, and educational authorities.

Five hundred questionnaires were prepared and transmitted to selected industrial firms within California. These questionnaires were complemented either by phone interviews with key personnel or by direct personal interviews with these personnel. The use of questionnaires was limited to firms either producing a product or repairing or testing products. Service industries were excluded in the belief that the study of quality control technician training should emphasize some type of "hands on" approach for all industries interviewed.

The response to the efforts of this project was in all cases sincere and constructive, indicating that industry and the Government services regarded a state study in quality control technology as a major step in promoting and recognizing educational needs in the subject field. One hundred and seven (107) industries responded directly to the questionnaire, an excess of twenty percent. Approximately fifty-nine formal interviews were conducted with industry, Government, and community-college personnel. In all cases, the respondents indicated a continuing need for quality control technicians to staff existing and future job assignments. Although responses related to college courses were varied, the pattern of subject material for training the quality control technician indicated a certain area of definition that would best suit the needs of the individual student as well as the employer.

The quality control technician, being utilized in all aspects of industry and service, presented a difficult target as related to the definition of jobs and assignments. The results of the study indicate that the type of employment the individual is assigned to dictates the subject matter that will be pertinent to that individual's success on the job.

No major problems resulted during the course of the study. Problems related to definition have been described, but did not present and will not pose a problem when the vocation of quality control technology is considered as an all-encompassing work area. The concept of the term "technician" was disturbing to some interviewees mainly because they felt that the study would and should include the professional aspects of quality control training, i.e., the education and training for the quality control technologist. It was necessary, during the period of study, to stress that the results of the program would primarily benefit the technician, and was being conducted as related to that individual and his contribution to a work assignment in a chosen technology.

The condensed definition of the Quality Control Technician is as follows:

1. The individual possesses a knowledge of and facility with basic algebra and trigonometry. He has a knowledge of basic numbering and digital expressions.

2. He understands and applies the principles of physical science. He is at least exposed to the subject areas of physics and chemistry.

3. He is acquainted with basic manufacturing processes and the processing of various materials.

4. He becomes a specialist in a certain chosen field.

5. He is proficient in communicating ideas and plans in writing and by verbal transmission.

The definition is structured closely to that presented by the U. S. Department of Health, Education and Welfare, and presents the basic requirement for sound technician training.

A more detailed definition of the quality control technician is presented in the Introduction to this report.

Responses to industry questionnaires indicated that 211,000 people were employed by those 107 firms answering the basic industry questionnaire. A total of 13,400 of these employees were engaged in quality control technician work. The responses to course content information indicated a need for practical classroom exposure and, as a result, the following suggested core courses were developed:

1. An Introduction to the Philosophy of Quality Control
2. Mechanical Measuring Techniques, (Quality Control oriented)
3. Electronic Measuring Techniques, (Quality Control oriented)
4. Basic Quality Control Statistics
5. Specification and Drawing Interpretation
6. Applied Physics
7. Technical Mathematics
8. Technical Report Writing

Suggested curriculum patterns for the Associate degree are also included as part of the study contents.

It is recommended that future follow-up with California industry, the Government, and with the community colleges be conducted. This follow-up should include reaction to the project study results as well as the effectiveness of quality technology programs currently in process and those to be initiated in the immediate future. There should be a continuing effort to recognize technological change and the need for quality control technician training in specialty areas. Cooperation and coordination between representatives of industry, Government, and community college personnel will enable educational programs in quality control to reflect current state-of-the-art developments and to provide meaningful education in this dynamic field.

INTRODUCTION

The topic Quality Control has become discussion material in the lives of most everyone involved in today's normal routine activities of life. Whether recognized or not, there are quality features with us constantly, features that play important roles in our selection and purchase of manufactured products, the determination of our tastes in entertainment, choices of foodstuffs, and even influences where and when we seek to further our education.

For a period exceeding twenty years, quality control technicians, quality control education, and recognition of quality control as a discipline have grown in stature and have been recognized as important contributors to the basic functions within society.

As consumers, we insist on purchasing a product that performs as we think it should, performing consistently and reliably under varying conditions of use and perhaps abuse. The degree of importance that we attach to these characteristics is usually based upon the significance of product safety and product cost. Manufacturers must produce a product that creates a consumer demand, a quality item. Service representatives must provide maintenance and repairs to manufactured products in a timely, efficient, and cost-conscious manner. The best of these representatives, it is often said, provide a quality service.

Many persons seek entertainment based upon their aesthetic tastes and desires. Coupled with these tastes is the evaluation of quality with a performance, play, lecture, or any phase of personal or private entertainment. The point to be made is how, in everyday usage, the word is used? Is there, however, a quality type individual, and just what is a quality person?

Studies have been conducted to define curriculums for aircraft technicians, marine technicians, environmental health technicians, recreation technicians, and others. Many of these studies have been done on an individual state basis and many have been performed encompassing all of the United States. Yet, the study of the quality control technician, his true identity, his place in industry, commands a different approach and analysis than a technician study in an established discipline.

The quality control technician is found in all industries, whether identified by the title quality control inspector, technician, etc. In some way, he or she is providing a guarantee that the delivered product conforms to specification requirements. In some way, products produced or services rendered are checked for the quality or integrity that has been implied or actually defined for the end item.

Many plants and industries, usually the smaller ones with less than fifty or one hundred people, quite often do not employ identified quality control technicians. A machine operator may be held solely responsible for the quality of the item he has produced. There are no quality control personnel as such to inspect and accept his product. Quality is controlled by those personnel on the job doing the manufacturing, finishing the product, and delivering the end item. In a study of quality control technology, these people with different names and titles should not be slighted.

This report is a summary and compilation of the results of interviews, both written and personal, conducted at manufacturing facilities, community colleges, U. S. Government installations, and with professional society members. Efforts were taken to make the report representative of all concerned and affected organizations. The technician himself was questioned as to his aims and goals, and especially to the type of quality control education he thought would be most beneficial to him.

DEFINITION OF TECHNICAL EDUCATION

A definition of technical education states: "Technical Education is concerned with that body of knowledge organized in a planned sequence of classroom and laboratory experiences usually, but not always, at the post-secondary level preparing students for a specific job or for a cluster of job opportunities in a field of technology. It requires a knowledge of the mathematics and sciences associated with the technology; an understanding of the methods, skills, materials, and processes commonly used in the technology; an extensive knowledge of a field of specialization; and sufficient depth in the basic communicative skills and related general education topics. Technical Education prepares for the occupational area between the skilled employee and the professional employee such as the doctor, the engineer, the scientist; and is on the continuum nearest to the professional employee."[1]

The quality control technician may be exposed to one or many specialties within the area of his work exposure. If he requires "an extensive knowledge of a field of specialization," this may be in the techniques of quality control application. To extend the definition further: "The technical curriculum must be so structured that it prepares the graduate to enter a job and be productive with a background which will enable him to advance with the developments in the technology, and to enable him with a reasonable amount of experience and additional education to advance into positions of increased responsibility."[2]

These definitions and descriptions generally fit the needs of industry and existing descriptions of the quality control technician.

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[1]California State Department of Education, "How to Apply for Assistance for Technical Education Programs via Title III George-Barden Act for the Fiscal Year 1968-1969" (Sacramento, 1968), p. 1.

[2]Ibid, p. 1

DEFINITION OF THE QUALITY CONTROL TECHNICIAN

One of the most outstanding and troublesome single words encountered during the program study was the word "technician." The connotation of the word itself; what it meant to different individuals; how it was and would be used, all of these applications concerned most everyone contacted during the period of study.

Many similar studies have sought to define the term "technician" as related to the particular topic being investigated. The U. S. Department of Health, Education and Welfare offered technician definitions, and it is possible to examine these definitions and to relate them to the field of Quality Control Technician training. As described in the HEW Report,[3] a technician has:

1. Facility with mathematics: ability to use algebra and some trigonometry as tools in the development of ideas that make use of scientific and engineering principles – mathematics being important to the job requirements of the technology.

2. Proficiency in the application of physical science principles, including the basic concepts and laws of physics and chemistry that are pertinent to the individual's field of technology.

3. An understanding of the materials and processes commonly used in the technology.

4. An extensive knowledge of a field of specialization with an understanding of the engineering and scientific activities that distinguish the technology of the field. The degree of competency and the depth of understanding should be sufficient to enable the individual to do such work as detailed design using established design procedures.

5. Communication skills that include the ability to interpret, analyze, and transmit facts and ideas graphically, orally, and in writing.

Analyzing the previous five items as related to the quality control technician, we find the following:

Item No. 1, the facility with mathematics, stresses the ability to apply some mathematics above arithmetic to everyday problems encountered. It seems apparent that if the tasks that quality control personnel must perform are analyzed, their knowledge must consist of an ability to apply the concepts of algebra and trigonometry.

Increased proficiency with mathematics may indeed become a stimulus that attracts the quality control technician toward further education in the field of quality control technology.

It should be safe to state than an inspector or technician must have a knowledge of basic numbering and digital expressions. Micrometer reading, oscilloscope definition, circuit analysis all require a basic knowledge of elementary mathematics. The use of measuring protractors, dividing heads and rotary tables all require a knowledge of angular readout as well as manual dexterity when utilizing the instruments. More advanced applications such as the use of the sine bar in mechanical inspection require a fundamental knowledge of what right angles can do – or very succintly, basic trigonometry functions. The question that must be answered is whether or not these applications, basic as they are, require formal completion of lower division college courses in algebra and trigonometry. The section of this report suggesting a "core" approach to quality control technology curriculums seems to answer this question.

Item No. 2 stresses the application of the principles of physical science. An in-depth exposure here might require the technician or technician-in-training to complete a year of applied science education or technical mathematics that will expose him to the principles of physics and chemistry. It is understandable that a specialist in the application of interferometric inspection methods will benefit greatly from a study of optics. The knowledge of chemical compositions in metals and non-metallics will greatly aid the inspector when examining grain structures, determining magnetic properties, and analyzing material content for its conformance to specification. The determination to be made is how deep the training and exposure must be to equip the technician to perform in a productive and personally satisfying manner.

Item No. 3, although closely allied with knowledge gained in the physical sciences, relates more directly to the use of manufacturing processes and the application of materials to these processes. The quality control technician, depending upon his area of specialization, becomes involved with chemical milling, soldering, welding, universal measuring machines, coordinate measuring machines, statistical techniques for material sampling and a host of other processes too numerous to list. Depending upon the extent of specialization, the quality control technician may see many applications of materials and processing techniques. It is the determination of what basic exposures are necessary to equip a technician to understand the area in which he will work; it is this determination that is elusive and difficult to express.

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[3]U. S. Department of Health, Education and Welfare, "Occupational Criteria and Prepatory Curriculum Patterns in Technical Education Programs" (Washington, D. C.: Government Printing Office, 1965)

Item or subject No. 4 stresses the specialty area. The quality control technician, it may be said, usually becomes specialized in a subject area that either utilizes his strong talents or because of the specialization within the industry, requires the individual to be trained specifically for that specialty area. A difficult, if not impossible, task is to determine during a certificate or degree program what extent of specialization training is needed. Even if an exhaustive study of specialty fields could be undertaken, any conclusion could soon be invalidated because of a local or general technological change. It might be better to develop interests and to acquaint students with specialty areas within quality technology, and to offer and develop these course areas in line with industry and student interest. All three of these items should be evaluated and considered when determining specialty fields of training.

The last definition statement, although certainly not the least important, is the one accenting basic communicative skills. It separates technical exposure from its definition. It stresses the need to inform and to be informed, and tries to indicate the basic needs of individuals to make themselves understood. The basic need for communication could probably be taught in conjunction with the training for technological subjects. The accent in this area of communication, however, relates to basic English, written expression and general education subject matter. Many technicians in many areas are excellent craftsmen, but they exhibit a predeliction against report writing, and transfer oral information in a difficult and often misunderstood manner. The problem, nevertheless, must at this time be approached on the level of technician training, and how to best conduct that training to improve communicative skills. It is also a matter of emphasis that the subject matter, taken in context with the training and education of the quality control technician, will strive to improve and establish communicative skills for the technician. The point is that the main reason for technician training is to improve his status for his own well-being in his chosen field of work. Just how this approach may be undertaken is suggested with the course-content descriptions presented in a later section.

The overall technology of quality control encompasses the duties and actions of the quality control technologist. This report, however, does not investigate the potential for education and training of this individual. The more highly technical aspect of quality control should be considered as a professional level with educational programs culminating in at least the baccalaureate degree.

This study conducted primarily to provide guidelines for community college vocational-technical programs may also provide a concept or a foundation for future lower-division college programs in quality control. These courses would permit an articulation between the community colleges and the four-year institutions, presenting to the student the opportunity to complete a baccalaureate program. Close articulation between the community colleges and the four-year institutions offering Quality Control programs is recommended.

Some California State Colleges do offer four-year programs for Quality Technology studies; these colleges include (1) San Jose State College in San Jose, California, and (2) California Polytechnic Institute in San Luis Obispo, California.

SURVEY PROCEDURES AND METHODOLOGY

Any effort to interview, quiz or obtain survey results on a representative industrial basis throughout California poses many problems. One of the obvious pitfalls is the tendency to neglect industries that may not be involved in the employment of quality control technicians, per se. Many industries are producing a quality product, but produce this product by utilizing competent technician skills applied in an effective systematic manner. Many firms, however, utilize and categorize quality control services on a recognized and assigned basis. These are the industries that indicate in their organization structure a department for quality assurance or product assurance. These firms are those that list quality control technician on their employment rosters, and as such could demand the full attention of a study devoted to quality control technology. The approach taken in this study was not to neglect those industries employing technicians with varying assignments — distinctive of quality control as part of their job description.

It was obvious during the study effort that the major Aerospace firms and large manufacturers, especially those engaged in Government contracting, have quality control departments. A study of quality control technician training could easily accent the already established and defined programs existing within the Government contract oriented industries.

In order to properly research the needs for quality technology technician training, the study must take into account industries utilizing quality control personnel, whether recognized or not, and the study must also include a wide range of industry size.

The problems associated with the acquisition, retention, and efficacy of quality control personnel are felt with an equal amount of pressure by the small firm employing less than one hundred people, as well as the large industrial complex. In order to approach the study in some orderly and unbiased manner, the services of the California Manufacturers 1968 Register were utilized.

Five hundred questionnaires were prepared and transmitted to selected industrial firms within California, and these questionnaires were complemented either by phone interviews with key personnel or by direct personal interviews with these personnel. The use of questionnaires was limited to firms either producing a product or repairing or testing products. Service industries were excluded in the belief that the study of quality control technician training should emphasize some type of "hands on" approach for all industries interviewed.

All counties within California were represented with at least one industry in each county receiving a research questionnaire, and, because of the population concentration in the Los Angeles County and San Francisco Bay area, these geographical entities did receive the bulk of written and personal survey emphasis.

QUALITY CONTROL, AN OVERVIEW

INDUSTRY APPLICATIONS

"Quality Control is as old as industry itself. From the time man began to manufacture, there has been an interest in quality of output. As far back as the Middle Ages, the medieval guilds insisted on a long period of training for apprentices and required that those seeking to become mastercraftsmen offer evidence of their ability. Such rules were, in part, aimed at the maintenance of quality. In more modern times, factory inspection and research, pure food and drug acts, activities of professional societies, all have sought for years to assure the quality of output. Quality Control has thus had a long history." [4]

Acheson Duncan aptly describes the place and function of quality control in his introductory comments to **Quality Control and Industrial Statistics.** The topic of quality control technology has reached such importance that education in this field is receiving more concern and direction from interested individuals within industry and the Government. Reports indicate all too frequently that the loss of product integrity may be a forerunner of product rejection and manufacturer financial collapse.

Many industries have sought and received help from the application of valid statistical controls of product manufacture. Statistical techniques from such authorities as W. A. Shewhart, Acheson Duncan, H. F. Dodge, H. G. Romig, Eugene L. Grant, and others have been put to practical use by many firms. The application of statistical methods, where effective, will probably continue to be an important factor in the overall concept of controlling quality.

Most companies give support to the concept of total quality control. Some approach the subject in different ways, such as automated inspection by machines, gaging by electronic devices, or by the operators of the machines that produce the product. In every application, however, there is an individual or group of individuals that must plan for, effect, analyze, and manage the function of the control of quality. It is this person or persons that industry has begun to recognize, and to appreciate the needs for adequate and effective education both before entry into the work force and during the productive years as a member of that unit. Despite the use of organizational structure and the positioning of the quality control function within the structure, the effects of quality are results of individual actions. Many industries have promoted the training of quality control technicians to upgrade and maintain outgoing standards of product conformance.

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[4] Acheson J. Duncan, "Quality Control and Industrial Statistics," (Homewood, Illinois: Richard D. Irwin, Inc., 1955), p. 1.

QUALITY CONTROL FUNCTIONS WITH THE INDIVIDUAL

Devoid of argument is the recognition of the importance of individual performance. Whether establishing control charts for the output of an automatic machine, determining "mean time between failure" of a valve mechanism, examining alignment details of an aircraft mechanism, all of these tasks require an individual to perform, and it is important that proper attention be given to this individual in a study of qualtiy control technology applications. It would be wise, before further discussion of the quality control technician is made, to determine why the examination of this vocational area has received such in-depth interest to justify a separate study.

The concentration of educational patterns toward the gifted student became apparent during the space age. Demands of education were such that college-preparatory courses were strengthened and made readily available to the qualified student. A study on the need for vocational education stated: "The effects, (of the Space Age), have been reflected in the nation's schools where college-preparatory programs have been strengthened, enriched and extended. Subject matter requirements for high-school graduation have been increased, particularly in academic areas, often resulting in less flexibility of a student's program of studies and fewer opportunities for vocationally oriented classes."[5]

A new interest in vocational education has developed during the past ten years. This has been an interest encompassing all the complexities of "why" in this modern age. People seeking education and firms needing completely trained individuals clamor for professional instruction in a myriad of complex work disciplines. Rising costs of instruction, building and facility requirements, have all complicated vocational education growth in California. There is a need for more and better vocational education and quality control technology is considered a part of that subject area.

ADVISORY COMMITTEES

The study found that community colleges use advisory committees for technical programs. Quality control technology advisory committees are comprised of community college educators, representatives of industry, employer and employee organizations and associations, technical societies, and Government agencies. The participating educators, often consisting of part-time faculty, are anxious to have the school facilities utilized for meaningful vocational training. Industry representatives are anxious to promote, via the school, quality technology education. Participation and cooperation are evident between the two groups, stressing an interdependence of action and purpose. Industry representatives have a need for job fulfillment that is not being accomplished through internal upgrading or normal happenstance hiring within the community. There are also deeper goals of the advisory committees, that reach beyond the immediate needs of providing competent staff within the quality control departments.

Technical education is a desire within itself, but when this education can be combined with an exposure to the general requirements of higher education an individual student becomes a more valuable, rounded individual. The advisory committees have become the spokesmen for quality control education. Where strong programs exist at present it is because the committees have worked in conjunction with the college vocational-educational personnel to establish these programs. Single course offerings in quality control technology, however, are occasionally found in supervision or production control curriculum offerings.

Advisory committees advocating the concept of quality control programs, per se, argue that programs are needed that place quality control technology in its true perspective. The emphasis upon product liability, the legal responsibility of a firm for the performance (which includes quality) of its product, has through the years spotlighted the role of industrial quality control. It is a separate discipline and should be treated as such by education practices just as it is treated as an entity within the firm or industry promoting this education.

There may be less concentration on entry-level positions, but there is certainly a concern by industry for competent first-time employees in the quality control field. Even though manpower resources are growing and complexities increasing in all the technological disciplines, many job opportunities actually exist. If institutions of higher learning can concentrate on determining job opportunities for the student and equipping that student to fill the jobs, many rewarding vocational opportunities will be fulfilled. In some important ways, the advisory committee cooperates to provide fulfillment of that objective. As long as a career consciousness can permeate throughout the schools – a genuine one – the student interest in quality control training will evolve. This interest should provide an important source for industry job-fulfillment, and if channeled effectively, may develop the quality control technician as an outstanding contributor to his work as well as to his social environment.

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[5]Division of Secondary Education, Los Angeles City Schools, "Strengthening Opportunities in Vocational Education," (Los Angeles: May 1964), P. 3.

Photo Courtesy TRW Systems.

STATEWIDE ADVISORY COMMITTEE on Quality Control Technology, June 1969. Left to right: William E. Whelan, Herbert L. Schlackman, Herbert Rogers, John Z. Mraz, Randolph L. Myers, Dr. Nathan H. Boortz, Harold Strutzenberg, Al F. Cota, William G. Gordon, Chairman. Others not present: Irvin Colt, Kenneth D. Fawcett, Glendon R. Guldberg, Merton R. Hubbard, Murray E. Liebman and Robert Tank.

4199

METHODS OF TRAINING THE QUALITY CONTROL TECHNICIAN

Some of the developments of quality control in industry have been studied and discussed in many works on the subject. It would seem that the quality control technician in a broad sense would be expected to control and supervise, statistically and technically, the factors affecting production quality. In line with this responsibility, this technician must be able to gauge the quality of products with the aid of instruments and determine whether or not the prescribed quality requirements are being met.

A major dilemma that has made itself apparent in modern day manufacturing industries is determining who is responsible for quality. It seems simple enough to say that the person making the product should also be responsible for the quality of that product. If this is a truth, then it is fundamental that the worker understand the importance of producing a quality product, that he inspect his product, and that he sense and feel a **quality consciousness** in performing his everyday work assignments. To take an approach of this type certainly relates to control of quality as part of, if not completely, the responsibility of the worker. It is recognized by studies on the subject of quality workmanship that because of manufacturing complexities and specialties the present day worker never sees the results of his work, nor does he relate to the finished product that he may have helped prepare for the customer. There have been interesting comparisons between the worker or craftsman of pre-industrial days and the modern industrial worker of today. One of these comparisons outlines the basic differences of these individuals.

THE PRE-INDUSTRIAL HANDICRAFT WORKER	THE MODERN INDUSTRIAL WORKER
Makes complete product.	Makes parts of product.
Makes single products.	Makes mass or serial products.
Has his own choice regarding design quality.	Has prescribed requirements regarding design quality.
Creates design quality.	Copies design quality.
Conscious knowledge of desired product quality.	Absenceland consequential ignorance of product quality.
Design quality immediately visible in product.	Product quality visible only with the aid of artificial means.
Interested in design quality.	Interested in product quality. [6]

The contrast is readily apparent and points to a lack of association between the present day worker and the product he is producing. Similarly, the quality control technician or analyst, inspector, etc., if not informed, has little opportunity to appreciate reasons for item product quality.

The discussion of the separation of the product from the product maker points to the need for broad education in the characteristics that make-up end-item performance and product useability.

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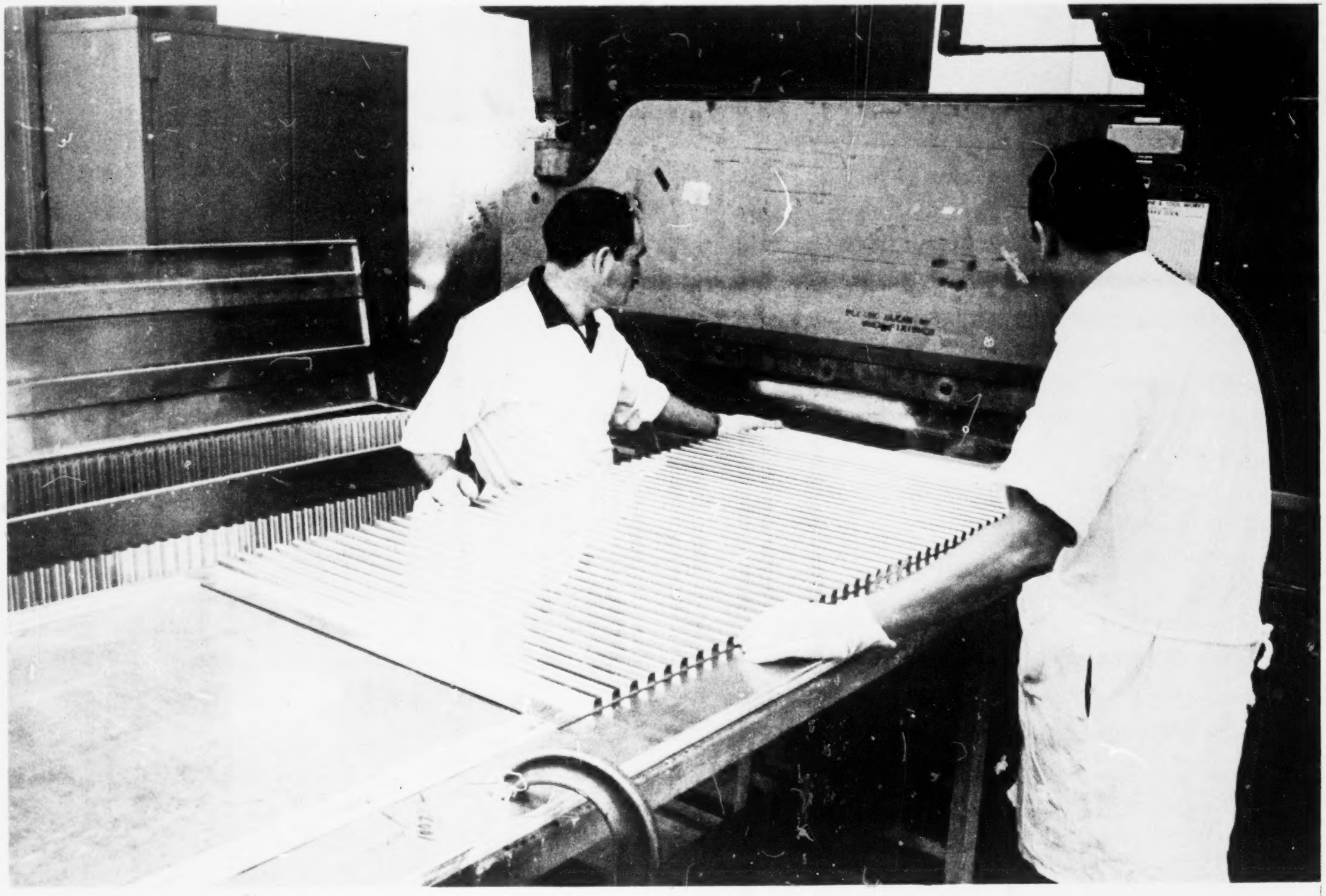
[6] Th. L. Stok, "The Worker and Quality Control" (Ann Arbor, Michigan: Graduate School of Business Administration, University of Michigan, 1965) p. 35.

4200

Photo Courtesy TRW Systems.



SOME FIRMS have no special quality control personnel, the worker is held responsible for his product.

4201

The more elusive part of the educational pattern seems to center around the learner-student exposure to a psychological task of creating a desirable understanding of work concepts. These concepts as study progresses should promote for individuals and industry in general an understanding of the need for an effective quality control organizational structure and the need for enhancing and maintaining quality consciousness.

The training and education currently being offered to the man or woman who aspires to learn more about the subject of quality control technology seems to be divided into three (although not too well defined) categories.

One method, although becoming less popular as well as available, is the apprenticeship method. Although still practiced in many of the disciplines of machine technology, the apprentice training of quality control technicians is practically non-existent. A more common approach has been found in student-worker preparation outside the confines of the industrial firm.

Training schools have existed for many years, specializing in the development of and the transfer to industry the student who completes the prescribed course. These schools have in the main been vocational private institutions, charging a fee, oftentimes substantial, for training in the vocational subject area. The subject of quality control technology has seldom, if ever, been offered as a course within itself, but has usually been offered as an adjunct or complementary subject along with the trade curriculum.

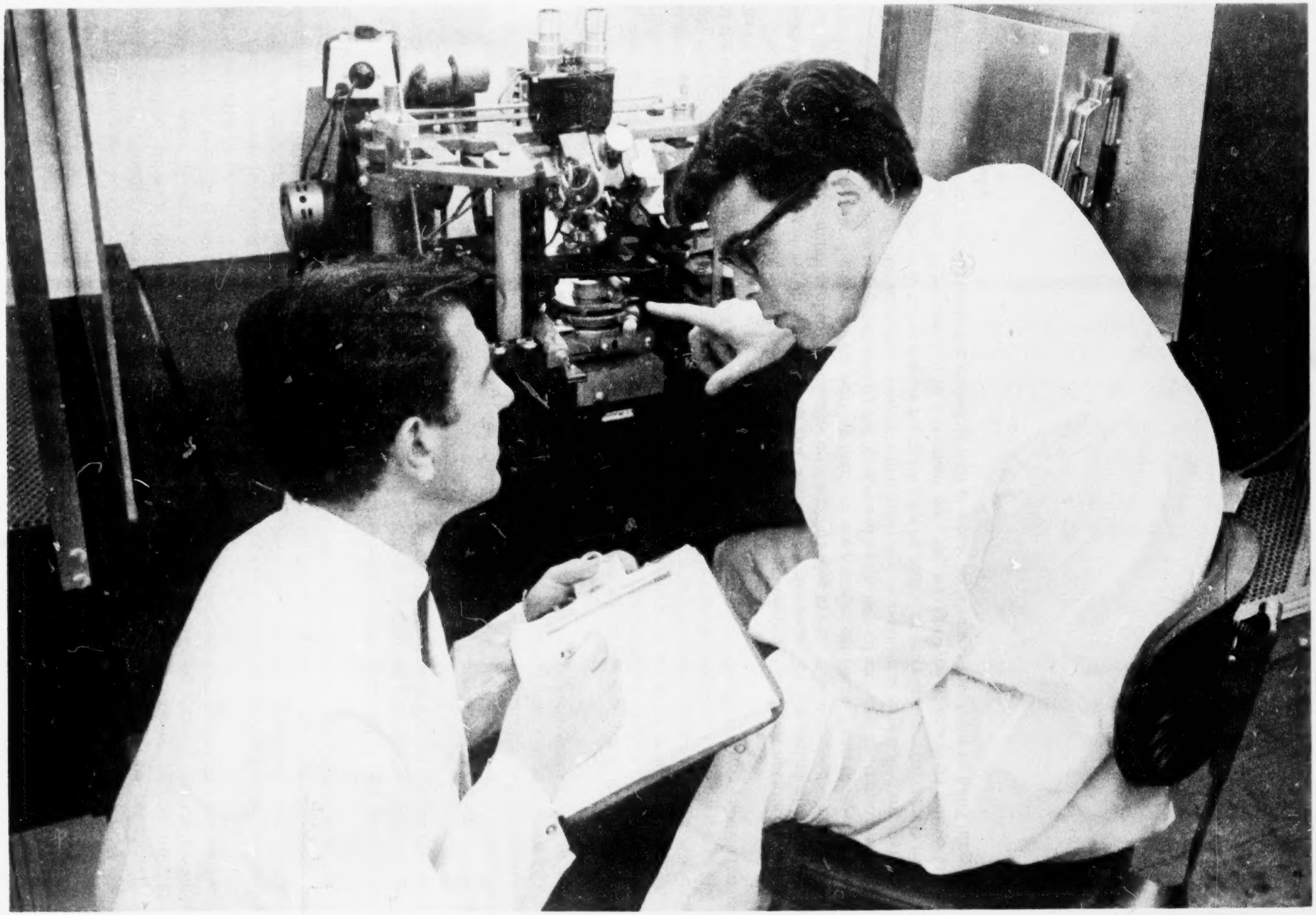
As recently as fifteen years ago, the public community colleges began to offer individual courses in quality control. These courses were usually oriented toward the statistical concepts of maintaining quality in a production oriented industry. The courses offered college-unit credit and were often the forerunners of other courses that led the student to job advancement and sometimes to a more formal and practical education.

As the value of quality control education seemed to be noticed by industry supervision, the requests and demands for this training increased. The subjects were extended to include such courses as (1) The organization and structure of quality control within industry, (2) The understanding of product design and function, (3) The understanding and applications of drawings and blueprints, (4) The use and care of basic measuring equipment, and (5) The ability to use mathematics for practical problem solving and work verification. This method of training was and remains successful and broadens the individual's concept of his total work environment.

Although the progress of the training at the community-college level is probably even yet in its infancy, the most successful method of training quality control technicians still seems to be on-the-job exposure, or frequently called "in-service training." The majority of industries that responded to questions related to the training of quality control technicians felt that the best education that these people could obtain was the general exposure they received on the job. Naturally, industry replies were centered around the needs for technicians in specific firms. In many cases, because of the complex work assignments or unusual product line, the quality control technician was by necessity a product of the firm's specialized needs.

The quality and effectiveness of technician training at the community-college level was not discounted, but the incidence of individuals receiving this training did not seem to be recognized by the individual responses. Some industries felt that the community colleges could offer on-the-job training to individuals employed — an on-site type of training that would be offered either during working hours or pre-arranged off hours. These obvious differences in needs seem to point strongly to required studies by the colleges and by industry of each case on its own merits. Specific specialized courses may be of little value in a community that offers only non-skilled or semi-skilled employment. Then again, too much generalization may fail to prepare the student for upgrading or entry-level employment in the industry that appears attractive to him. There seems to be a constant need for the right type of education offered in a timely manner to satisfy industry and to equip the individual with an economic demand that helps to fulfill his goals, both materially and personally.

Photo Courtesy TRW Systems.



PROPER GUIDANCE and instruction permits the Community College student to apply himself to meaningful problem solving.

4203

THE COMMUNITY COLLEGE STUDENT

It is a known fact that California has been one of the leaders in establishing a public community-college system. A recent count showed eighty-nine such institutions with plans for continual additions where community growth indicates a need for community-college education. Programs offered are normally completed over a period of two years or less. Students enrolling at these colleges represent a multitude of individuals with different ideas, goals, backgrounds, and personalities. It is actually a cross-section of a community and the term "community college" seems to best fit the description of the educational center. Students entering the community college usually do so to fulfill various objectives:

(1) To prepare for transfer to a four-year institution.
(2) To prepare for entry into an occupational field.
(3) To pursue general education goals for their own self-satisfaction.
(4) To prepare for upgrading or retraining while gainfully employed.

None of these objectives should be placed ahead of another. All are indeed important and have a significance in all phases of community-college education. The college offers the student what the student, as an individual, seems to consider most important.

Recent studies have shown that over two-thirds of the students entering the community college consider themselves to be transfer students and are planning to enter the four-year institution after completion of the first two years of undergraduate work. Those actually transferring to the four-year institution represent no more than one-third of the original count. [7]

Let alone what the statistics indicate, the community college is to perform or offer a fulfillment to the individual seeking an educational service. A significant observation of the value of the community college has been stated by a national advisory committee:

"Neither does recognition of the need mean that a junior-college program must be so exclusively vocational that it shuts out extension of cultural horizons or restricts adaptability to change. Time must be provided, even in a two-year curriculum, for at least basic courses in languages, arts and social sciences. The technicians of the future must be innoculated against the malady of over-specialization, a condition from which many professionals of the past suffered. They must not be forced to concentrate so narrowly on technology that they cannot be useful citizens or cannot accomodate to changes in their own specialties." [8]

The community-college student represents a diversified assembly of people seeking an education. Although his goal may be initially one of academic learning and upper-division transfer, he may find that a general exposure in the technical arts has, even by accident, prepared him for useful contribution to an industry or societal function.

If but one-third of the student body entering the two-year college transfers to a four-year college or university a community-college program should seriously plan for the constructive education of the remaining individuals. Whether publicized as an objective or not, the college should have programs implemented that prepare the two-thirds for employment. Vocational or occupational education becomes a major responsibility for the community college. In the area of quality control technology, the principal source of trained technicians should be the community-college graduate who has specialized in that subject field.

The community-college student, if his potentials are grasped early enough, can be guided toward personal fulfillment even if the four-year transfer proves to be impossible. The intense emphasis on the professional occupations that has permeated the culture of America has done much to influence the goals of today's youth. These influences are well-meaning, but all people in a certain age group and area cannot achieve professional status. Perhaps a professional goal in many respects is desirable from a prestige viewpoint and as a result careers in the occupational area receive an unjust second-rating.

A solution here might be to examine with the student the course offerings in the vocational/occupational area and investigate these courses as preparing for job entry or job advancement. There need be no "terminal" connotation to this examination, but it should be one of beginning opportunity for the student. A likening toward introduction to technologies where a student could leave and then return to an educational institution prevents a feeling of despair when the student withdraws from school. A recent study on technological progress has stated:

"Education, training, and re-training should be available to individuals throughout their lives ... A system of education that is open-ended, with freedom for mature students to enter, leave when alternative experiences seem mo. fruitful, and then re-enter, can be a reality through the coordinated efforts of public schools, community colleges, vocational schools, universities, and employers." [9]

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[7] James W. Trent and Leland L. Medsker, "Beyond High School" (Berkeley: Center for Research and Development in Higher Education, Univ. of California, 1967), p. 86-95.

[8] National Advisory Committee on the Junior College, "A National Resource for Occupational Education" (Washington, D. C.: American Association for Junior Colleges, December 1964)

[9] National Commission on Technology, Automation, and Economic Progress, "Technology and the American Economy" (Washington, D. C.: Government Printing Office, 1966)

A lot depends upon the guidance given to an individual by the counseling staff of the community college. Many schools have attempted to offer a core curriculum in basic technologies, and others have found it desirable to group basic or similar technologies together in a first-year study program. This latter approach permits the student to branch out into a specialty area after he has been able to examine, even though superficially, all the vocational education disciplines available to him.

Above all, the student must obtain a feeling that an effort is being made to attract him into an education pattern that will be meaningful to him. Stereotyped classes and methods of presentation will soon be rejected by the student. If exposure to modern technological advancements is neglected by the colleges, the industrial plant will be forced to acquaint employees with these features – bypassing important support to the community colleges. Recognized experts should speak to student groups and stress the role of the community college in perpetuating technical as well as academic education.

There is a demand for the trained and educated community-college student. His objectives are important, and it is also important to provide him with tools that equip him to be useful within society as well as satisfying his personal aims. Guidance is important, but not to the point of restriction. Technological awareness is important, to the extent that the community college can assist industry as well as acquaint the individual with the myriad of occupational specialties within the industrial environment. It is believed that the field of quality control technology is an important discipline within the framework of industry and Government, and is one of the many areas needing the individual, the student, to perpetuate the benefits of this function within our present and future society.

EMPLOYMENT OPPORTUNITIES AND TRENDS

It is nothing new to point out the tremendous growth in the manufacturing trades within the last decade. The statistics can be analyzed, however, and evaluated in line with the need for the actual employment of quality control technicians within the California industrial community.

The Research Department of the California State Chamber of Commerce has published useful information related to industrial growth within the last ten years.

"Payrolls in manufacturing industries were estimated at nearly 10.6 billion in 1965. This exceeded the payrolls of 1964 by 4.3 percent and exceeded the payrolls of 1961 by 24.5 percent, reflecting the powerful and sustained recovery from the nationwide recession in 1961. By 1963, shifts in the procurement policies of the United States Department of Defense were beginning to have adverse effect on some defense industries. Declines in employment were noted in this category during that year. However, a moderate upswing started in 1964 and continued through 1965 and into 1966 due to increased procurement for the Vietnam conflict.

"At the same time, reflecting the powerful post-1961 recovery, every major nondefense industry showed gains during 1964 and 1965. The most substantial increases were in chemical products, food products, apparel, lumber and wood products, products of stone, clay and glass, fabricated metal products, and machinery.

"Between 1955 and 1965, employment of wage and salary workers in the durable goods group of manufacturing industries rose 29.3 percent, reaching an estimated monthly average of 946,000. During the period, despite some losses near its end, the number of workers in ordnance increased by 434 percent and in electrical equipment (including electronics) by 172 percent. In instruments the increase was 79 percent. Manufacturers of nonelectrical machinery, primary metals, fabricated metal products, products of stone, clay and glass and furniture and fixtures all expanded employment with gains ranging from 19 to 34 percent.

"Nondurable goods industries expanded employment by 21.8 percent from 1955 to 1965, and in the latter year were estimated to have had an average employment of 462,300. Of these, producers of rubber and plastics products showed the highest rate of employment growth, with a gain of 55 percent. Other nondurable goods industries, including printing and publishing, chemical products, apparel, food products, and paper products increased the number of workers on their payrolls by amounts ranging from 18 to 44 percent for the ten-year period. Employment in the California petroleum industry, however, declined somewhat during this period." [10]

The statistical summary as presented indicates the growth and presumed growth trend within California industry. What role will the quality control technician assume in this growth period, and what significance has the quality control technician had during the past ten years of industrial progress? These are some of the questions that required an analysis, and the questionnaire/interview technique was employed to conduct this analysis.

Industry replies to inquiries requesting job descriptions and wage ranges for quality control technicians were received from approximately 90 percent of those firms responding to the industry questionnaires. Job projections were offered by those firms that felt that they could, with some veracity, predict the need for additional quality control technicians

in future years. The type of jobs that were filled or could be filled by students completing a community-college quality technology program (either full program or certificate course) and opportunities for job advancement were stated by industry and Government in a second questionnaire or were gathered from personal interviews.

JOB DESCRIPTION – INDUSTRY

The complexity of the term "Quality Control Technician" and the significance attached to this job description resulted in varied definitions. The job descriptions presented have been selected as representative of industry and Government. They are placed in a progressive order showing in theory how an individual could advance from one assignment to another. Duplicate or apparently similar job descriptions have not been listed in the interest of report continuity and effectiveness. The details of the job descriptions are meant to be realistic and hopefully indicate what the individual is doing, generally, while employed during his work day. There are many intangible characteristics that will not appear on a prepared job description. **The ability of an individual to get along with others, the methods by which a person communicates, his overall awareness of a given situation, all go into the recipe for a knowledgeable and contributing individual, but are lacking in most job definitions.** The objective details of prepared job descriptions are offered in this section, the wage ranges related to these descriptions accompany each description.

INSPECTOR – TRAINEE

Wage Range: $100 to $128 per week.

JOB DESCRIPTION

Perform various semi-repetitive checking, comparing or inspection functions, including the operation of certain testing machines or equipment, while working under the guidance of more experienced inspectors. Occupation to be used primarily as a training function for advancement into more specialized inspection classifications.

WORK PERFORMED

Perform various semi-repetitive functions as set forth herein, and if required, stamp, sign, or otherwise signify approval of acceptable items and covering documents; in inspection activities such as:

Operate Brinell and Rockwell type hardness testing machines to test the hardness of metals, and may use Barcol, Webster, or similar devices.

Work with magnetic operators and inspectors by counting, handling, stacking parts; removing and cleaning parts; applying dye for identification, etc., or work with flourescent inspectors by dipping, spraying, washing, drying, identifying parts, etc.

Compare or check multiple run parts with previously completely inspected sample parts.

Check spot weld or roll weld machine set-up and quality of individual spots, checking test parts or items in shear testing machine and by cross-section test. Record results on test reports.

Check electrical wiring bench operations, including length of wire, completeness of harnesses, completeness of identification marking, etc.

Inspect standard supply items received from vendors for conformity to supplies and company specifications by use of snap gauges, "go" and "no go" gauges, scales, micrometers, and similar testing devices not requiring set-up; check metal, glass, wood, plastic, or other flat or formed articles for scratches, cracks, dents, breaks, or other visually apparent defects; and may check non-standard supply items to blueprint after blueprint reference, method of inspection, testing devices, etc., have been determined, established or set by others. May inspect similar parts made in the company where level of difficulty of inspections is no greater than outlined herein, and where limitations outlined are followed.

May be required to perform, in addition to the above, any other duties related to the inspection function, such as opening boxes and unwrapping parts in preparation for inspection by self or others; applying protective coatings, and wrapping and packaging inspected parts for transportation and/or storage.

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[10] California State Chamber of Commerce Research Dept., "California Manufacturing Industry Trends 1955-1965," "California Manufacturers 1968 Register Official Directory" (California Manufacturers Association, 1968), p. XIII.

EDUCATION AND EXPERIENCE

Working knowledge of those specifications, and inspection practices and procedures involved in the duties mentioned above, and of common production methods. Ability to use the required instruments and devices, and to read blueprint call-outs. Must be able to differentiate between colors.

QUALITY ASSURANCE LABORATORY TECHNICIAN

Wage Range: $158 to $169 per week.

JOB DESCRIPTION

Performs standard laboratory tests, and preparation and analysis of in-process samples in accordance with established methods and general instructions utilizing appropriate equipment to determine the acceptability of the product.

WORK PERFORMED

Performs standard physical tests and analysis of in-process propellant or liner samples such as: viscosity, density, constant load, constant strain, shore hardness, strand burning rates, heats of explosion, average particle size, specific surface area of materials, propellant sawing and milling and the like. Records data and observations on test data records in accordance with standard operating procedures.

Assembles related test data and reduces, records, and plots data that is necessary for graphs, reports and summaries for the dissemination of test data using calculator and/or slide rule, requiring knowledge of algebra in accordance with standard operating procedures.

Initiates discrepancy reports and maintains records of test data and of related information.

May assist higher classified employees in developing and testing of new and revised test methods and equipment by performing specific laboratory operations in accordance with special instructions.

Performs routine maintenance to assure operation of laboratory equipment.

May be assisted by lower classified employees on standard laboratory assignments.

Uses laboratory equipment and apparatus such as aquameters, analytical balances (torsion and automatic), calorimeters, heat of explosion bombs, Fisher sub-sieve sizer, particle size distribution apparatus including micro sieves, screens, micromerograph, moisture measuring instruments, dielectric heaters, Instron tensile tester, gauges, viscometers, ovens and muffle furnace, potentiometers, temperature recorders, vacuum pumps and desiccators, conditioning boxes, propellant saws and mills, high and low pressure strand burning rate apparatus, durometer, pentrometer, micrometers, hand and power tools.

Operates or uses non-destructive testing equipment such as: high energy accelerators, radioactive isotopes, industrial X-ray machines, dye penetrant materials, magnaflux equipment, ultrasonic equipment, and necessary measuring instruments and hand tools to accomplish the work.

Note: Holding this classification requires the ability to obtain applicable certification in accordance with contract requirements.

INSPECTOR – PRECISION RESEARCH

Wage Range: $162 to $175 per week

JOB DESCRIPTION

This occupation requires inspecting the fabrication, assembly, mating, functional test and checkout of missile structures, structural parts, and assemblies, mechanical systems, sheet metal items and intricate machined precision missile parts and assemblies, for the purpose of providing research design on new developmental or mockup assemblies. Make complete inspection to dimensional specifications of nuclear reactor and structural components.

WORK PERFORMED

In the inspection of typical work performed by Development Mechanic-Research Laboratories and Machinst-Precision Research, must be able to and normally does perform the following duties:

Make complete inspection of nuclear reactor structural components, determining the initial inspection operational sequences to obtain desired dimensional exactness, and measure to highly refined optical tolerances.

Carry out inspection processes and tests on the fabrication, assembly, installation, mating, functional test and checkout of missile structures mechanical systems, sheet metal items, and intricate machined precision missile parts and assemblies. Typical equipment inspected includes nuclear reactor and associated equipment, hand-honed sound wave measuring equipment, requiring the use of optical precision measuring devices to attain critical optical dimensional measurements.

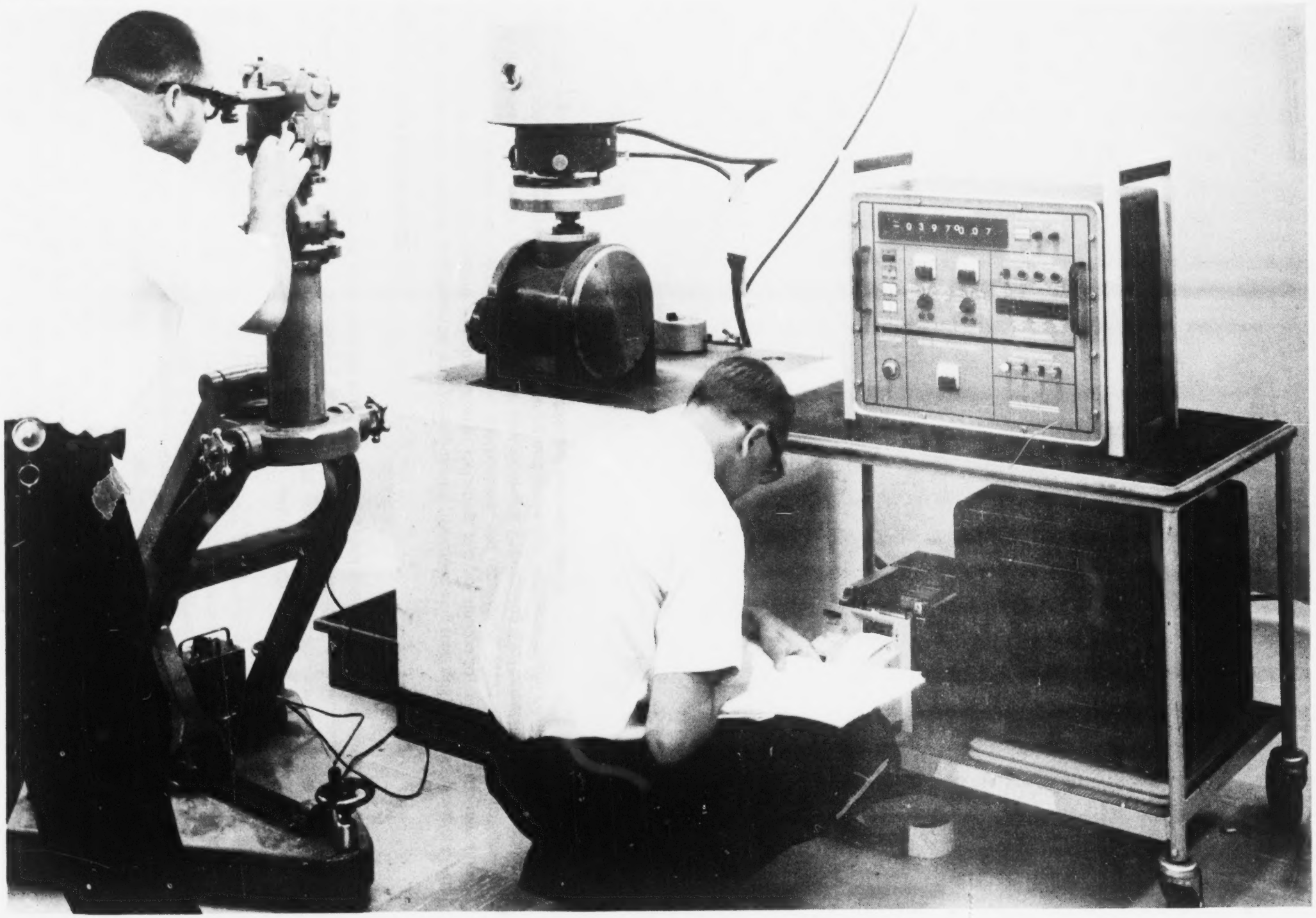
In connection with the above, perform first article 100 per cent inspections of precision machined parts requiring extremely close dimensions and tolerances. Inspect prototype first run machined parts and assemblies where previously developed technique and fixtures are not available and very difficult precision instrument surface plate set-ups are required for the measurement of compound angles, three dimensional projections and/or for the checking of numerous precision linear and angular coordinated dimensions and reference points on two or more planes.

Micrometers, vernier calipers, height gauges, precision measuring instruments, optical comparators, surface analyzers, electro-limit gauges, gauge blocks, thread-wires, counters and timers, power supplies and power measuring equipment; laboratory measuring equipment and test panels. Panoramic analyzers, distortion analyzers and optical measuring equipment are examples of the typical tools and equipment used in this job.

EDUCATION AND EXPERIENCE

Knowledge of precision research experimental and developmental manufacturing methods and practices as applied to guided and free flight missile systems and components, including, but not limited to, miniature, sub-miniature, optical, electro-mechanical and mechanical devices, mechanisms and apparatus; types and specifications of materials used; heat treat, weld, processing and finish specifications; Engineering and Research, Inspection theory, and select and use applicable precision testing, measuring and inspection instruments and devices, and to read and interpret drawings, prints, process specifications, sketches and methods manual.

Photo Courtesy TRW Systems



QUALITY CONTROL TECHNICIANS using mechanical, electrical, optical and electromechanical equipment.

4209

TOOL & GAGE INSPECTOR A

Wage Range: $182 to over $200 per week.

JOB DESCRIPTION

Perform a variety of complicated inspections on all types of first-run precision machined parts to prove the accuracy of machine tools. Use complicated inspection and precision measuring instruments and equipment. Enter prescribed information on engineering drawings and forms. Inspect, maintain, adjust, and order all thread and plug gages used in the Instrument Division and special gages used primarily in Parts Inspection Department.

WORK PERFORMED

Work under general supervision of designated supervisor and follow established procedures. Perform a variety of complicated inspections on all types of first-run precision machined parts to prove accuracy of tooling used in their machinging. Use complicated engineering drawings. Use shop mathematics, including trigonometry.

Set up and use a variety of inspecting and measuring instruments and equipment such as shadowgraph, sine plate, height gages, micrometers, vernier calipers, indicators, comparators, and other requisite inspection tools.

Perform lay out of metals or materials, including hole patterns, when directed. Check dimensions, fits, locations and surface finish of parts with engineering drawings to determine their conformance to prescribed tolerances and standards. Enter actual dimensions, fits, locations and surface finish of parts with engineering drawings. Complete all other required inspection forms and reports. Forward drawings and other papers to designated persons or departments for their review and action. May discuss results of inspection with supervisor, or members of engineering and purchasing departments, when necessary.

Inspect and maintain in good operating condition all thread and plug gages used in the Instrument Division and special gages used primarily in Parts Inspection Department. Assure that such gages are of the prescribed size and diameter.

Adjust gages to prescribed standards, using master gage, master set plug, gage blocks, comparator and thread wires, and other required instruments, as necessary. Recommend purchase of gages. Write purchase requisitions for gages, as required. Determine need for inspection gages. Design, or suggest the design of special inspection gages. Request fabrication of such gages through approved channels. May offer advice and guidance to Tool and Gage Inspector B. Perform related duties as assigned.

EDUCATION AND EXPERIENCE

Completion of high school, plus completion of a four year apprenticeship as a Machinist or Toolmaker, or equivalent. Five years experience as Toolmaker, Machinist, or Precision Inspector in a shop producing primarily short turn precision parts.

Photo Courtesy TRW Systems

A TOOLING INSPECTOR verifying the dimensional requirements of a production fixture.

4211

Photo Courtesy TRW Systems

A QUALITY CONTROL TECHNICIAN using a surface gauge with dial indicator to check an outside diameter mount.

4212

QUALITY ENGINEER B

Wage Range: $150 to $235 per week

JOB DESCRIPTION

Performs professional quality engineering project assignments in one or more specialized fields of quality engineering. Under the direction of and in assistance to Quality Control Engineers "A", assumes technical responsibility for a major project phase of sub-division of a new engineering or manufacturing program; or assumes technical responsibility for an established program after initial concepts and decisions have been made. Reports to Senior Quality Engineer or Quality Engineer "A".

WORK PERFORMED

Performs quality engineering assignments usually involving one phase or aspect of a major product or surveillance of an established program. Reviews preliminary engineering designs and determines practicability of dimensional, tolerance performance, and specification call-outs. Recommends design changes to reduce gaging and labor costs. Carries out the details of quality engineering plans and solves transitional problems between product engineering, manufacturing engineering and shops during initial development and pilot run production.

Establishes minimum inspection requirements and prepares general instructions to inspection planners. Reviews manufacturing plans to determine primary inspection points, special processes and techniques. Determines the need for special gages, instruments, and equipment. Approves and authorizes purchase of standard layout and measuring instruments for general use or modifications to meet specific project needs.

Conducts gage and methods proofing assignments and accepts or rejects accordingly. Notifies suppliers of gage failures and makes arrangements for immediate corrections. Authorizes allowable deviations and acceptance of minor dimensional discrepancies.

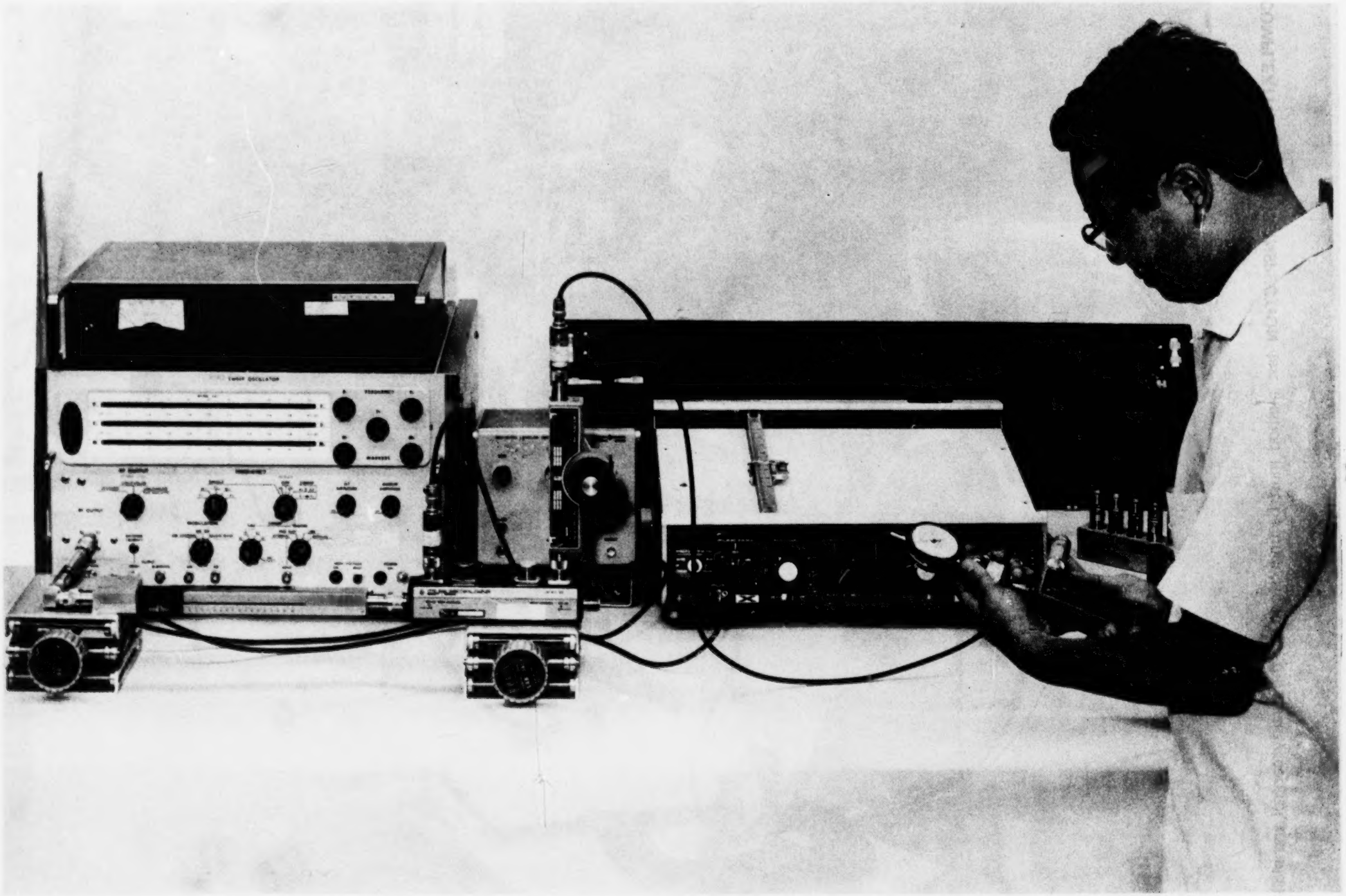
Maintains surveillance of manufacturing and testing activities to assure compliance with quality control policy and objectives. Provides technical guidance to inspection and manufacturing personnel as required. Participates in the review of defective parts and materials. Writes rework and repair instructions.

May perform one or a combination of specialized quality engineering activities covering gaging non-destructive test, design review, etc., as required. Provides support information and data for Material Review Boards. Prepares reports, correspondence and statistical studies as required. Performs quality liaison functions between technical, manufacturing, test and other organizations. Performs other related duties as they are assigned. Gives technical directions to Quality Control Analysts, Planning and Inspection personnel.

EDUCATION AND EXPERIENCE

B. S. degree in Engineering or the Sciences or High School plus two (2) years technical or trade school training plus five (5) years experience in the technical aspects of Quality Control.

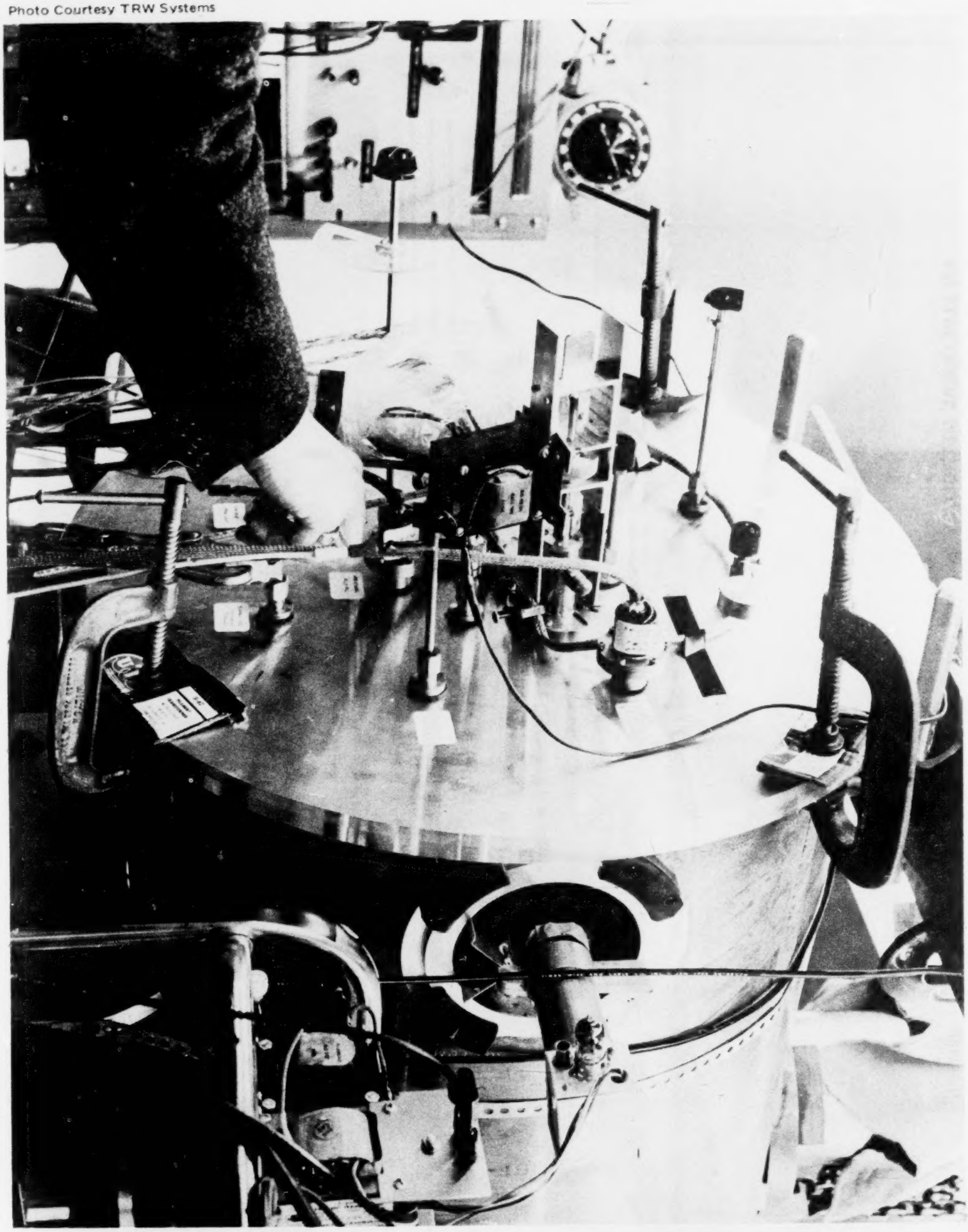
Photo Courtesy TRW Systems



AN ELECTRICAL METROLOGY technician performing verification duties with industrial equipment.

4214

Photo Courtesy TRW Systems



COMPLEXITIES OF THIS INSPECTION test method must be understood by the quality control technician.

4215

SMALL FIRM JOB DESCRIPTIONS

The foregoing job descriptions are indications of the tasks a quality control technician might be expected to accomplish. It is necessary to remember that, in the main, industries responding to a request for information acknowledge the existence and the need for technicians in a specialty field such as quality control technology. Some of the descriptions could identify with a technology or job area not directly associated with quality control. Even in these situations, it should be remembered the responses indicate that the technology was being utilized to produce a quality product or perform a quality control service. The major response, represented by detailed and descriptive job analysis was supplied by the larger companies, primarily those firms representing aerospace contractors. Many of the smaller companies, employing less than two hundred people did not have detailed job descriptions. These replies did indicate nomenclature for job classification and many of the responses listed details of the job directly on the industry questionnaire. A group of these descriptions is included along with a sample of U. S. Government job descriptions for quality control technology personnel.

The California Department of Employment also maintains job descriptions for quality control personnel. These descriptions are available upon request to that agency.

TYPICAL SMALL FIRM JOB DESCRIPTIONS

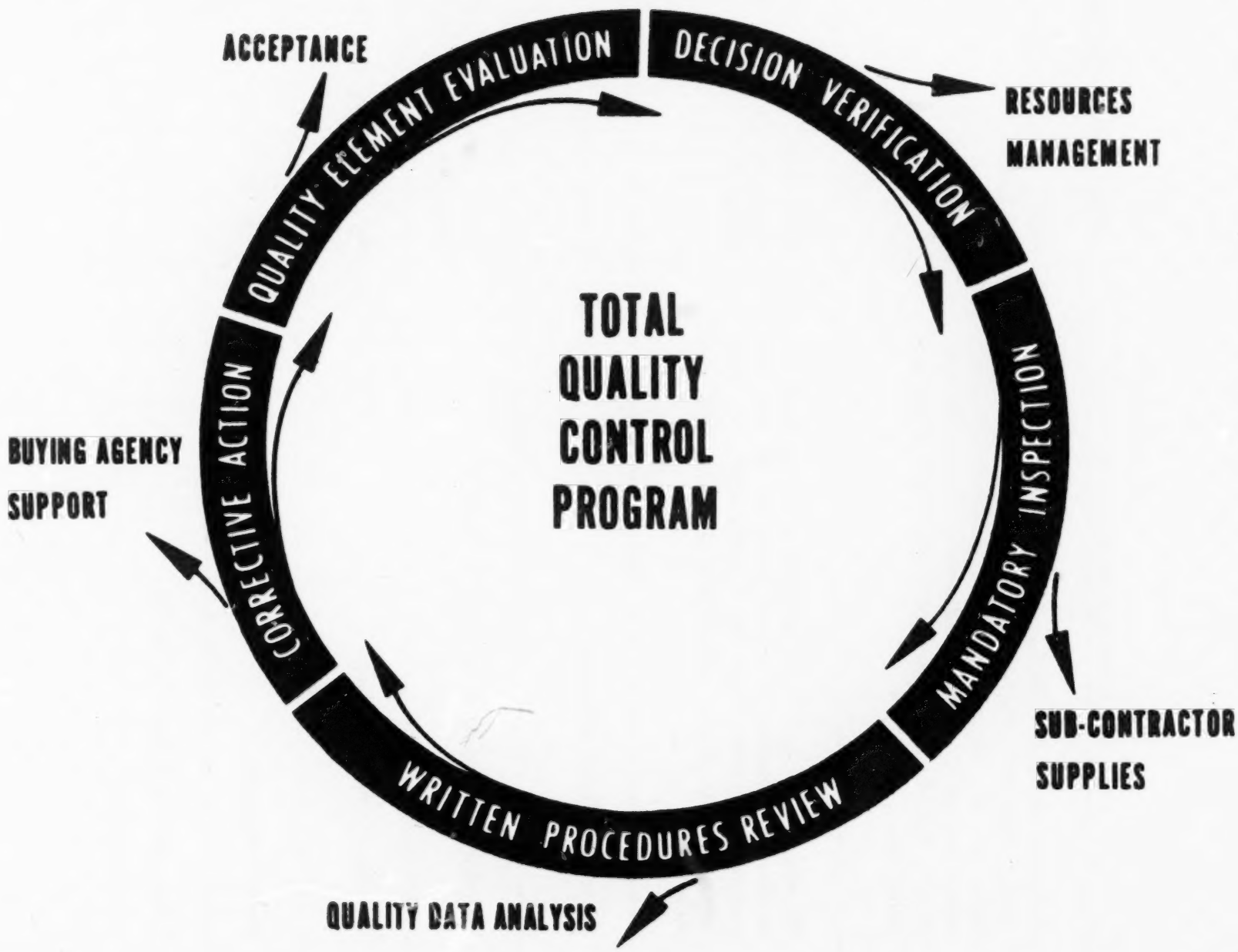
JOB DESCRIPTION	WORK PERFORMED	EDUCATION & EXPERIENCE	WAGE RANGE
Product Assurance Requirements Analyst	Analyzes manufacturing and engineering drawings, calibration methods and procedure, specifications, and test requirements, and contract and procurement documentation to assure integrity and adequacy to fulfill quality requirements of customer.	2 years College and 4 years work experience, or total of 6 years work experience.	$159 to $249 per week.
Product Assurance Specialist	Develops, implements, and coordinates contract analyzes, comprehensive programs, plans, work statements, data control systems and basic procedures to insure quality performance in the development, manufacture, and test of missile, space vehicle, and related activities, by contractor or subcontractor.	Degree in engineering or administration and 8 years experience in QC, or related fields.	$254 to $383 per week.
Inspector – Shipping	Inspect components, parts, assemblies, spares, tools, associated ground support and test equipment, raw material for conformance to Company and Customer requirements for shipping.	Knowledge of regulations concerning shipping; ability to read blueprints and determine safe packaging practices.	$138 to $155 per week
Assembly Inspector I	Inspects electrical and mechanical subassemblies and assemblies to insure blueprint requirements are complied with.	High School-3 years work experience in electronic assembly with 2 years inspection experience. Must be NASA soldering school graduate.	$118 to $157 per week.

4217

JOB DESCRIPTION	WORK PERFORMED	EDUCATION & EXPERIENCE	WAGE RANGE
Final Inspector A	Perform a variety of complicated precise inspections and/or conduct standard functional performance and environmental tests on all types of highly complex, completed electro-mechanical instrument assemblies, to assure their meeting prescribed inspection and testing specifications and standards.	High School-4 years work experience.	$138 to $198 per week.
Industrial X-Ray Technician	Requires the set-up and operation of X-ray equipment to produce radiographs of major structures, systems and components thereof, and the interpretation of these radiographs to detect unacceptable defective parts and materials.	Knowledge of radiograph techniques, read and interpret radiographs.	$150 to $165 per week.
Quality Engineering Aid	Assist Senior Quality Engineer	2 years College	$170 to $227 per week
Construction Inspector	Performs Structural Tests on Cements, Steels	Technical Education in Laboratory Analysis Specialty.	$170 to $200 per week.
Statistics Clerk	Elementary Data Compilation	High School -- On-the-job Training	$90 per week
Bottler, Lab Technician	Process Inspection	High School	$132 per week
Installation Salesman	Design and install Heat Transfer Equip.	2 years College or Equiv.	$-------

4218

QUALITY CONTROL PROGRAM



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U. S. CIVIL SERVICE COMMISSION

851 SOUTH BROADWAY
LOS ANGELES, CALIFORNIA 90014

4219

APPLICATIONS WILL BE ACCEPTED UNTIL
FURTHER NOTICE

ANNOUNCEMENT NO. SF-75-1(67)
ISSUED: 1 MARCH 1967

REVISED: 27 June 1969

QUALITY CONTROL REPRESENTATIVE AND ASSISTANT

GS-9 AND GS-7

POSITIONS TO BE FILLED: The purpose of this examination is to establish a list of eligibles for filling positions of Quality Control Representative, GS-9, and Quality Control Assistant, GS-7, throughout California and Nevada for agencies within the Department of Defense. Registers resulting from this examination may also be used to fill similar positions in other Federal agencies except where an adequate register is maintained by a Board of Examiners or Interagency Boards of U.S. Civic Service Examiners.

DESCRIPTION OF WORK AND QUALIFICATIONS:

QUALITY CONTROL ASSISTANT, GS-7

DUTIES: Assists in the surveillance of designated portion of the contractor's inspection or quality control program under guidelines contained in contract specifications, drawings, standard inspection procedures, local instructions, etc. The work assignments, objectives and methods are prescribed by instructions and guides provided and technical supervision is constant and corrective. This grade level is viewed as an intermediate step to the position of Quality Control Representative, therefore, close technical supervision, training and work assignments covered by specific instructions will prepare the employee for promotion to the GS-9 level.

QUALIFICATIONS: Past experience will be evaluated on the basis of the candidates ability to perform tasks related to inspection, statistical evaluation, sampling, testing, troubleshooting, etc., as well as his knowledge of commodities listed under the options covered by this announcement, and his technical background. Education in the area of technology, science, or quality control will be credited as preparatory experience. Performance on the written test in combination with experience and education will be considered as evidence for potential development.

QUALITY CONTROL REPRESENTATIVE, GS-9

DUTIES: Quality control representatives at this level perform the full sequence of tasks in monitoring a quality control program. This includes conferring with the manufacturing management, applying statistical quality control procedures, evaluating inspection or quality control programs, analyzing types of defects and maintaining surveillance of a quality control program for component parts of more complex items, such as items in a production situation requiring some modifications or engineering changes during manufacturing.

QUALIFICATIONS: It is necessary to have experience and training in the use of precision measuring devices, a knowledge of standard industrial treatment processes, familiarity with various inspection guides and quality control instructions and an understanding of the various statistical technical standards used in controlling manufacturing process. This experience must demonstrate the ability to assist in planning, developing or operating a quality control program, to monitor quality control procedures in a manufacturing operation and to make recommendations or establish necessary corrective controls.

OPTIONS

Applicants will be rated by subject matter specialist, for eligibility in the following options:

GENERAL COMMODITIES, GS-1901-7 and 9: Included are positions the duties of which involve a combination of work characteristics of two or more series, also includes positions for which a separate series has not been provided (office supplies and equipment, paper and paper products, furniture, hardware and tools, recreational and athletic equipment, musical instruments, cleaning equipment and supplies, etc.).

MANAGEMENT, GS-1903-9 (only): Includes positions the duties of which are to advise, administer, perform technical or administrative work primarily concerned with the development, installation or administration of quality control or inspection programs, plans, methods, procedures, systems, or techniques.

SUBSISTENCE, GS-1905-7 and 9: Includes the full range of subsistence items from the commercial types of fresh, frozen and canned foods to the specialized military requirements such as dehydrated foods, operational rations, and survival rations.

CLOTHING, TEXTILES AND LEATHER, GS-1906-7 and 9: Includes items of clothing and individual equipment, for textiles and textile products, leather and leather products.

CHEMICALS, GS-1915-7 and 9: Includes chemicals products other than petroleum or ammunition items. Chemicals include substances obtained by a chemical process or used for producing a chemical effect including drugs and pharmaceutical. Products may involve organic chemistry (chemistry or hydrocarbons and their derivatives, or of carbon compounds) or inorganic chemistry, all other compounds and of the elements.

PETROLEUM, GS-1916-7 and 9: Includes POL (Petroleum, Oils, Lubricants) surveillance in connection with Quality Assurance programs covering contractor/pipeline carriers and bulk complex facilities for storage, refining and bulk distribution of petroleum products, liquid oxygen, liquid nitrogen and other exotic propellants.

MATERIALS, GS-1920-7 and 9: Includes lumber, millwork, plywood and veneer, nonmetallic fabricated materials, nonmetallic crude materials, metal bars, sheets, and shapes, ores, minerals and their primary products.

ELECTRONIC, GS-1936-7 and 9: Includes electronic equipment, systems, components and sub-assemblies and related electronic or electrical items, including the specialized categories of instruments, radio, radar and computers.

MECHANICAL, GS-1940-7 and 9: Includes mechanical systems, equipment, components, parts and/or assemblies, including industrial business, and household machinery which is predominantly mechanical in the completely assembled state, such as mechanical power transmission equipment; wood working machinery and equipment; metal working machinery, refrigeration and air conditioning equipment; furnace, steam plant, and driving equipment, etc. including the specialized categories of instruments production tools, nuclear components and engines.

AUTOMOTIVE, GS-1941-7 and 9: Includes transportation, construction, combat and prime moving self propelled vehicles other than aircraft, watercraft, and missiles, also includes components, parts, and subassemblies of such vehicles.

AIRCRAFT, GS-1942-9 (only): Includes airframes systems, components and sub-assemblies, or aircraft engine and sub-assemblies or aircraft components and sub-assemblies, including the specialized categories of airframe, propeller rotor blades and powerplant.

ORDNANCE EQUIPMENT, GS-1947-7 and 9: Includes nonexplosive mechanisms, devices, systems, and components, or sub-assemblies thereof, such as guns, howitzers, mortars, and related equipment; rockets, torpedos and associated equipment; release equipment such as torpedo tubes; rocket and depth charge launchers; sighting; mechanical range finding and fire control equipment, excluding optical lenses, prisms, and electronic devices; small arms and parts; nuclear weapons, associated test, loading and handling equipment, etc.

4221

AMMUNITION, GS-1948-7 and 9: Includes ammunition, ammunition components, propellants, and explosives, including the control of ammunition containers, and magazines, building, depots, and other facilities used for temporary or permanent storage of ammunition.

MISSILE, GS-1950-7 and 9: Includes missiles and assemblies including the specialized categories of airframe, guidance, propulsion, nose cone and launching systems.

SPACE SYSTEM, GS-1955-9 (only): Includes principal systems or sub-systems elements launch vehicles, spacecraft, ground support equipment, and test hardware used in launching operating and maintaining vehicles or craft in space.

CALIBRATION AND MEASUREMENT, GS-1961-9 (only): Includes calibration, certification, control, usage, care and handling of measurement and test equipment and standards.

MATERIALS TREATMENT PROCESSES, GS-1965-9 (only): Includes electroplating chemical films treatment, chemical and mechanical cleaning, painting, impregnation of materials, laminating and casting; and specialized forms of nondestructive testing methods such as radiograph (X-ray and Gamma-ray), magnetic particle, ultrasonic and penetrant; and specialized types of destructive tests for physical and chemical properties of materials.

PLEASE INDICATE ON THE SUPPLEMENTAL FORM CSC 680 THE OPTION(S) FOR WHICH YOU FEEL YOU ARE BEST QUALIFIED AND FOR WHICH YOU WISH TO BE EVALUATED.

EXPERIENCE: It is necessary to have experience or training in an optional field listed in this announcement which has been of sufficient scope and quality to enable applicants to perform the duties of the position at the level for which they are applying. No special length of experience is required but the applicants' record of experience and training should clearly indicate knowledges, skills, and abilities of the kind listed below.

(1)	Knowledge of commodities (technical knowledge)	GS-7 and GS-9
(2)	Knowledge of production processes (manufacturing)	GS-7 and GS-9
(3)	Ability to communicate	GS-7 and GS-9
(4)	Ability to read and interpret plans and specifications	GS-7 and GS-9
(5)	Ability to recognize problems	GS-7
(6)	Ability to analyze data and to recognize actual or potential problems	GS-9
(7)	Mathematics – statistical knowledge	GS-9
(8)	Knowledge of quality control principles, methods and practices	GS-9
(9)	Ability to perform the duties of the positions without excess training and/or supervision	GS-7 and GS-9

Applicants will be evaluated on the basis of each of the above elements. Those who possess a sufficient degree of commodity (technical) knowledge and indicate the ability to perform the duties of the position without excessive training and/or supervision will be considered as basically qualified at the GS-7 level. They will be ranked on the basis of the scope and quality of their training, education and experience.

In addition, those applicants who possess a sufficient degree of knowledge of Quality Control principles, methods and practices and indicate the ability to perform the duties of the position without excessive training and/or supervision will be considered as basically qualified at the GS-9 level. They will then be ranked on the basis of the scope and quality of their experience, education and training.

BASIS OF RATING: Applicant will be ranked on a scale ranging from 70 to 100. The ranking will be determined by a panel of subject matter experts who will evaluate past experience, training, education and for the grade GS-7 level positions, a written test. Grade level and options will be based upon the grade level and options indicated on the application form (SF 57) and the judgment of the rating panel.

WRITTEN TEST: Candidates who wish to be considered for Grade GS-7 positions and who meet the commodity technical knowledge requirements will be required to take a written test which will assist in an evaluation of their potential as Quality Control Assistants. Applicants who fail to meet the technical commodity requirement will be rated ineligible and will not be scheduled for the written test.

The written test will take approximately 1½ hours and will cover verbal abilities, abstract reasoning, and interpretation of statistical data, such as charts and graphs. The test is not designed to measure particular quality control knowledges nor is it to be used as a device for disqualifying applicants. It is intended to furnish the rating panel with additional information about the potential of applicants.

PHYSICAL REQUIREMENTS: Applicants must be physically able to perform efficiently the duties of the positions which are described elsewhere in this announcement. Good distant vision in one eye and the ability to read without strain, printed material the size of typewritten characters are required, glasses permitted. Positions where color vision is essential applicants must be able to distinguish either basic colors or shades of colors. In most instances, an amputation of arm, hand, leg or foot will not disqualify an applicant for appointment, although it may be necessary that this condition be compensated by use of satisfactory prosthesis. For the positions of Ammunition Quality Control Representative and Assistant, applicants must possess the ability to hear the conversational voice without a hearing aid. An amputation of arm, hand, leg or foot will disqualify an applicant for appointment to these positions. Applicants must possess emotional and mental stability. Any physical condition which would cause the applicant to be a hazard to himself or to others will disqualify him for appointment.

TRAVEL AND ABILITY TO DRIVE AN AUTOMOBILE: The duties of some of these positions may include driving an automobile. The appointee should, therefore, be a capable and experienced driver and possess or be able to obtain a valid state motor vehicle license.

CERTIFICATION: When certifying for jobs in California, consideration will be given first to eligibles who live in California. Furthermore, persons residing in Southern California will be given first consideration in Southern California, and persons residing in Northern California will receive first consideration for vacancies occurring in Northern California, provided eligibles express a willingness to work in the area where the position is located.

The registers established under this examination announcement will supersede and cancel registers in all grades and options established under the following examination announcements: 12-75-1(60), 12-75-1(62), SF-75-2(63), and SF-75-18(62).

The electronic and missile GS-9 registers under announcement SF-75-8(62) will be combined with the registers established under this announcement. The electronic and missile GS-11 register under announcement number SF-75-8(62) will be superseded.

WHAT TO FILE:

Applicants who wish to be considered for both GS-7 and GS-9 positions should file only one copy of the following forms.

(1) Standard Form SF-171. Be sure to show the title of the position for which you are applying, the number of this announcement (SF-75-1 (67) and the lowest salary you are willing to accept.

(2) Card Form CSC-5000AB and 5001-ABC

(3) Supplemental Forms CSC-630ABC.

Applicants for GS-9 only, will not be required to file card form 5000AB.

WHERE TO OBTAIN FORMS:

(1) Interagency Board of U. S. Civil Service Examiners, U. S. Civil Service Commission, 851 So. Broadway, Los Angeles, California, 90014.

(2) Director, San Francisco Region, U. S. Civil Service Commission, 450 Golden Gate Avenue, San Francisco, California, 94102.

(3) Apply at any post office for application forms or information as to where such forms may be obtained.

WHEN TO FILE:

(1) Applications will be accepted UNTIL FURTHER NOTICE.

SEND YOUR APPLICATION FORMS TO:

Interagency Board of U. S. Civil Service Examiners
U. S. Civil Service Commission
851 So. Broadway
Los Angeles, California 90014

ZIP CODING REQUIREMENTS:

(1) Applicants are required to incorporate ZIP code information into all addresses called for in the application and forms.

ALL QUALIFIED APPLICANTS WILL RECEIVE CONSIDERATION FOR EMPLOYMENT WITHOUT REGARD TO RACE, RELIGION, COLOR, NATIONAL ORIGIN, POLITICS, SEX OR ANY OTHER NON-MERIT FACTOR.

Class Code: GS-1901, 1903, 1905, 1906, 1915, 1916, 1920, 1936, 1940, 1941, 1942, 1947, 1948, 1950, 1961, 1965.

ZONE OF PUBLICITY: CALIFORNIA AND NEVADA.

SALARIES – FOR INFORMATION CONCERNING SALARY RATES, SEE THE CIVIL SERVICE SALARY SUPPLEMENT WHICH ACCOMPANIES THIS ANNOUNCEMENT.

FURTHER INFORMATION – Further information about Federal employment benefits, veteran's preference, citizenship, types of appointments, physical requirements, and conditions of employment can be found in U.S. Civil Service Commission Pamphlet No. 4, **Working for the U.S.A.,** which may be obtained at most places where applications are available.

AVAILABILITY AND PROJECTION OF QUALITY CONTROL TECHNOLOGY OCCUPATIONS

The industries and Government representatives responding to inquiries related to the current needs and future projected needs for quality technology personnel all indicated a growing and continuing demand for competent and knowledgeable technical people.

Raw data accumulated from answered questionnaires indicated that responding firms employed a total of 13,400 quality technology employees. Total employment figures reached approximately 200,000 personnel.

The ratio of quality control personnel to total industry personnel was approximately six to one hundred; or the percent of quality control to total personnel was six percent.

The overall availability of jobs and the opportunity for community college trained for employment in the field of quality control technology accents the broad potential existing between industry and the community college as related to present and future job fulfillment.

If the classification of job levels is listed as (1) Professional, (2) Semi-Professional, (3) Technical, (4) Skilled, and (5) Semi-Skilled, it can be seen that the community college can serve, educationally, a large proportion of these individuals. A national study indicated that by 1970 over fifty percent of the labor force will be semi-professional and technical; highly skilled; or managerial, business and sales.[11] Needless to say, community college education will be a main contributor toward the training of these individuals.

The ratio of quality control personnel will vary between types of industries. Commercial electronic manufacturers may indicate a ratio of 3.5 percent as compared to automotive manufacturers at 5 percent. Aerospace prime contractors may quite often exceed an 8 percent ratio of quality control personnel to those assigned other responsibilities.

Admittedly, the tasks and descriptions of quality control personnel were varied and ranged from simple work desciptions to complicated analyses of the job detail. Nevertheless, projected future trends looked promising and showed fertile ground for quality technology educational efforts.

INDUSTRY SOURCES FOR QUALITY CONTROL TECHNICIANS

Most of the industries contacted indicated that personnel are obtained for quality technology employment either from (1) upgrading from within the organization, and (2) from other companies; people between jobs, or proselyted from firms performing related work. Noticeably in the minority are those students hired after completing their community-college education. The most significant reason for the showing the community college made was simply that most of these schools are not as yet preparing entry-level employees for jobs in quality control technology. Also misleading is the evidence that many individuals were upgrading themselves at the community college during extended-day sessions while employed full-time. As this individual leaves a particular work assignment for another with more responsibility, requiring more knowledge and skill, he is considered as advancing through the ranks. The community college, however, may have fostered this promotion, but, as the ratings indicated, were not recognized for this contribution.

JOB ADVANCEMENT POTENTIALS

Questionnaire replies indicate that advancement potentials are always and will always be present. The efforts and ambitions of quality technology personnel could lead them into professional categories, i.e., quality engineering assignments and to in-depth exposure to complex technical disciplines.

Many employers encourage their technicians to pursue goals basic to the practical applications of quality assurance. These pursuits would include quality control subjects, such as configuration management, systems analysis, and reliability principles. Other employers felt that potential advancement into metrology and laboratory associated work presents a prime area for job fulfillment needed for the industry as well as the employee.

In almost all cases, personal interview results indicate that the industrial environment is looking to the community-college graduate to fulfill the important technician job assignments.

A choice of paths for job advancement appeared to be given to the individual. Depending upon his personal characteristics, i.e., technical ability, communicative skills, reasoning, and analytical approach, the selections were there. Quality control technology offered varied opportunities available for those willing to seek out, through educational media, those assignments requiring advanced skills and applications.

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[11] Norman C. Harris, "The Community Junior College — A Solution to the Skilled Manpower Problem", "Higher Education in an Age of Revolution," ed. G. Kerry Smith (Washington, D. C.: Association for Higher Education, National Education Association, 1962), p. 111.

THE SPECIALIST AND QUALITY CONTROL

Even if the definition of a quality control technician presents a description of an individual performing in a specialty area, there are many work disciplines that are purely technical in nature having intrinsic quality control characteristics. These disciplines can actually be considered from a work-performance standpoint, the type of job being done, skills required to do these jobs, and the quality of the final product or service.

Although most of the replies from industry questionnaires listed job descriptions of quality control personnel, some of the responses indicated that the firms employed highly skilled technicians, even graduate engineers, to perform quality control tasks. The rationale was that these technicians and engineers were engaged in producing or testing a product; A function that inherently required a quality-consciousness that was not an independent aspect of normal work-performance. The emphasis was on the work requirement and many other cogent remarks were directed toward job training and community-college education for a special work discipline, per se. These work areas were, for example, in the subjects of metallurgy, drug processing, petroleum refining, medical technology, horticulture, and others. The direct implication from those responding, emphasizing a particular job function, was that the study of quality control technician training should not neglect those technicians performing in a skill area that did not include or imply the term "quality" in its job description. Some of the more frequently mentioned positions are discussed in the following paragraphs.

METALLURGICAL TESTING

Many of the ferrous and non-ferrous metal industries employ test technicians that are responsible for checking and analyzing various conditions of metals and metal processing. The field of mechanical testing is extremely important within the metal fabrication industries. In an entire section on mechanical testing described in a treatise by the United States Steel Corporation, the term "quality control" is mentioned by name only once. The section, however, is devoted to an explanation of how important proper test methods are, understanding the technical details of the tests, and requirements for sampling. As an example: "Another function of mechanical testing results from its great usefulness in the development of new and improved products. Even in applications so complex in nature that a final test in service may be required, it is ususally possible by judicious mechanical tests to establish trends and select the materials most likely to perform satisfactorily. The particular test chosen may depend to a great extent upon the ease with which it can be made if frequent inspection or extensive sampling is needed. Mechanical testing may be carried out as a means of quality control."[12] The concept of the article relates strongly to the principles of quality control. Test methods and applications are described later in he article, and are concerned with proper work methodology and the relationship of testing to the entire product run.

The metal industry responses directed attention to the skilled technician and engineer, and their roles in producing a quality product. This industry tended to feel that an overall concept of quality-consciousness, or a quality control philosophy, should be a part of all technical courses and not relegated to a special course or series of courses. The basic precepts of quality control technology, as special courses, served a useful purpose, but a basic understanding of why an industry or firm is interested in producing a quality material should be an inherent part of the art of quality control teachings.

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[12]United States Steel Corporation, "The Making, Shaping and Treating of Steel," (8th ed.), (Pittsburg, Pa., 1964) p. 1142.

DRUG PROCESSING

The quality control procedures and methods of the pharmaceutical industry may be different than the aerospace industry, but the objective an acceptable product, is of utmost importance. Quality control personnel employed by a drug manufacturer may require a strong background in chemistry and even such subjects as microbiology and bacteriology. These are technical areas and require intensive study for mastery and job application. A close association with the development, production and sale of pharmaceuticals becomes part of the responsibilities of this technician. All of the steps throughout the manufacturing cycle require quality controls and processing responsibilities. Some of the basic elements found in many quality control training programs enable the drug industry to respond to modern demands and technological advances.

Incoming raw materials are usually accepted based on an applicable sampling plan. The concepts of the sampling plan could be the same as a plan for in-process manufactured products. Schools teach the concepts and fundamentals, and the exposure goes across industries and professions. The type of inspections may differ significantly, from chemical analysis to dimensional measurements, yet the sampling plan techniques and applications remain the same. An interesting analogy can be made with the elements making up a quality control system in a pharmaceutical company as well as an aerospace firm. An article in a leading magazine on quality control lists the following items as governing systems effectiveness within a drug concern. The article describes how quality control evaluation is made through a review of:

1. Qualifications of personnel.
2. Adequacy of specifications and methods used to determine conformance to specifications of raw materials, finished formulation and finished products.
3. The degree of conformance to specifications.
4. Adequacy of facilities, buildings and equipment used in the manufacturing processing, packaging, labeling and storage of products.
5. The degree of adherence to all methods and procedures to assure that appropriate quality characteristics previously established through design of the product are being built into the product during manufacture and preserved thereafter.
6. Adequacy of records and record systems.
7. The degree of compliance with regulatory requirements.[13]

There is no particular peculiarity that categorizes any of the seven items to the drug industry. Almost any type of manufacturing concern or even service industry could apply the same descriptions to functions of a quality system evaluation. The point to be made is that if basic concepts of a quality control system do exist they can be made applicable and useful in many industries. If this statement is factual, it seems that the instruction of basic quality control concepts will be useful to the student no matter what type of quality control work he does or what type of industry employs him.

ENVIRONMENTAL CONTROL

An important technology that has been in existence since modern sanitary conditions were devised within the United States has been that of environmental quality control. Sometimes referred to as a public health technology, the subject bases itself on the control of the quality of air, water, and earth resources. Training in this area may be somewhat removed from the prosaic courses in manufacturing quality control, but, nevertheless, should be recognized as a contributor to the control of the natural environments. Environmental control technicians are a vital part of quality control, performing inspections of milk production and processing control of health problems including diseases.

The quality controls will include bacteriological tests on liquid and solid wastes, and foods and water. He will be exposed to many common educational concepts such as basic mathematics, sciences, such as physics or chemistry, drafting and blueprint reading. The environmental control technician is a member of the overall family of quality control and should be acknowledged and considered when discussing programs encompassing all of the quality control disciplines.

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[13] "A House Built on Quality," "Quality Progress," II (March, 1969), p. 8-12.

4227

NONDESTRUCTIVE TESTING (RADIOGRAPHIC)

Another important specialist employing many of the general techniques of quality control is the X-Ray/Gamma Ray Technician. This technical area is common to industry and the health professions, and helps to verify the conditions of both animate and inanimate objects. General principles again are apparent, the combination of manipulative skills and analytical reasoning, common characteristics of the control of quality. The technician must thoroughly understand the methods and reasons for employing radiation protection. He must know the details of radiographic techniques, preparation, and processing of films, reporting patient or hardware conditions, and he should have a general awareness of what this specialty does for his firm or service in the way of overall effectiveness and economic contribution. Subject areas of general quality control, such as mathematics, metal characteristics, processing requirements and quality control procedures, would form a base that would be useful in this specialty field.

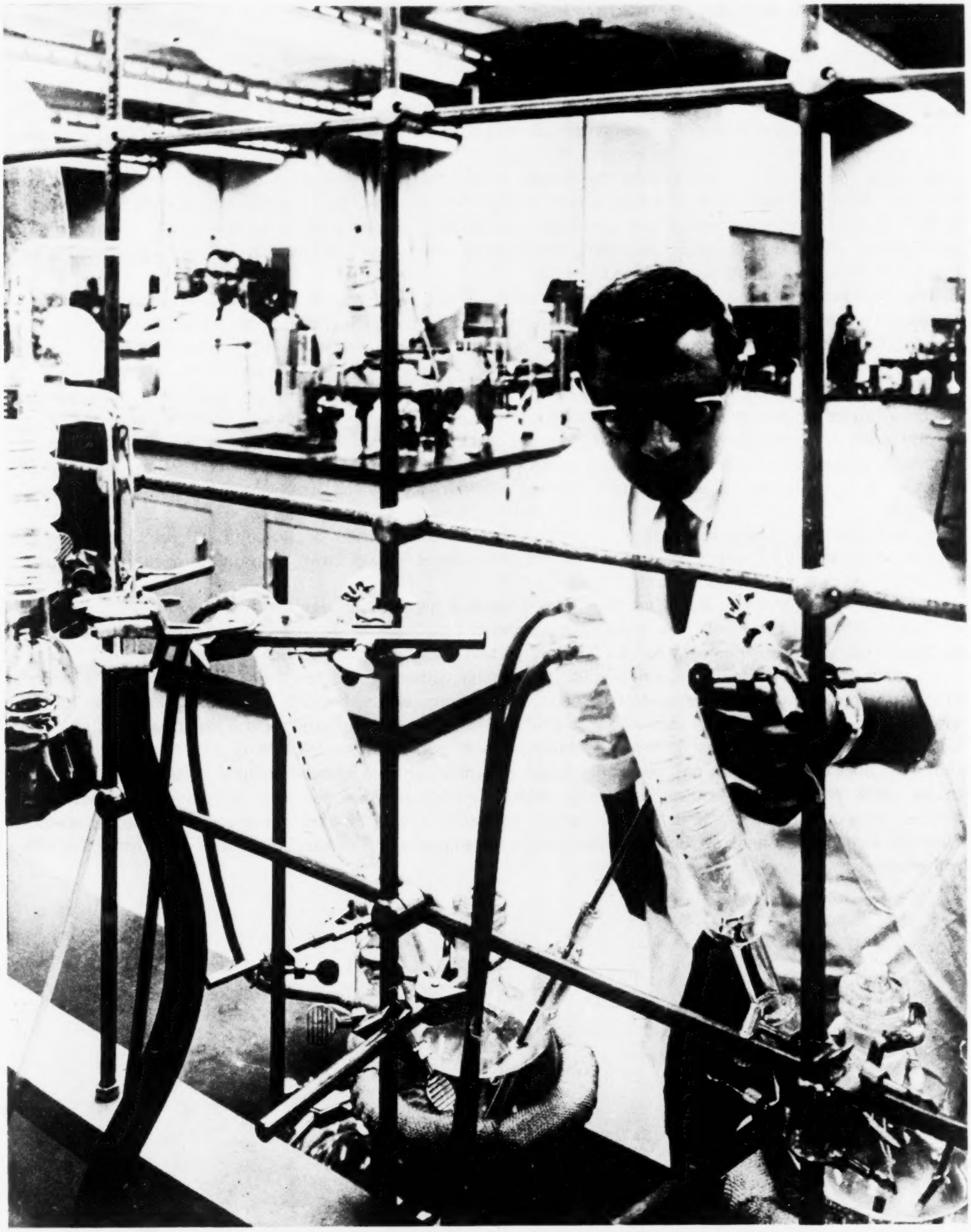
The comments of this section are an effort to point out, even though many technical disciplines exist in everyday industry, that many, if not all, have some relation to the quality control of a product or service. Also, in contrast is the acknowledgement that many quality control functions have first evolved from technical requirements or tasks that required engineering or scientific work application. These functions came before the concept of quality control as it is known today, and in most situations where the industry or individual firm has been successful, the philosophy of quality control has permeated the environment whether recognized or not. Quality control technology vis-a-vis engineering or scientific technology is an interdependent function. The one cannot be utilized without the other; quality control principles cannot be applied to a non-existing unit of work, nor can a scientific or industrial effort succeed without the application of quality control technological principles.

In summary, the training in the field of quality control should consider applicability and practicability toward general industry requirements. Training in specific technologies should strive to promote quality consciousness and awareness during the time of student training.

The emphasis on specialty fields has been made because some questionnaire and interview replies denoted that an individual should be trained in a specialty area first, and be made aware of quality control applications either as part of his on-the-job training, or as an ancillary part of his training and general education.

It seems difficult to reflect upon a specialty training without some acknowledgement of quality control. Likewise, a grounding in quality control concepts, applications, and techniques is a strong foundation for later specialization and should reflect uses in the specialty areas. Later edification in all the major concepts of quality technology is also a possibility and many individuals will pursue this training as quality control experts. The choice of one, however, does not necessarily beget the other without planned training methodology. The point to be made is that the spectrum of quality control technology envelopes most all productive industry and services. It is a part of practically all successful, productive disciplines and has become adjoined to so-called "special" technologies, and, as such, deserves educational emphasis and concern because of its constructive effect within society.

Photo Courtesy TRW Systems



A SPECIALIST performing laboratory evaluations.

4229

THE GOVERNMENT AND QUALITY CONTROL

The Federal Government has always been concerned with the quality of product it purchases and utilizes. Government inspectors have performed duties from ammunition inspection to zinc verification. The tasks have been manifold with varying degrees of complexity. Throughout the years, inspection duties have grown from such tasks as individual product verification to responsibility for systems effectiveness, yet in essence, Government quality control has two fundamental responsibilities: (1) To accept a product or products for the Government, and (2) To assess the adequacy of a contractors quality control system.

As recently as the World War II era, changes in inspection techniques began to form. To inspect each item from a mass produced batch became virtually impossible. Not only quantity but the complexity of many items physically prohibited verification on a unit-per-unit basis. Times were changing. Although the craftsman then, as now, was an important contributor to product manufacture, there seemed to be a need for some individual or group of individuals to perform a control of the quality of the manufactured commodity.

The Government took measures within their own organization to make their tasks more effective. Responsibility for conformity was assigned to the contractor who had claimed that he would perform and produce a product meeting certain agreed-upon or negotiated requirements. The Government would assign inspectors to audit or to sample the finished item, but the control of the quality became more and more the sole and prime responsibility of the contractor.

In many respects, this change influenced the actions and reactions of many suppliers of Government goods and services. The change quite naturally affected Government inspection concepts and philosophy. The use of sampling techniques became to be an interesting device in proving or disproving product quality. The advent of World War II saw the initial serious attempt to utilize sampling methods.

Although sampling in itself is a very interesting and useful example of the sophistication of inspection, it is merely mentioned in context as one of the devices that necessitated a reform in quality control.

Product sophistication and involvement were nurtured in World War II. After 1945, manufacturers and designers were given the go-ahead to produce complex and exacting assemblies and their components. Many of the assignments were conceived by the Government and distributed to private industry on the basis of competitive bidding.

Although the award of contracts by the Government is indeed a complex subject in itself, it has become a factor in the modern definition of quality control.

Technical competence was a necessity in the manufacture of most Government-ordered items. This was a competency in manufacturing as well as inspection. Defects began to be classified as to their affect on life, function, and interchangeability. Machines and men were needed to produce these items. Machines, equipment, and men were needed to inspect these products. Not to inspect, in all cases, merely the function and dimensional characteristics, but also to verify that processes and materials were in control and authentically represented pre-established specifications. In many respects, this was a change for many inspection personnel as well as for management. The word used, quite frequently, was "total quality control." The inspector of parts still played an important role, but he was required to broaden his experience and usefulness or be aided by other individuals possessing the capabilities required of this involved discipline.

The major concern for quality manifested by the Government for the last twenty years has probably been reflected throughout the aerospace and weapons industry. As mentioned, the use and application of basic Government issued sampling plans, such as the Military Standard 105 (MIL-STD-105) and MIL-STD-414, have found their place for application in many firms. Basic requirements in the form of specifications for part suppliers and systems contractors have been developed by the Government and have been published, issued and included in contractual data. Documents, such as the Military Specification for Inspection System Requirements MIL-I-45208, the specification MIL-Q-9858 stipulating quality program requirements, MIL-C-45662, the specification for calibration system requirements, and many others, represent some of the existing documentation required by contract and used by many Government contractor/suppliers.

The advent of complexity has created a concern for the development and retention of competent personnel in the field of quality control. This is a concern felt not only by industry relative to quality technology, but a concern by the Government for their own personnel as well as for the firms supplying goods and services to the body politic.

Unfortunate as it might seem, results of industrial practice do not indicate that quality products can be produced without some form of quality controls. Implementing these controls in many cases becomes the task of the quality technologist.

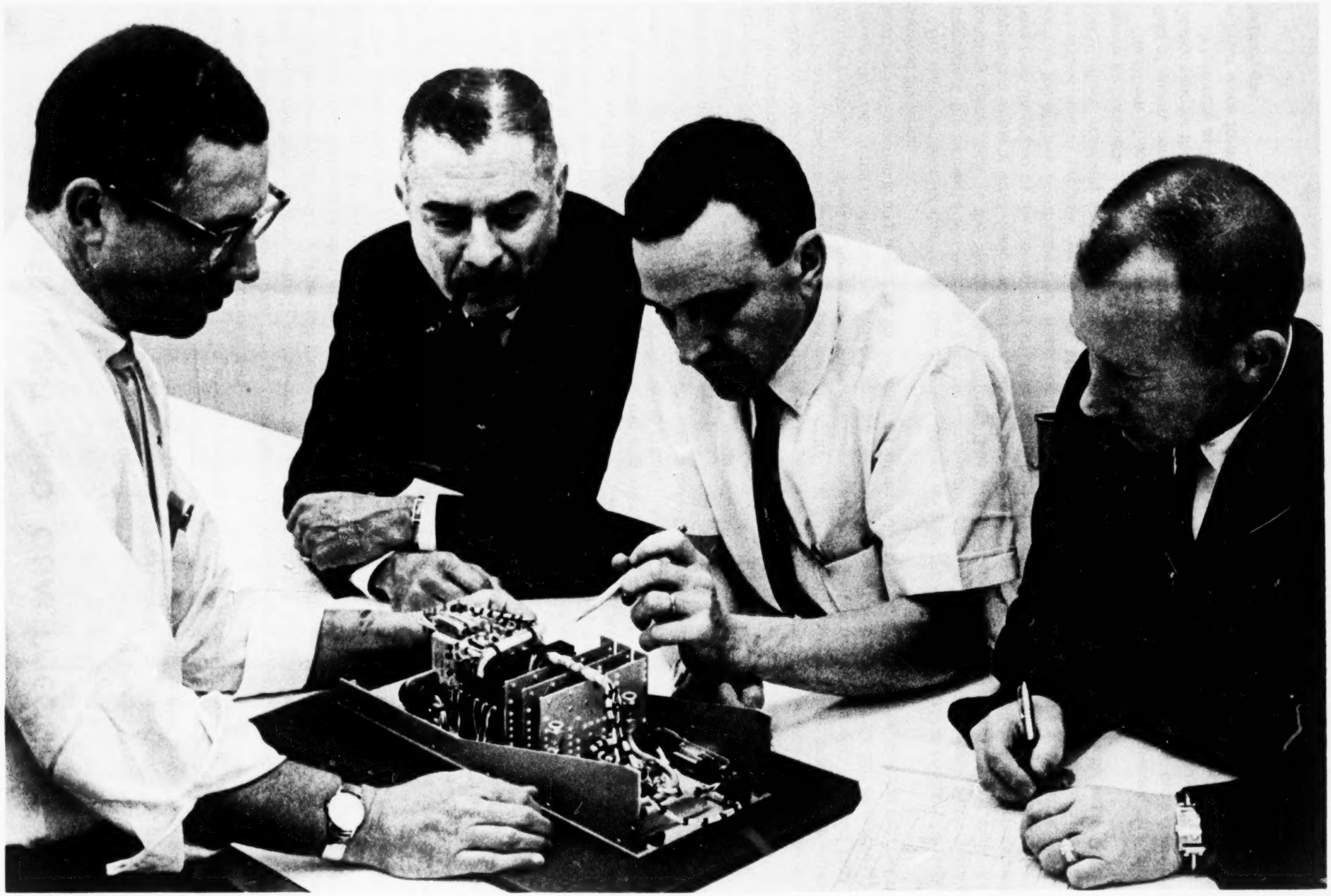


Photo Courtesy TRW Systems

GOVERNMENT AND INDUSTRY representatives discussing design and hardware configuration requirements.

4231

Product manufacturers quite frequently must develop a manufacturing and quality control plan before the reward of contract. The quality plan represents that portion of the control of the product that must be implemented during development manufacture and test to assure product conformance upon delivery and application. Personnel are required to initiate these requirements and others must apply work-experience to utilize these same requirements. The quality control technician who is assigned to the control of quality is in most instances performing tasks that range from hardware inspection, planning definition, systems verification, end-item delivery, and field performance.

Government concerns are for the development and utilization of these people within industry. Likewise, the effectiveness of Government quality control technicians – verifying contractor performance, is of paramount importance and actually permits a blending of useful and effective Government/contractor activities. The problems of coping with modern technology and the ever-present attrition rate due to retirement and advancement have created justifiable promotion to quality technology education by the Government. Reliable Government sources estimate the average age of quality control personnel to be fifty years. Many will retire early, some may transfer to different assignments and geographical areas. As people leave the work field, job assignments will exist and as such provide excellent opportunities for the student graduate of community-college quality technology programs.

Government participation in recognizing the discipline of quality control or quality control technology has provided a considerable amount of stature for this work area. Military contracting with accompanying quality requirements have been instrumental in expanding and improving quality technology in the nation's best interest. In many instances, the techniques and values gained from the Government programs involving aerospace and weaponry have been conveniently applicable for the control of the quality of sophisticated and complex consumer products. The food industry, automotive facilities, and even service centers have been affected by Government requirements. The combination of many of these factors has created a consciousness of the need for sound and effective quality control education. Facility requirements and instructional techniques have been constructively criticized with resulting improvements.

Government efforts and activities in the professional societies, participation on college advisory committees, have all been contributory toward more meaningful quality controls within industry as well as within the Government quality control ranks.

It seems important in any report on the subject to acknowledge the effective role of Government influence and participation in promoting the potential of quality control education.

EQUIPMENT AND FACILITY REQUIREMENTS FOR QUALITY CONTROL TRAINING

Quality technology courses offered throughout the community colleges in California are grouped into three categories that represent the use of facilities and equipment. These categories are based upon the extent of an availability of facilities and equipment needed to conduct meaningful courses and/or entire programs. Naturally, expense is a prime factor in considering the extent of the physical layout and the complexity of the equipment to be used. The use factor of the equipment is also important, how often will tools, devices and aids be utilized during the school year. This is analogous to a rate of return in some respects, analyzing the productivity of tools and facilities to the final end-item. In the situation encountered in quality technology training, this end-item is the student, an intangible from a dollar and cents standpoint but an important economic contributor to the industry or service function employing this individual. Basically, the three categories of training, as related to facilities and equipment, fall into one of the groups as follows:

1. Those community colleges utilizing on-campus, independent laboratories and equipment exclusively for quality technology purposes. These are classrooms or laboratories that are equipped for the instruction of quality control technology and are not dependent on equipment from other schools of the college.

2. A second category would find the college employing or demonstrating equipment that was purchased for a mutual use, such as, the tools and items characteristic of machine technology and the sciences of engineering and physics. This arrangement can prove quite compatible, satisfying the needs of different training requirements on an economical basis.

4232

3. A third category encountered throughout the California community colleges is the use of normal classroom facilities, lecture rooms, and the utilization of visual aids, movies, industry-loaned equipment and field trips. The instructors of courses best suited to student participation have in many instances been able to promote a working arrangement with neighboring firms, an arrangement that quite often provides for actual "hands on" experience at the firm being visited.

Naturally, many of the courses in quality control technology do not employ the use of tools and equipment. Lecture courses in the Introduction to Quality Control and Procurement Practices do not require equipment such as is found in industrial shops. Aids are useful, however, such as chart diagrams for visual presentations, a quincunx, beads, dice, etc. for sampling theory demonstrations, and many other useful visual types of observations that enable the student to see as well as to hear and read about quality control practices and techniques.

The fully equipped laboratory provides an ideal method of student contact to what comes close to a true practical exposure to work environments. Even well-equipped facilities may provide problems associated with space planning and equipment utilization. It is sometimes difficult to provide a student with work opportunity on a large complex inspection item because the nature of the inspection work prevents other students from sharing the work experience. Many pieces of valuable and complex equipment can present as great a problem as a facility with little or no equipment. Proper utilization, group participation, and meaningful work problems should be constant goals of the quality control technology instructor.

The atmosphere of a quality technology laboratory should reflect an efficiency and attractiveness on a par with any other good college program. There should be a quality control atmosphere in the classroom, a feeling given to the student that he is practicing for work in a discipline that has industry stature and recognition. Implementation of this feeling is not an easy assignment for the school staff, but can be effected through genuine interest and effort.

If the classroom or laboratory is fortunate enough to have its own equipment, the storage and care of this equipment should be taught early in the course of study. The equipment is meant to provide high standards of quality, the experiences gained by the use of this equipment should be valid, basic, broad in variety, and intensive in practical experience.

A recent study on technician education stated: "Well-equipped laboratories with sufficient facilities for each student to perform the laboratory work are required for the specialized courses. If the facilities are shared with classes of students studying other objectives, the facilities should not be compromised for either group and their use by each group should usually be scheduled separately. The training program should provide for experiences which illustrate the function and application of principles, using as wide a variety of components, devices, units, systems, procedures, practices, techniques, services or interpersonal relationships as is practicable and consistent with the technician's special work." [14]

The community colleges teaching some of the more recondite aspects of quality control, such as the practical applications of metrology, would be expected to maintain their equipment and controls with the same special attention exercised by an industrial user of such equipment. This entails environmental controls for temperature and humidity and periodic procedures for equipment calibration. This practice is akin to the creation of an atmosphere closely patterned after that of industry. The type of equipment will vary, but the quality and precision of the equipment must be such that experiments are meaningful. Quality control practices representing current state-of-the-art procedures are a vital part of a thorough quality control technology program.

The variety of equipment may be more important than the quantity of equipment. With a variety of equipment, scheduling of effective work groups becomes a major responsibility of the instructor. The higher cost of precision and high quality equipment quite often, in the span of a few years, will prove less expensive than the purchase of cheaper equipment that requires more frequent maintenance and replacement. The importance the instructor plays in utilizing this equipment naturally presents itself when equipment is demonstrated and used. The search for surplus equipment often proves fruitful, and the use of this equipment is quite often more effective than the use of more sophisticated items. The principles of many work applications are made evident by the use of a more fundamental piece of equipment mainly because the essentials of the work are clearly and easily exhibited. The purchase of all laboratory equipment must be performed or recommended by an expert in the subject field. If possible, the instructor for the specific class should participate in the recommendations for equipment, and structure his course content around this equipment. The acquisition of equipment for quality control technology programs can require expensive outlays. The extent of commitment should be planned and the courses carefully structured to fully utilize effectively all of the equipment. Many schools will find it impossible to purchase quality control technology tools. In this situation, research into the availability of leased items and the solicitation of industry help would be required.

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[14] U. S. Department of Health, Education and Welfare, "Criteria for Technician Education, A Suggested Guide", (Washington, D. C. Government Printing Office, 1968), p. 23.

Photo Courtesy TRW Systems

A TYPICAL INDUSTRIAL mechanical inspection laboratory.

4234

Local industry is usually cooperative in permitting students to acquaint themselves with specialized tools peculiar to the industry. X-Ray laboratories have consented to permit students to X-ray parts, develop the X-ray negatives and evaluate results on the laboratory premises. Most often, there will be a charge for use of the X-ray film, but the experience is extremely valuable for a student studying nondestructive testing. It should be noted that a community college installing conventional X-ray apparatus must consider safety requirements and the accompanying need to provide lead lined exposure rooms for the use of such equipment. There are available, however, small portable units that can be purchased providing maximum utilization with a minimum of environmental protection.

Many modern-day inspection apparatus are so complex and expensive that procurement of these devices is prohibitory. Yet, the exposure to these items is an essential part of many courses in quality control technology. Again, the importance of industry cooperation becomes apparent. A few specific examples may be cited.

A community college will utilize the equipment of a large aerospace firm to teach optical tooling practices. The instructor, an employee of the firm, has the students under his direction using such instruments as jig transits, autocollimators and theodolites. A community college would most likely not be able to justify the procurement of enough equipment for a satisfactory class in this subject.

A manufacturer of precision coordinate measuring machines will permit one or more class-sessions to review the internal mechanisms of this machine. A subsequent class-session may actually experience the use of this item as applied to an inspection problem in industry.

A firm utilizing automatic manufacturing processes for the production of large quantities of like items provides excellent first-hand exposure to the benefits and details of sampling inspection. If the parts are easily handled, the class may actually measure the items and gain first-hand experience in the theory of sampling. Equipment expense would be a minimum, the necessary ingredient is the cooperation and interest of the firm performing the manufacturing.

A manufacturer of pneumatic gauging allows the students to demonstrate among themselves the use and applicability of air gauges. Naturally, the use of such gauges requires an air supply source and utilization is best made at the manufacturer's facility.

A class studying metrology, (the Science of Measurement), visits the vacuum and pressure laboratory of a commercial facility or aerospace firm. They observe equipment that measures pressures up to 12,000 pounds per square inch and have demonstrated to them a high vacuum system, nearly perfect: 10^{-10} Torr. A class in metrology can only observe these applications in industry. Useful practical examples of less complex nature can be performed in a physics laboratory at the college, or use of the physics equipment might be utilized by the metrology class.

The further a student is from equipment use and equipment application, the more he loses in the practicability of his training. The situation is apparent when he has the tools to do the work, but he has no work with which he can identify. Likewise, too much exposure to work results or extensive field trips may bring about a feeling of disassociation of methods and results.

Obtaining a meaningful training balance is at best not an easy accomplishment. There are many educational advantages attached to the use of quality control technology equipment and many problems associated with their use and maintenance. Not only is the initial cost of such equipment to be considered, but periodic upkeep must be recognized. Money for supplies, repair, and the replacement of obsolete items must be available on an annual basis to provide the student modern and advanced technological knowledge.

Even though the initial cost of such equipment is expensive, from a pure dollar and cents viewpoint, the depreciation, in practical value, of this equipment is minimal. Compared to dollar outlays for major metalworking machinery and the possible early obsolescence of this machinery, the investment in quality technology apparatus can be legitimately justified over periods of sustained use and application.

Equipment lists, as applicable, including prices, may be obtained from those community colleges offering programs in quality control technology. These colleges are listed in section 10 of this report.

4235

CALIFORNIA COMMUNITY COLLEGES OFFERING QUALITY CONTROL COURSES OR PROGRAMS

The survey conducted throughout the State of California indicated that twenty community colleges offer one course or more in the subject area of Quality Control. Among these schools are those that are offering completion certificates and Associate degree programs in Quality Control Technology.

The philosophy evident in the type of courses and series of courses that are offered most often reflects industry and Government concern for the training of quality control personnel. This is a concern for community needs within industry and the services, and in most instances represents the vocational exigencies of the immediate geographic surroundings.

Industry and Government concern is for job staffing and job support from community college technical training programs. A secondary function requested of the colleges is to prepare the student for transfer into a four-year college program in quality control technology.

The greatest student response for quality control education comes from the man or woman already employed attending extended-day classes after working hours. These individuals are most often interested in broadening their present skill foundation and in learning of subject matter not directly related to their daily tasks. Many contemplate the application of units earned toward an Associate degree from the community college. Some will pursue that objective and eventually secure for themselves the AA or AS degree.

Most of the educators contacted in the community colleges felt that the courses in quality control technology could be made available for regular daytime scheduling, attracting students into a quality control pre-employment program. The main concern was that the appeal of such a course had not reached the high-school level. Quality control technology was not among the popular and recognized subjects, such as electronics, machine technology, or the sciences, and as such could not be a self-supporting program for full-time day students. The community colleges that were recipients of students from nearby industries, industries that strongly supported the school program, were successful in initiating day classes for selected subjects. Other colleges have discovered that concentrated offerings in quality technology have been successful. Classes meeting five to six hours a day over a period not exceeding ten meetings in a three to four week period have been well received. Classes such as these have been requested by the Government agencies and have been attended by Government employees. The employee attends usually one-half on his own time and one-half on Government work time.

The following table indicates the California community colleges that offer quality control technology training. The data includes, where possible, information that will be available in the Fall 1969 school catalogues. The listings include information on the community colleges offering selected courses in quality control and indicate those schools with programs culminating in an Associate degree and/or Certificate in Quality Control Technology.

QUALITY CONTROL TECHNOLOGY PROGRAMS
THE CALIFORNIA COMMUNITY COLLEGES

Table 1

COLLEGE	ADDRESS	SELECTED COURSE(S)	AA	AS	CERTIFICATE
ALLAN HANCOCK	880 S. College Drive Santa Maria, Calif. 93454			X	X
CHABOT	2555 Hesperian Boulevard Hayward, Calif. 94545	X			
CHAFFEY	5885 Haven Avenue Alta Loma, Calif. 91701				X
CITRUS	18824 E. Foothill Boulevard Azusa, Calif. 91702				X
DE ANZA	21250 Stevens Creek Boulevard Cupertino, Calif. 95014		X		X
EL CAMINO	El Camino College, Calif. VIA Torrance, Calif. 90506		X		X
LANEY	1001 Third Avenue Oakland, Calif. 94606			X	X
LOS ANGELES PIERCE	6201 Winnetka Avenue Woodland Hills, Calif. 91364		X		X
MIRA COSTA	Barnard Drive Oceanside, Calif. 92054	X			
MODESTO	College Avenue Modesto, Calif. 95350	X			

4237

Table 1 (Cont'd)

COLLEGE	ADDRESS	SELECTED COURSE(S)	AA	AS	CERTIFICATE
MOUNT SAN ANTONIO	1100 N. Grand Avenue Walnut, Calif. 91789		X		X
OHLONE	650 Washington Boulevard P. O. Box 909 Fremont, Calif. 94537		X		X
ORANGE COAST	2701 Fairview Road Costa Mesa, Calif. 92626		X		X
PASADENA CITY	1570 E. Colorado Boulevard Pasadena, Calif. 91106	X			
RIO HONDO	3600 Workman Mill Road Whittier, Calif. 90608			X	X
RIVERSIDE CITY	3650 Fairfax Avenue Riverside, Calif. 92508	X			
SAN DIEGO CITY	1425 Russ Boulevard San Diego, Calif. 92101			X	X
SAN JOSE CITY	2100 Moorpark Avenue San Jose, Calif. 95114	X			
SAN MATEO	1700 W. Hillsdale Boulevard San Mateo, Calif. 94402	X			
WEST VALLEY	44 E. Latimer Avenue Campbell, Calif. 95008	X			

SUGGESTIONS FOR QUALITY CONTROL TECHNOLOGY CURRICULUMS

Given information on quality control technology courses, the task was to determine the effectiveness of such programs and evaluate the true contribution given to industry, service organizations, and the community. Industries, educators and Government representatives responding to questionnaire and interview requests provided the mainstream of necessary information. This information has been used as a base for core course suggestions in the subject area of Quality Control Technology.

The following fundamentals were evident, based on a review of interview comments and questionnaire results:

1. Community-college programs in most cases are developed from an interest expressed by local industry and Government agencies.

2. Local community-college advisory committees are primarily interested in meeting the needs of the community. Benefits may overlap later to other geographic areas.

3. The detailed and sometimes arduous tasks required of many of the advisory committee members, including the participating educators, has indeed been evident in all school programs. The resulting curriculums and course outlines are considered the best available and are championed zealously by the authors and other content contributors.

4. There is not solid unanimity from industry as to the most efficient pattern for quality technology programs. There is evidence of a preferential group of courses in the subject area.

5. The most articulate and vocal comments offered relating to quality control technology emanate from the aerospace and Government contracting industries. Equal emphasis is sounded by Government agencies themselves.

6. Various societies and organizations provide technical advice to community colleges offering these programs.

7. The major contribution and response to written and verbal information requests came from the larger industrial organizations. Smaller firms expressed an interest in the study, but in general did not have time to answer questionnaires in writing. Job descriptions pertinent to quality control were submitted in the main by the larger companies and service organizations. Many small firms did not employ quality control technicians, per se, but held workers responsible for the quality of their work and the end results.

8. Closely related to Item 7 was the fact that the control of quality was a prime requirement of all firms engaged in an operation for profit. Drug and food industries, toy manufacturers, tire makers, furniture assemblers, and automobile manufacturers were all conscious of quality control. Response was limited from these groups, with the exception of the automobile industry, but nevertheless, those that did respond indicated a true respect for the control of quality and the means for achieving that objective — the education of the individual.

9. The major portion of courses in quality control technology are currently being offered in extended day sessions. Students enrolling for these classes usually are employed and are striving to upgrade themselves or to acquaint themselves with an unfamiliar subject area.

cooperation of the quality technology advisory committees.

A uniform approach to quality control technology, a core of courses, should provide an individual with a foundation that would permit him to specialize later or to pursue professional goals subsequent to his educational endeavors at the community college. This concept was followed in developing a suggested core of courses for quality control technology programs at the California community colleges.

Typical course descriptions are presented following the quality control technology program core suggestions. The brief descriptions are representative of current course content offered at the California community colleges. Further in-depth details of particular courses may be found in an investigation of college course outlines and, naturally, a first-hand exposure to the course as presented at the respective college.

The analysis of submitted data from industry, education, and the Government did indicate a disparity of opinions concerning basic quality control technology course offerings. As mentioned, community preferences were evident in existing programs and the preponderance of aerospace/Government influence affected those offerings.

The most likely conclusion that could be made in a study of many different technologies would be that a program should be oriented toward the needs of the immediate community. Peculiarities of industries or services would directly affect the pattern of courses. This approach would seem to attenuate the basic concept of a curriculum study in quality control technology.

There is no doubt that the course structures currently presented by the community college are educationally and vocationally effective. The community as indicated is concerned with immediate and future manpower requirements, but it is also important to realize that our society, today, is extremely mobile and that vocational preparation in California may not only be utilized throughout the State, but in other parts of the United States and even the world.

An apparent pitfall, although easily overlooked, is the over-saturation of courses. Community colleges that are located within commuting distances of each other rarely can offer, successfully, duplicated programs in quality control. Where one will offer a specialty area different than a neighboring college, the sequencing of core to specialty programs becomes logical and beneficial to the college and the student.

Aside from duplicate college programs, the tendency to overload the program with quantities of courses can weaken the basic program structure. Success in offering initial courses may encourage the addition of more courses within a program, eventually reaching a point of diminishing returns. All of the potential problems are in most instances overcome with community-college planning among the schools, and with the advice and

SUGGESTED BASIC CORE AND CERTIFICATE CURRICULUM

3 Units AN INTRODUCTION TO THE PHILOSOPHY OF QUALITY CONTROL
Significance of quality control in everyday life as it relates to business and industry.

3 Units MECHANICAL MEASURING TECHNIQUES, QUALITY CONTROL ORIENTED
Exposes an individual to the use and application of inspection hardware. Acquaints him with unfamiliar tools and equipments.

OR

3 Units ELECTRONIC MEASURING TECHNIQUES, QUALITY CONTROL ORIENTED
Similar to mechanical measuring. Basic instruments are used, fundamental theory is discussed. This course and the mechanical measuring course utilize laboratory exposure for practical training purposes.

3 Units BASIC QUALITY CONTROL STATISTICS
The practical aspects of a control chart, the everyday significance of probability theory.

3 Units SPECIFICATION AND DRAWING INTERPRETATION
Basic blueprint reading complemented by a review of specification complexity and the use of specifications and drawings as customer and engineering tools of communication.

12 Units

3 Units APPLIED PHYSICS
A study of the fundamentals of physics as they apply to the technician.

6 Units TECHNICAL MATHEMATICS
Applied practical mathematics designed for the vocational technical student.

3 Units TECHNICAL REPORT WRITING
The techniques of writing clear and factual reports.

12 Units

24 Units (Semester)

TYPICAL COURSE DESCRIPTIONS FOR SUGGESTED CORE REQUIREMENTS

AN INTRODUCTION TO THE PHILOSOPHY OF QUALITY CONTROL

Credits: 3 Units

Course Description: This course is designed to present the total quality control function in industry. The emphasis will be on the latest concept in the light of modern manufacturing requirements. Provides a knowledge of the basic requirements and functions of an effective and economical quality control program; and conveys to the student concepts and techniques used in the development and implementation of a quality program and the benefits that can be derived from such a program. Use of case problems particularly helpful, problems permitting the student to develop inspection planning; determine cause and associated corrective actions for various types of discrepancies; establish quality control reports relative to discrepancies and associated quality costs; perform drawing specification and purchase order reviews to ensure inclusion of quality requirements; establish methods for evaluation of supplies and adequacy of quality control systems.

MECHANICAL MEASURING TECHNIQUES, QUALITY CONTROL ORIENTED

Credits: 3 Units

Course Description: A lecture and laboratory course providing correlated technical information applicable to mechanical inspection gages, tools, and measuring devices. The principal area covered includes nomenclature, measuring tools and equipment, gages, and basic methods of measurement and inspection policy. An introduction to the uses and types of nondestructive testing equipment.

BASIC QUALITY CONTROL STATISTICS

Credits: 3 Units

Course Description: To present basic statistical techniques which have a wide range of industrial applications. Special emphasis will be placed on statistical concepts and methods for quality control and reliability prediction. Management reporting will also be studied. This course deals primarily with various types of Shewhart control charts and with various types of acceptance sampling systems and procedures. These simple, but powerful, techniques have been widely used in many industries and in many countries throughout the world to improve product quality and to reduce costs. The most effective use of these techniques depends, of course, on their being understood by inspectors, engineers, management and production and inspection supervisors ... and this course is designed to be directly useful to all of these groups. It is also appropriate for engineering and business students, and for other students involved with problems of manufacturing. A special feature of the course is the liberal use of descriptions of actual cases from a number of industries. Each example has been selected to bring out one or more important points. A number of examples deal not only with the behavior of random variables, but also with the behavior of people in various circumstances involving quality matters.

SPECIFICATION AND DRAWING INTERPRETATION

Credits: 3 Units

Course Description: This course covers all facets of engineering drawing used for product description, including material, manufacturing processes, and test specifications. Views of configuration identification, as related to engineering drawing, are studied for clear inter-relationship of multi-detail and multi-assembly accountability.

ELECTRONIC MEASURING TECHNIQUES, QUALITY CONTROL ORIENTED

Credits: 3 Units

Course Description: A study of advanced inspection methods and principles peculiar to the electronics industry. Provides the student with a useable knowledge of the application of electrical measurements. Relates this knowledge to the quality control organization and its function in assuring total quality control within a firm or industry. Reviews applications and uses of selected nondestructive testing apparatus.

4241

APPLIED PHYSICS
Credits: 3 Units
Course Description: An introductory course including the application of mechanics, heat, sound, electricity, and light. This course is designed for vocational and technical students.

TECHNICAL MATHEMATICS I and II
Credits: 6 Units (Two semesters)
Course Descriptions: Selected mathematics needed by the vocational technical student. Problems include those involving fractions, algebraic solution of formulas, and logarithms. Solution of right triangles by trigonometry, solution of area and volume problems by geometry and the related slide rule operations.

TECHNICAL REPORT WRITING
Credits: 3 Units
Course Description: Stresses writing clear, concise statements to communicate technical ideas and specifications, and the development of logical continuity of operations. Designed for anyone in industry whose job requires writing reports.

The core approach is a result of responses and recommendations from representatives of industry, Government and the California Community Colleges.

There are basic precepts accompanying these recommendations:

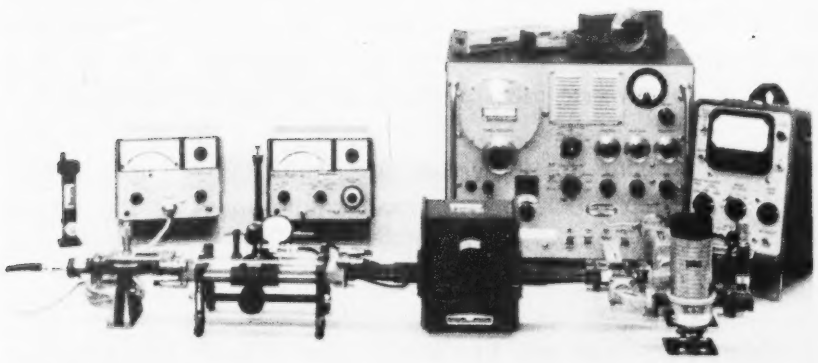
1) The study of quality control training was conducted according to the philosophy of the George-Barden Act, Title III. A technical curriculum structured under this Act would "prepare the graduate to enter a job and be productive with a minimum of additional training after employment, to provide him with a background which will enable him to advance with the developments in the technology, and to enable him, with a reasonable amount of experience and additional education, to advance into positions of increased responsibility."

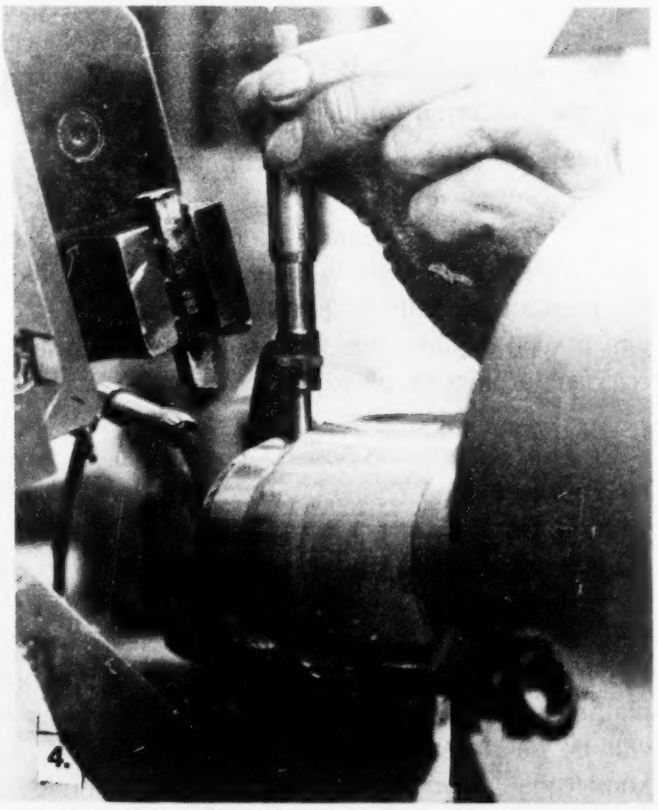
2) The primary purpose of the course suggestions is to prepare the individual for job fulfillment and gainful employment. The courses should prove meaningful for the person seeking entry-level employment or the person wishing to upgrade or increase his present skills and knowledge. A secondary objecive would be to prepare the student for transfer to a four-year college program.

3) A person entering this program need not be a high school graduate, but should have a basic foundation in the fundamentals of oral and written communication, i.e. English and Speech. He should understand elementary mathematics and arithmetic, including fractions and decimals. An exposure to high school algebra and geometry will be helpful, i.e. successful students in a quality control statistics course will probably have a good working knowledge of elementary algebra and understand some trigonometry. Students who have deficiencies in mathematics or English may need to enroll in remedial courses in order to overcome their weaknesses and to successfully pursue the quality control technology program. Students choosing a specialty area in quality technology, extending beyond the core requirements, will require further strengthening in mathematics and the sciences.

The ability to communicate both orally and in writing is fundamental to success in most endeavors. Employee proficiency in these disciplines has been weak, according to some industry reports; and, therefore, effective instruction in these subjects becomes a cornerstone for building sound quality control technology programs.

Photo Courtesy TRW Systems.





1. **A COMMUNITY COLLEGE** student using a theodolite, loaned by local industry.

2. **PRECISION** length calibration.

3. **ORIGINALITY,** coupled with technical knowledge and skills, is required to set up and operate this electronic test.

4. **BASIC MECHANICAL INSPECTION** knowledge may be a part of the core requirement for a program in Quality Control Technology.

4243

SUGGESTED CURRICULUM PATTERNS FOR THE ASSOCIATE DEGREE

GENERAL QUALITY CONTROL

Core Requirements		24 Units
Statistics, Concepts and Application	3 Units	
Procurement Practices	3 Units	
Metrology Fundamentals	3 Units	
or		
Electrical Measuring Techniques	3 Units	
Introduction to Data Processing	3 Units	
Process Control	3 Units	
		15 Units
General Education Requirements		16 Units
Electives		6 Units
Required for Degree		61 Units

Note: All core courses need not be taken during the first year of study for the degree. Core requirements and the above requirements could be spread over the normal two-year period.

ELECTRICAL METROLOGY

Core Requirements		24 Units
Advanced Applied Physics	3 Units	
Metrology Fundamentals	3 Units	
Circuit Analysis	3 Units	
AC Fundamentals	3 Units	
DC Fundamentals	3 Units	
		15 Units
General Education Requirements		16 Units
Electives		6 Units
Required for Degree		61 Units

MECHANICAL METROLOGY

Core Requirements		24 Units
Advanced Applied Physics	3 Units	
Electronic Measuring Techniques (Quality Control Oriented)	3 Units	
Metrology Fundamentals	3 Units	
Optical Tooling Fundamentals	3 Units	
		12 Units
General Education Requirements		16 Units
Electives		9 Units
Required for Degree		61 Units

NONDESTRUCTIVE TESTING

Core Requirements		24 Units
Radiography	3 Units	
Liquid Penetrant and Magnetic Particle Inspection	3 Units	
Ultrasonic Inspection	3 Units	
Eddy Current and Microwave Inspection	3 Units	
Holographic and Thermal Inspection	3 Units	
		15 Units
General Education Requirements		16 Units
Electives		6 Units
Required for Degree		61 Units

4244

STATISTICAL QUALITY CONTROL

Core Requirements		24 Units
College Algebra	3 Units	
Data Processing	3 Units	
Applied Quality Statistics	3 Units	
Reliability Concepts and Application	3 Units	
Process Control	3 Units	
		15 Units
General Education Requirements		16 Units
Electives		6 Units
Required for Degree		61 Units

SUGGESTED ELECTIVES

The following list presents some suggested elective courses in the field of quality control that might be utilized by a community college. These are courses other than those previously listed in this section.

Quality Control Engineering
Configuration Management
Introduction to Governmental Requirements
Quality Control Applications
Manufacturing Processes
Industrial Processes
Industrial Organization
Basic Optics
Quality Control Inspection Planning
Systems Analysis
Maintainability Principles

*All Units shown are in semester units

BASIC TEXTS

Basic texts in the field of quality control are listed with their authors. A more complete summary of existing textbooks may be found in the Sources Consulted reference by T. L. Coss, **Product Assurance Advisory Board, Reference Bibliography on Quality and Reliability.** Prepared by Space Systems Division Product Assurance, Sunnyvale, California: Lockheed Missiles and Space Corporation, 1968.

1. **Basic Electrical and Electronic Principles** – Maurice Suffern
2. **Basic Electronic Test Procedures** – Rufus P. Turner
3. **Fundamentals of Dimensional Metrology** – Busch
4. **Handbook of Dimensional Measurement** – Farago
5. **Inspection and Gaging** – Kennedy
6. **Machine Trades Blueprint Reading** – Ihne and Streeter
7. **Principles and Practice of Nondestructive Testing** – Lamble
8. **Principles of Automatic Data Processing** – Data Processing Management Association
9. **Processes and Materials of Manufacture** – Lindberg
10. **Quality Assurance Manual** – Covino/Meghri
11. **Quality Control and Industrial Statistics** – Duncan
12. **Quality Control and Reliability Management** – Seldon/Smith
13. **Quality Control Handbook** – Juran
14. **Quality Control Theory and Applications** – Hansen
15. **Quality Control Training Manual** – State University of Iowa
16. **Reliability Principles and Practices** – Calabro
17. **Reliability Theory and Practice** – Bozovsky
18. **Statistical Quality Control** – Grant
19. **Total Quality Control** – Feigenbaum

DEVELOPING TECHNICAL EDUCATION PROGRAMS

Community College districts should give consideration to the following actions in developing technical education programs:

1. Conduct a study of the job opportunities, employment trends, and occupational practices in the area to be served.

2. Determine the availability of potential students.

3. Establish an advisory committee for the technical field in which the curriculum is being considered. This committee should provide advice and counsel in the planning and development of the program and aid in the evaluation of the program once it is established. Employer and employee organizations and associations, technical societies, and the appropriate public and private agencies should be represented.

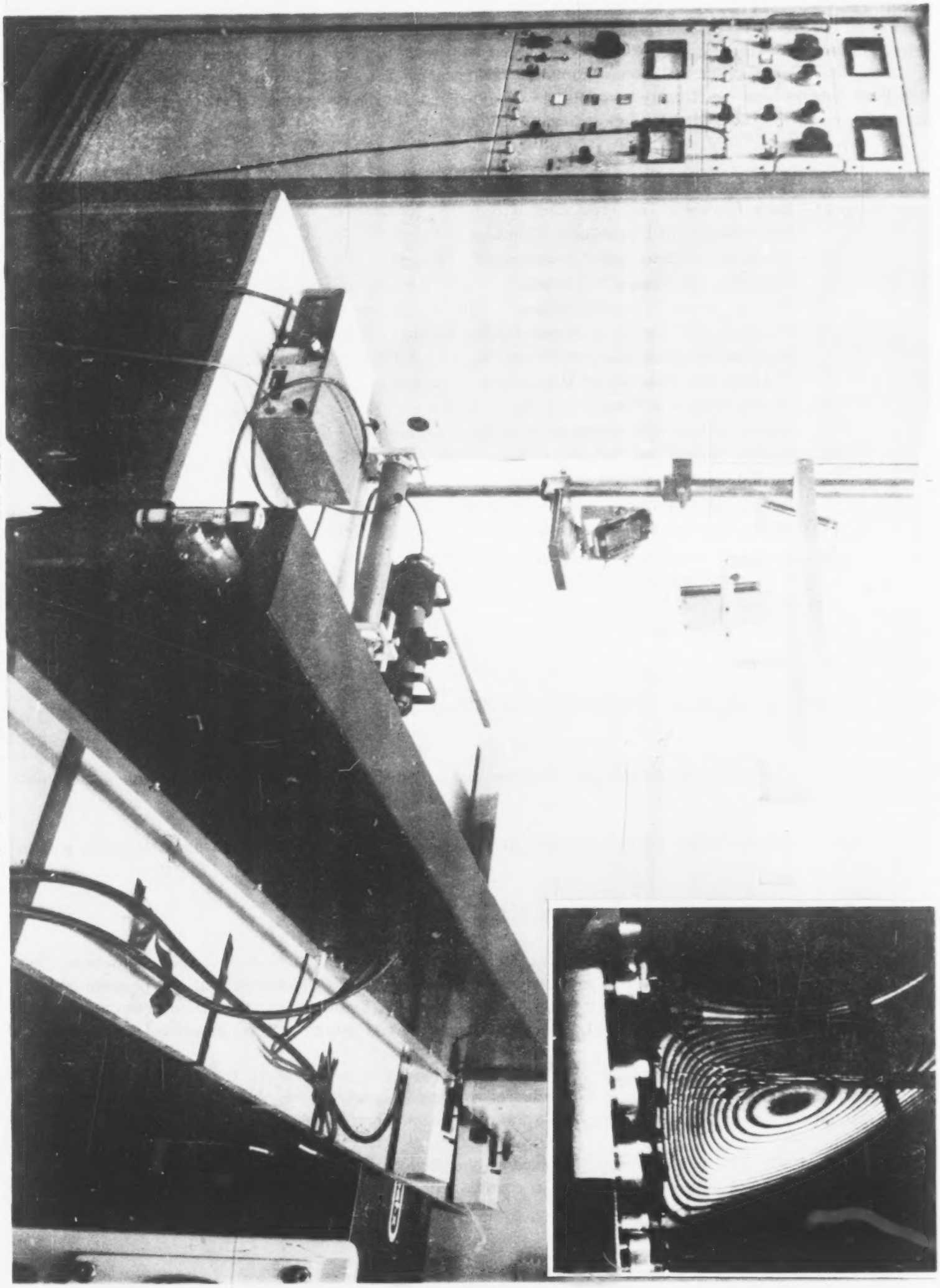
4. Plan the curriculum cooperatively with adjacent community college districts. It may not be practical for each community college to offer the technical education curriculum requested. Interdistrict coordinating committees may aid in determining where the program may best be placed.

5. Structure the curriculum so that it prepares the student to enter employment with a minimum of additional training after employment or to advance within the occupation if he is currently employed.

6. Determine the availability of instructors.

7. Develop methods of evaluation the program.

Photo Courtesy TRW Systems



LASER HOLOGRAPHY Equipment Setup and Results.

4247

CONSULTANT SERVICES

The Division of Vocational Education, Office of the Chancellor of the California Community Colleges is able to assist in developing new programs and curriculums and provides consultant service from the staff. Services are available through three regional offices and a headquarters office as listed below:

HEADQUARTERS OFFICE

Baldwin, Leland P.
Assistant Chancellor
Vocational Education

Cresci, Gerald D. (Dr.)
Dean, Vocational Education

Clawson, Jean M. (Miss)
Consultant in Health Occupations

Cronin, John D.
Assistant Supervisor
Peace Officers' Training

DeNure, Mary E. (Mrs.)
Consultant in Public Service Occupations

Gordon, William G.
Consultant in Technical Education

Johnston, Velma S. (Mrs.)
Consultant in Home Economics Education

Matthews, Ralph E.
Consultant in Agricultural Education

Silva, J. Winston
Supervisor
Peace Officers' Training

Urias, Alfonso C.
Assistant Supervisor
Peace Officers' Training

Division of Vocation Education
Office of the Chancellor
The California Community Colleges
825 - 15th Street
Sacramento, California 95814

4248

COAST REGIONAL OFFICE

De Marco, Philip E.
Consultant in Business Education
415-834-3460 Ext. 426

Hernandez, Raymond E.
Consultant in Industrial Education
415-834-3460 Ext. 423

Division of Vocational Education
Office of the Chancellor
The California Community Colleges
Room 4064
1111 Jackson Street
Oakland, California 94607

SOUTHERN REGIONAL OFFICE

Gardner, Marjorie E. (Mrs.)
Consultant in Business Education
213-620-2090

Wirta, Elmer R.
Consultant in Industrial Education
213-620-3424

Division of Vocational Education
Office of the Chancellor
The California Community Colleges
Room 809-C
217 West First Street
Los Angeles, California 90012

CENTRAL REGIONAL OFFICE

Opperman, H. James
Consultant in Industrial Education
916-445-9570

Division of Vocational Education
Office of the Chancellor
The California Community Colleges
1919 - 21st Street
Sacramento, California 95816

COORDINATION AND SUPERVISION

Since technical education involves cooperation with many industry-oriented organizations, school administrators will find it desirable to assign the responsibility of this cooperation to specially trained educators. These educators are normally qualified instructors who have occupational experience and who are trained in translating manpower needs into education programs. Depending upon its particular organization or its size, the college or college district may employ a dean, a director, a supervisor, a coordinator, or a combination of these. In any case, these people are assigned responsibility to maintain adequate industry contacts in order to keep the school program abreast of the continual changes that are typical of industry. Some of the responsibilities may include working with industry consultants, advisory committees, employer and employee organizations; organizing course materials; obtaining instructional materials from industry; assisting in instructor recruitment, selection, and in-service training; cooperating with school counseling and guidance staff; and placing graduating students. They provide liaison between community, business and industry, and the college. In so doing, these men become effective public relations emissaries for the college.

QUALITY CONTROL TECHNOLOGY INSTRUCTORS

The pattern of most all the community colleges offering quality control education during the extended day sessions is to hire, on a part-time basis, instructors who are employed by industry during the day. These instructors are professional people who, as the evidence indicates, have extensive knowledge in the field of quality control technology. The community colleges that do offer day courses have excellent communications with neighboring industries, firms that encourage and permit their daytime employees to teach selected day classes at the college. Full-time quality technology instructors, those employed on a yearly basis, are not employed by any of the community colleges. Yet, such employment is being contemplated by some of the schools offering evening classes. These schools are considering initiation of day classes primarily for entry-level students and for specialized concentrated programs during morning/afternoon sessions. The optimum choice of the professional staff for these classes is an extremely capable individual, capable as a result of his technical knowledge coupled with his practical experience and industrial exposure.

This ideal teacher is not easily discovered; he is usually a product of unique educational and work experience. If the subject matter he teaches requires demonstration of equipment and the application of special apparatus to accomplish an experiment, there are usually many scientific principles related to the specific subject being taught. The more an instructor understands the basic phenomena behind the experimentation, the more capable he is of guiding the student and building a firm understanding of the principles involved, for that student.

Requirements for qualifications of the technical education instructional staff have been defined in studies written on the subject. The studies tend to neglect the part-time faculty that in many cases provide a cornerstone for further building of full-time programs. Requirements listed tend to be specific and thorough in content. A current writing on the subject states:

"Usually, the instructional staff acquire their subject specialty preparation in professional schools, such as engineering, medical, or other professional health occupation schools ... professional schools for teachers of physics, botany, mathematics ... and social studies. The attainment of professional or equivalent preparation in the subject specialty is required, whether by conventional educational preparation or by its valid equivalent."[15]

The valid equivalent is a difficult definition and provides for disagreements and disparities among those qualifying and attempting to qualify as quality control technology instructors. Heavy and exclusive emphasis on theoretical training can be detrimental to any rated qualification of technical education teaching personnel. The instructor, not having practiced the skills and mastered the working procedures of a specialty, cannot identify the job atmosphere to the technicians in training.

Working experience is practically a necessity for quality control technician instructors. They should be able to relate their own on-the-job experiences to the students, providing a link with industrial practices that the student would otherwise lack. The field that an instructor specializes in should be a field that he has been employed in and in which he has become competent. The broadening of the understanding of the world of work makes the instructor a better practical teacher.

Naturally, the entire emphasis on exemplary educational practices should not be directed to the teacher. The staff, including administrators, librarians, counselors, and staff members in closely related subjects, should be sympathetic toward the objectives of quality control technical education.

Probably the most important qualification, an intangible one, is the teaching ability of the individual instructor. This is a trait that does not exist as a result of education or even experience. It seems to be evident with those instructors who relate themselves to the class environment. This relation provides for communication to each student in the class — understanding the capabilities and consternation that each student possesses. The instructors should sincerely strive to provide their students with the knowledge and desire to become competent technicians and to be enthusiastically seeking new information and knowledge.

Industrial technology today changes so rapidly that the technical educator has many problems maintaining pace with innovations and methodology. A constant study must be maintained by the instructors to keep up their value to an existing program. Full-time instruction personnel versus part-time instructors may have different problems peculiar to their everyday experiences.

The part-time instructor, the man who is employed full-time within industry, in many respects, may have the advantage over the full-time technical educator. Many industries keep up with state-of-the-art concepts, equipment is of the latest model and used for practical applications. The individual maintaining an exposure to

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[15] U. S. Department of Health, Education and Welfare, "Criteria for Technician Education" (Washington, D. C.: Government Printing Office, 1968), p. 32.

these up-to-date techniques brings his knowledge to the classrom and updates his course contents and classroom approach according to the latest techniques and applications. Then again, the converse may be true. The full-time employee may be deeply involved in a specialty area or product, and not have the exposure to the broad general subject area. An individual responsible for complicated electronic assemblies, teaching electronic inspection in the evening may by necessity spend the entire working day using special test equipment specifically designed for a peculiar product line. The knowledge he possesses of his special field is intense, but other important changes may be occuring in technical subject matter that does not concern him.

Many instructors, both full and part-time, serve as consultants in their fields of specialization, maintaining their technical competency by their broad contacts and unique requests for industry problem solving. Attendance and participation at symposiums should be encouraged and could be mutally supported, financially, by the school and by industry. This arrangement would be extremely beneficial to an individual instructor whose firm cannot fully support conference expenses but would share the expenses with the school employing the instructor.

It should be noted that the influence and impact on the type of education offered and the quality of teaching at the community colleges is greatly affected by the professional societies. Better than one-half of the teachers of quality control technology are members of at least one professional society. Yet, classes consist of students the majority of whom are not members of any organization. It would seem beneficial to acquaint the classes of the existence of organizations and to invite a class to one of the periodic meetings held by one or more of the existing societies. The individual, whether he be in the extended-day session or a full-time student, could benefit from and contribute to the general concepts of many professional organizations.

The importance of the advisory committee in choosing the staff for quality technology instruction should not be overlooked. Even though the instructor is hired by the school administration and he is personally interviewed and evaluated by the dean or coordinator of the area in which he will instruct, the advisory committee should evaluate each potential teacher on the depth of his ability and qualifications. In all situations examined throughout California, the advisory committees apparently do recommend and evaluate each instructor. The committee should stand as experts in evaluating technical competence and should be able to provide the school administration with objective evidence, related to a candidate's or existing teacher's capabilities. There was some concern expressed as to whether or not the advisory committee should also include instructors, mainly because of a natural bias the instructors might have to perpetuate themselves. It seems difficult to eliminate instructors in total from the community-college advisory committees of quality control technology. It does seem wise as with other advisory committee members to stagger periods of service, retaining some of the older members but permitting new members to be enlisted at certain specified intervals.

The following is a summary of the availability and other characteristics associated with present instructors of quality control technology in the California community colleges:

Obtained from: Local Industries, after approval of the advisory committee and school coordinator.

Education: Bachelor's Degree or equivalent.

Experience: Exceeds five years in industry; has probably done on-the-job teaching prior to community-college assignment.

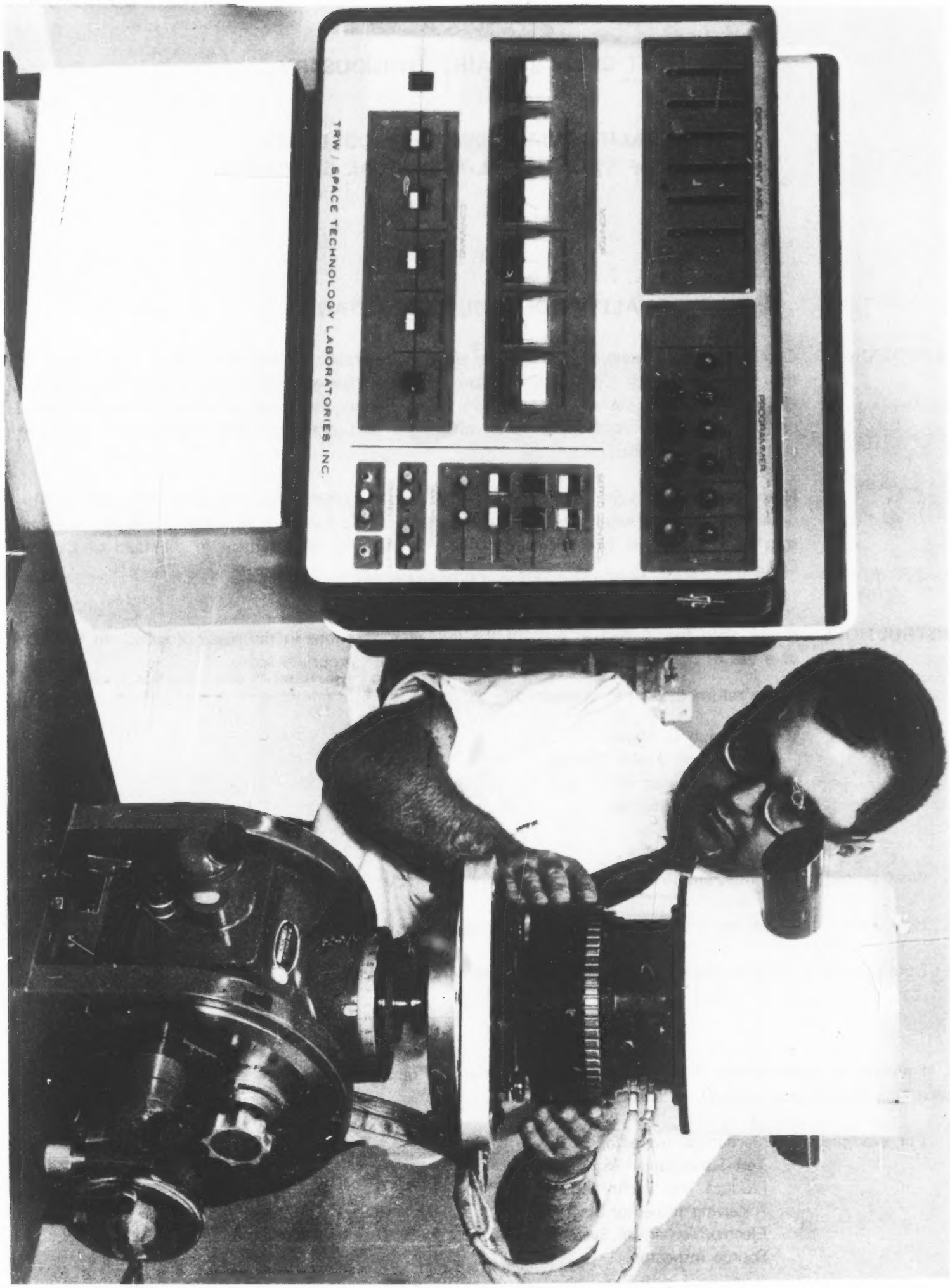
Product Line Association: Manufacturing or manufacturer service, Government service, and service oriented industries.

Preparation for class: Two hours of outside preparation for each hour in the classroom. One class of three hour duration requires six hours of preparation. This includes instructional or laboratory type as well as lecture/theory courses.

Competent instructors are difficult to attract to the community college scene. Many valuable potential teachers are so involved with their place of employment that they do not have the time to devote to teaching. The ties between industry, education, and the professional societies becomes evident once again. Industry needs the educated and capable individual, and cooperation with and assistance to the schools and societies can provide the means to develop these people. The extent of industry cooperation is evident in the San Francisco Bay area, an area where a major aerospace firm provides instructors to staff not only the extended-day programs, but also provides teaching personnel in the day sessions at a local community college. In the Southern California section, a large firm permits its employees, on special request from the local community college, to conduct specialized classes extending over periods of time from three to ten days.

Cooperation and a willingness to serve is indeed important, and without an attitude that includes these qualities, the purpose of educational progress and fulfillment would probably not be realized.

Photo Courtesy TRW Systems



QUALITY CONTROL INSTRUCTORS are industry oriented and relate practical experiences to classroom teaching.

APPENDIX A

FIRST QUESTIONNAIRE TO INDUSTRY

THE CALIFORNIA COMMUNITY COLLEGES
BUREAU OF VOCATIONAL-TECHNICAL EDUCATION

QUALITY CONTROL TECHNICIANS

DEFINITION: Quality Control Technicians are those persons, regardless of job title, who are employed in the field of Quality Control and whose education background is less than a Baccalaureate Degree. These people are oriented in their training and responsibilities toward product assurance, product conformity to specifications and drawings, and meeting and satisfying customer requirements.

Note: It is the thought in this survey that Quality Control Technicians in the future will be principally persons who have successfully completed a two-year educational program beyond the high school level which is designed to fit them for employment in the field of Quality Control.

INSTRUCTIONS: Please place the answer to each of the following questions in the space provided. In the case of a yes or no answer, please place an "X" in the appropriate space.

Please return the entire questionnaire to:

Randolph L. Myers
Rio Hondo Junior College
3600 Workman Mill Road
Whittier, California

1. What is the total number employed by your firm (approximately)? _____

2. How many employees are engaged in quality control work? _____

3. Does your firm employ Quality Control Technicians as defined above?

Yes _____
No _____

4. If answer to question No. 3 is yes, please give job titles and number of employees under each title. (If more space is needed, please use back of sheet.)

For example:
Mechanical Inspector
Test Surveillance Technician
Product Test Technician
Receiving Inspector-Electrical
Electro/Mechanical Systems Inspector
Source Inspector

TITLE _____ Salary Range _____ Number _____

TITLE _____ Salary Range _____ Number _____

TITLE _____ Salary Range _____ Number _____

TITLE _____ Salary Range _____ Number _____

TITLE _____ Salary Range _____ Number _____

TOTAL _____

5. What are the predictions as to the number of **additional** Quality Control Technicians that your firm will need to employ each year in the future?

1969 _____
1970 _____
1971 _____
1972 _____
1973 _____
1974 _____
1975 _____

TOTAL _____

6. What is your most successful method for recruiting or developing Quality Control Technicians?

_____

_____

_____

7. Would your firm be interested in participating in a cooperative work experience or internship program for Quality Control Technicians in conjunction with a community college?

Yes _____
No _____

8. Do you feel that Quality Control Technicians, as employed by your firm, would benefit from training in statistics, data processing, and the objectives of reliability?

Yes _____
No _____

9. What specific courses would you like to see offered by the Junior Colleges for the training and education of Quality Control Technicians?

_____

10. If your company has job descriptions for inspectors or quality control technicians, would you please include these with your reply?

11. Would your firm be willing to provide a representative to serve on an Ad Hoc or advisory committee for developing curriculum for a Quality Control Technician program at the junior college level?

Yes _____

No _____

Firm Name: _____

Firm Address: _____

Person we may contact for further comment on questionnaire topics:

_____ Telephone _____

COMMENTS:

_____

_____

_____

_____

PLEASE RETURN COMPLETED QUESTIONNAIRE TO:

Randolph L. Myers, Director – Quality Technology Program Study
Rio Hondo Junior College, 3600 Workman Mill Road, Whittier, California

IF YOU WISH CLARIFICATION OF ANY POINTS OF THE QUESTIONNAIRE, FEEL FREE TO CONTACT MR. MYERS AT (213) 692-0921, Ext. 241.

4255

APPENDIX B

RESULTS OF THE INITIAL QUESTIONNAIRE

107 Responses

1. Total Number Employed – Approximately 200,000 personnel.

2. Employees in Quality Control work – **13,400.**

3. Firms employing Quality Control Technicians as defined on questionnaire – Yes **79,** No **14,** No Positive Answer, **14.**

4. Requests for job titles and pay rates received well. Representative results included beginning Page 15 of this **report.**

5. Needs for additional Quality Control Technicians – Reference **Appendix E.**

6. Most successful method for recruiting or developing Quality Control Technicians:

   29 – Newspaper Ads
   13 – Local Colleges, adult education, trade schools
   7 – Word of mouth
   55 – In-plant transfers and on-the-job training.
   3 – Department of Employment
   11 – Trainees in plant.

7. Participation in cooperative work experience – Yes **50,** No **38,** No positive answer **19.**

8. A benefit from statistics, data processing, etc. – Yes **79,** No **18,** No positive answer **10.**

9. Specific Courses Mentioned – These courses are those listed on the second industry questionnaire, **Appendix C**

10. Representative job descriptions submitted by industry and Government have been included beginning Page 15 of this **report.**

11. Firms willing to provide advisory committee members – Yes **78,** No **22,** No Answer **7.**

APPENDIX C

COVER LETTER AND FOLLOW-UP QUESTIONNAIRE TO RESPONDING INDUSTRIES

Dear

Thank you for your response to the basic questionnaire submitted requesting your opinions on the training of quality control technicians. Most of the replies indicate a need for a basic core curriculum in Quality Control Technology.

This questionnaire now attempts to provide the study with more details related to specific core courses.

Courses are listed on this questionnaire alphabetically, and have been assembled from data provided in all returned questionnaires.

Please indicate your preference for Quality Technology Courses, meaningful courses for the high school graduate planning to enter the field of Quality Control and the individual planning to upgrade himself.

If you feel a distinction should be made between an entry level situation and an upgrading situation, please separate your scoring in the matrices as provided.

A No. 5 indicates your choice as **most** important for core requirements. Numbers 4, 3, 2 progress in that order to No. 1 which is, in your opinion, **least** important.

Use any number as many times as you feel necessary. An extreme example would be using No. 5 for all courses indicating you feel all courses are necessary for a core curriculum. This would naturally be impractical; you are requested to limit your use of the No. 5 to some reasonable application.

Your part in this research has indeed been appreciated. Final results of the survey are due to be printed in July 1969. You will receive a copy of the final report.

Thanks again for your cooperation and interest.

Sincerely,

R L Myers

Randolph L. Myers
Director
Quality Technology Program Study
Rio Hondo Junior College
3600 Workman Mill Road
Whittier, California 90608

RLM:dlj
Encls.

MATRIX NO. 1

Use this Matrix for **Entry Level** as well as **Upgrading Type Courses**; OR if you wish to separate, use for entry level only.

COURSES	5*	4	3	2	1**
Accounting					
Algebra					
Blueprint Reading					
Business Law					
Calculus					
Chemistry					
Configuration Management					
Data Processing					
Drafting					
Economics					
Electronics – Quality Control Oriented					
Electronics (Technical Application)					
Engineering Technology (A Survey)					
Geology					
Machine Tool Operations (Technical Application)					
Mathematics – Technical					
Mechanical Measuring (Quality Control Oriented)					
Mechanical Testing (Tensile, Shear, Compression Testing)					
Metallurgy					
Metrology – Concepts and Applications					
Nondestructive Testing					
Optical Tooling Applications					
Physics					
Process Controls (Plating, Heat Treating)					
Procurement Practices (Quality Control Oriented)					
Psychology					
Quality Control Concepts (Its function within industry)					
Quality Control Engineering					
Quality Control Systems (Control Charts; Laws of Probability)					
Reliability Principles and Applications					
Report Writing – Technical					
Specifications – Interpretation					
Statistics – Concepts and Techniques					
Supervision					
Trigonometry					
Value Engineering					
Welding					
Others:					
Inspection Planning					

* Most important for core requirement.
** Least important for core requirement.

4258

MATRIX NO. 2

Use this Matrix for **Upgrading Type Courses,** only if you wish to separate **upgrading** from **entry level.** If you feel there should be no distinction, **do not** fill in this Matrix.

COURSES	5*	4	3	2	1**
Accounting					
Algebra					
Blueprint Reading					
Business Law					
Calculus					
Chemistry					
Configuration Management					
Data Processing					
Drafting					
Economics					
Electronics – Quality Control Oriented					
Electronics (Technical Application)					
Engineering Technology (A Survey)					
Geology					
Machine Tool Operations (Technical Application)					
Mathematics – Technical					
Mechanical Measuring (Quality Control Oriented)					
Mechanical Testing (Tensile, Shear, Compression Testing)					
Metallurgy					
Metrology – Concepts and Applications					
Nondestructive Testing					
Optical Tooling Applications					
Physics					
Process Controls (Plating, Heat Treating)					
Procurement Practices (Quality Control Oriented)					
Psychology					
Quality Control Concepts (Its function within industry)					
Quality Control Engineering					
Quality Control Systems (Control Charts; Laws of Probability)					
Reliability Principles and Applications					
Report Writing – Technical					
Specifications – Interpretation					
Statistics – Concepts and Techniques					
Supervision					
Trigonometry					
Value Engineering					
Welding					
Others:					

* Most important for core requirement.
** Least important for core requirement.

4259

APPENDIX D – RESULTS OF FOLLOW-UP QUESTIONNAIRE

MATRIX NO. 1

Use this Matrix for **Entry Level** as well as **Upgrading Type Courses;** OR if you wish to separate, use for entry level only.

COURSES	5*	4	3	2	1**
Accounting	2	1	12	6	29
Algebra	14	10	22	9	2
Blueprint Reading	40	7	5	1	1
Business Law	1	2	1	10	36
Calculus	2	3	4	5	22
Chemistry	5	9	14	14	6
Configuration Management	3	7	16	6	13
Data Processing	5	9	11	15	9
Drafting	9	10	18	10	4
Economics	3	2	13	14	16
Electronics – Quality Control Oriented	13	16	10	3	8
Electronics (Technical Application)	4	12	15	7	8
Engineering Technology (A Survey)	6	12	19	6	6
Geology	0	0	5	3	38
Machine Tool Operations (Technical Application)	5	17	15	11	2
Mathematics – Technical	24	15	6	4	2
Mechanical Measuring (Quality Control Oriented)	29	14	3	2	2
Mechanical Testing (Tensile, Shear, Compression Testing)	12	12	15	10	0
Metallurgy	5	11	16	11	5
Metrology – Concepts and Applications	17	12	6	3	10
Nondestructive Testing	14	11	15	6	2
Optical Tooling Applications	4	12	15	10	5
Physics	6	10	14	15	5
Process Controls (Plating, Heat Treating)	10	8	17	9	4
Procurement Practices (Quality Control Oriented)	11	8	15	10	7
Psychology	3	6	9	12	15
Quality Control Concepts (Its function within industry)	33	7	6	4	1
Quality Control Engineering	20	9	10	2	2
Quality Control Systems (Control Charts; Laws of Probability)	25	11	6	4	2
Reliability Principles and Applications	8	13	10	8	6
Report Writing – Technical	12	18	11	6	1
Specifications – Interpretation	15	23	8	2	1
Statistics – Concepts and Techniques	16	10	14	2	4
Supervision	9	9	12	8	8
Trigonometry	16	11	11	8	6
Value Engineering	2	5	18	9	9
Welding	3	3	10	10	20
Others:					
Inspection Planning	1				

* Most important for core requirement.
** Least important for core requirement.

MATRIX NO. 2

Use this Matrix for **Upgrading Type Courses,** only if you wish to separate **upgrading** from **entry level.** If you feel there should be no distinction, **do not** fill in this Matrix.

COURSES	5*	4	3	2	1**
Accounting	0	1	10	5	9
Algebra	11	2	4	2	2
Blueprint Reading	12	4	3	1	2
Business Law	1	4	8	2	9
Calculus	3	5	8	6	22
Chemistry	5	8	3	6	6
Configuration Management	4	7	5	6	6
Data Processing	4	4	11	7	3
Drafting	4	4	7	10	2
Economics	4	1	11	4	2
Electronics – Quality Control Oriented	8	8	5	2	3
Electronics (Technical Application)	5	7	5	7	4
Engineering Technology (A Survey)	8	4	6	5	2
Geology	0	0	3	4	17
Machine Tool Operations (Technical Application)	10	7	5	4	1
Mathematics – Technical	12	5	6	2	2
Mechanical Measuring (Quality Control Oriented)	17	4	2	2	0
Mechanical Testing (Tensile, Shear, Compression Testing)	10	8	6	3	0
Metallurgy	9	5	5	5	3
Metrology – Concepts and Applications	12	6	4	1	3
Nondestructive Testing	9	9	8	3	1
Optical Tooling Applications	5	9	8	5	1
Physics	4	11	4	4	4
Process Controls (Plating, Heat Treating)	9	9	3	4	1
Procurement Practices (Quality Control Oriented)	5	9	7	2	2
Psychology	4	5	8	4	7
Quality Control Concepts (Its function within industry)	13	5	5	2	0
Quality Control Engineering	17	6	6	0	0
Quality Control Systems (Control Charts; Laws of Probability)	13	9	2	2	0
Reliability Principles and Applications	4	9	9	3	2
Report Writing – Technical	11	10	2	3	0
Specifications – Interpretation	12	10	4	1	0
Statistics – Concepts and Techniques	12	7	5	3	1
Supervision	10	8	12	0	0
Trigonometry	10	6	5	1	2
Value Engineering	2	4	11	7	1
Welding	3	4	11	5	2
Others:					

* Most important for core requirement.
** Least important for core requirement.

APPENDIX E

GROWTH-RATE TRENDS FOR QUALITY CONTROL PERSONNEL

(Based upon **13,400** employees, as indicated from responses to **107** questionnaires for 1968 data.)

1969	**351** additional
1970	**415** additional
1971	**459** additional
1972	**621** additional
1973	**661** additional
1974	And beyond, indicated an increase in quality control personnel, but most firms responding indicated an unwillingness to apply employment estimates that far in advance

Growth rate approximation for quality control personnel:

1969	**2.6%**
1970	**3.0%**
1971	**3.2%**
1972	**4.3%**
1973	**4.3%**

Figures and percentages have been derived from the firms responding to questionnaire employment questions. An extrapolation for all California industry is not included.

4262

APPENDIX F

RESULTS OF COMMUNITY COLLEGE RESPONSES

California Community College – Request for Information

Replies are tallied and included directly on a form requesting information, sent to all The California Community Colleges.

Total Requests Submitted: 89

Total Responses: 49

THE CALIFORNIA COMMUNITY COLLEGES
BUREAU OF VOCATIONAL-TECHNICAL EDUCATION
TRAINING AND EDUCATION OF THE QUALITY CONTROL TECHNICIAN

Dear

Rio Hondo Junior College, in cooperation with the California Community Colleges, Bureau of Vocational-Technical Education in Sacramento, is conducting a study to determine industry requirements for the employment of Quality Control Technicians. We are developing a standard questionnaire that we will be sending to all the Community Colleges in California. Before we issue this questionnaire we are anxious to explore the more important aspects of the study – points that the Community Colleges would like to see stressed. This letter is a request asking you to comment on those areas of Quality Technology that you think should be included in a questionnaire covering the subject.

1. Do you feel that you have an adequate understanding of the subject of Quality Technology?
No – 25
Yes – 14
NA – 10

2. Should a study of Quality Technology include in its findings such topics as:

	YES	NO
Curriculum patterns		
Core Courses and Titles		
Course Outlines		
Other		

All replies to this question indicated a "yes" answer to all three categories, with the following exceptions: five replies were "Not applicable", two "No" to the core courses and titles, and four "no" to the course outlines.

4263

3. Do you feel that such a study should explain what basic tools and equipment are needed to establish a course in Quality Technology?

All replies to this question were "yes" with the exception of four "no's" and four "NA's".

4. Is a description of laboratory layout and building requirements needed to conduct such a study?

Yes – 24
No – 18
NA – 2

5. Are you interested in the types of industries employing Quality Control Technicians?

All colleges responded "yes" with the exception of five reporting no answer or not applicable and one indicating a "no" answer.

6. Do you feel a survey should include the educational and vocational requirements for instructors in Quality Technology?

Yes – 31
No – 8
NA – 5

7. What information would you like from industry, such as pay scales, grade rating of inspectors, etc? Please list:

Listings included items such as pay scales, job descriptions, job preparation requirements, differences in Q. C. occupations in various industries, the number of job opportunities projected into the future, etc.

8. Do you have a Quality Control Advisory Committee? If so, please mail a copy of the names on your committee and include the names of industries or educational institutions they represent.

Yes – 8
No – 31
NA – 3

9. Are the Quality Technology classes being offered in your college using the facilities of another college program? If so, please indicate in what area of study this is occurring.

Most of the responses to this question indicated an answer was not applicable. Those schools offering quality control technology, in the main, did so without equipment or the need to use the facilities of another program.

10. Do you feel that the Quality Technology program should be a part of some other subject area, such as machine technology, mathematics, electronic technician training, etc?

Yes – 12
No – 11
Uncertain – 21

4264

11. Has your college been contacted by representatives from industry expressing an interest in the development of a Quality Control Technician training program?

Yes – 15
No – 27
No Answer – 3

Can you identify the industry that made this contact?

Those identifying indicated the American Society for Quality Control was instrumental in ten contacts, the balance made up from industry and Government contacts.

The program requested was:

2	Specific Subject
8	Selected evening offerings
4	Full day, two year curriculum
1	Other **Specific Subject for Special Student** Groups.

Would the program require laboratory facilities?

There were 12 responses to this question. Nine said yes, laboratory facilities would be required. Three felt they were not necessary.

12. What, in your opinion, are the general duties and responsibilities of a Quality Control Technician?

Reponses were varied; many indicated this was industry's assignment. Typical replies were:

1. Meeting contractual requirements
2. Final inspection of completed products
3. Nondestructive testing
4. Developing sampling plans
5. Inspection and testing materials

Please return this letter, with any comments you might wish to add, to:

Randolph L. Myers
Director Quality Technology
Program Study
Rio Hondo Junior College
3600 Workman Mill Road
Whittier, California
90808

4265

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VT 014 462
SKIDMORE, CAROLYN R.
VOCATIONAL INSTRUCTIONAL LEARNING CENTER TO CREATE A BRIDGE BETWEEN SCHOOL AND EARNING A LIVING FOR YOUNG PEOPLE. FINAL REPORT.

KANAWHA COUNTY BOARD OF EDUCATION, CHARLESTON, W. VA.
WEST VIRGINIA STATE BOARD OF EDUCATION, CHARLESTON. DIV. OF VOCATIONAL EDUCATION
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DESCRIPTORS - *VOCATIONAL EDUCATION; *LEARNING LABORATORIES; *EDUCATIONAL RESOURCES; *STUDENT IMPROVEMENT; *INSTRUCTIONAL MATERIALS CENTERS; HANDICAPPED STUDENTS; EDUCATIONALLY DISADVANTAGED; INSERVICE PROGRAMS; PROGRAM DESCRIPTIONS; CURRICULUM PLANNING
IDENTIFIERS - *EDUCATIONAL RESOURCE CENTERS; WEST VIRGINIA

ABSTRACT - THE PURPOSE OF THIS PROJECT WAS AN ATTEMPT TO BRIDGE THE GAP BETWEEN SCHOOL AND EARNING A LIVING. THIS WAS APPROACHED THROUGH THE ESTABLISHMENT OF AN EDUCATIONAL RESOURCE CENTER AT THE COWER CAREER CENTER. A MEDIA SPECIALIST AND AN AIDE WERE HIRED TO MANAGE THE RESOURCE CENTER. SPECIFIC OBJECTIVES WERE TO: (1) PROVIDE STUDENTS AN OPPORTUNITY FOR INDIVIDUALS TO WORK TOWARD ACADEMIC IMPROVEMENT, (2) PROVIDE FOR CONTINUOUS IMPROVEMENT OF INSTRUCTIONAL COMPETENCIES, AND (3) PROVIDE AN ENRICHMENT PROGRAM TOWARD IMPROVING THE BASIC SKILLS OF THE HANDICAPPED AND EDUCATIONALLY DISADVANTAGED. ACCOMPLISHMENTS OF THE RESOURCE CENTER OVER THE PAST YEAR INCLUDE: (1) ORDERING AND ACCESSIONING FURNITURE, EQUIPMENT AND MATERIALS, (2) DEVELOPING AND PRODUCING INSTRUCTIONAL MATERIALS, (3) PLANNING AND CONDUCTING IN-SERVICE TRAINING FOR THE TEACHERS, (4) ASSISTING TEACHERS IN CURRICULUM AND LESSON PLANNING, AND (5) WORKING WITH STUDENTS INDIVIDUALLY AND IN SMALL GROUPS. (AUTHOR/GEB)

VT 014 462

Final Report

W.Va.-70-E-11

DVE-7-W.Va.-70-E-11

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4269

Final Report

Project No. W.Va.-70-E-11

Grant No. DVE-7-W.Va.-70-E-11

Vocational Instructional Learning Center to Create a Bridge Between School and Earning a Living for Young People

Carolyn R. Skidmore

Kanawha County Board of Education
200 Elizabeth Street
Charleston, West Virginia 25311

August, 1971

West Virginia
State Board of Education
State Department of Education
Bureau of Vocational, Technical and Adult Education
Division of Vocational Education

4270

Final Report

W.Va.-70-E-11

DVE-7-W.Va.-70-E-11

Vocational Instructional Learning Center to Create a Bridge Between School and Earning a Living for Young People

Clarence E. Burdette - Project Director
Carolyn R. Skidmore - Project Coordinator
Kanawha County Board of Education

Charleston, West Virginia
August 1, 1971

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West Virginia
State Board of Education
State Department of Education
Bureau of Vocational, Technical and Adult Education
Division of Vocational Education

Contents

title	page
Summary	1
Introduction	2
Methods	4
Results	7
Conclusions	9
Recommendations	10
Glossary	11
Apendix	13
Referral to ERC and Evaluation Form	14
Work Order	15
Schedule of Equipment	16
ERC Traffic	17

Summary

Bridging the gap between school and earning a living was the title of the project undertaken by the Kanawha County Vocational Staff for the Carver Career and Technical Education Center. The staff approached bridging this gap by establishing an Educational Resource Center at the Carver Career Center. They asked that a media specialist and an aide be hired to manage the resource center.

The following items were accomplished this year by the resource center staff; ordering and accessioning furniture, equipment and materials for the ERC, developing and producing all types of instructional materials; planning and conducting in-service for the teachers, assisting teachers in curriculum and lesson planning and working with students individually and in small groups in the ERC.

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Introduction

It has been evidenced in recent years that in every school there is a special need for the improvement of continuous learning. Teachers do not always have the materials or the range of knowledge to provide for individualization of instruction for all students within the classroom or shop setting. It has also been evidenced for many years that individualized learning can be effectively promoted through the use of instructional media and programmed materials. There is a need for this type of activity in vocational education. Students would not be tied to classroom activity alone and would have the time to expand their knowledge and work on their strengths and weaknesses. In order to bridge this gap between school and earning a living, the educational resource center was established to provide for continuous learning through enrichment programs, development of basic skills necessary for success in any vocational area, and the creation of an atmosphere for the growth of various ability level students, including the handicapped and disadvantaged.

Teachers many times do not always receive help in presenting a lesson which calls for a procedure unfamiliar to them or in dealing with students who have special problems, such as handicapped or need for verbal and mathematical skills improvement. Hopefully, the educational resource center would be of help to the teacher in communicating with the student and be an aid in teaching remedial reading and mathematics.

It is the purpose of this report to explain how the Carver Career and Technical Education Center has established an Educational Resource Center and obtained a Media Specialist to aid in bridging the gap between school and earning a living. A person was needed to operate the resource center that would be competent in relating with students and faculty. The center would be the focal point of learning in that the resource coordinator would be the curriculum specialist who would assist instuctors in the overall improvement of the learning situation by helping the teachers personally or working with the students.

The objectives of the project were as follows:

1. To provide the students an opportunity for individuals to work toward their academic improvement which would create a bridge between school and earning a living through the extensive use of instructional media which were needed for selfimprovement and an independent study program.

2. To provide for continuous improvement of instructional competencies through the efforts of a curriculum specialist who would assist instructors in applying new teachniques of learning; also offer

extensive occupational resource information for the broadening of occupational aspirations and opportunities for youth.

3. To provide an enrichment program, remedial and development program toward the improvement of basic skills for the handicapped and the educationally disadvantaged.

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Methods

The Kanawha County Vocational Education staff proposed to include with the Carver Career and Technical Education Center an opportunity for students to improve themselves toward earning a living, learning a skill, and being able to compete in society by the implementation of an educational resource center which would provide these opportunities. It would be staffed by a person competent in relating with students and faculty, capable of maintaing and operating a learning resource center. This center would be the focal point of learning in that the learning resource coordinator would be the curriculum specialist who would assist instructors in the overall improvement of the learning situation. The center would make available to students educational materials for self improvement.

It was proposed that students would not be scheduled into the media center by the teachers as a daily schedule but rather when the teacher felt the student or students needed more work in a particular area. The instructor would then consult the media specialist on the best approach. The Research and Development studies pointed out weaknesses that were experienced and recommended cures:

Specific R & D Projects

ED-016-359 The Instructional Materials Center, Michigan State Department of Public Instruction.

ED-014-906 A study of the concentration of Educational Media Resources to assist in certain educational programs of national concern. Areas covered included observations on Vocational Education inadequacies in (1) facilities and equipment, (2) general use of media, and (3) personnel training and information dissemination.

ED-033-616 Standards for School Media Programs. The program should provide materials needed by students and teachers, working areas, equipment consultant services, instruction in media use and information on recent developments.

It was planned to have teacher in-service frequently on the best use of the center and the media specialist. It was hoped that the teachers and students would look to the center for assistance in improving the total learning situation on an individualized instructional basis, as opposed to a "forced" schedule basis.

The media specialist to be hired would devote 100% of his time to the operation of the resource center with the following duties:

1. To provide specialized learning materials as they relate to course content.

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2. To provide for individualized learning to students needing remedial English and Mathematics.

3. Maintain and provide educational materials to instructors so as to facilitate and possibly assist them in improving their instruction.

4. Maintain, in conjunction with the counselor's office, as complete as possible, an occupational publications file for use by students and instructors.

5. Maintain up-to-date files regarding new educational materials and teaching techniques.

6. To work closely with the instructors. For example, if an instructor felt he was not getting a particular point across to the students, he could consult with the coordinator, give him the information and then the coordinator could either assist the instructor in the classroom or relate concepts or techniques which might assist the instructor.

The Media Specialist would have the following qualifications:

1. Master's degree in media or audiovisual.

2. At least three years teaching experience.

3. Display an interest in vocational education.

4. Desire to help students.

5. Display capability in setting up in-service programs for teachers.

6. Show capability for directing individualized instruction.

7. Display good communications ability.

8. Some experience in working with the disadvantaged and handicapped.

9. Familiar with all types of audiovisual equipment and operation of same.

10. Work experience in labor market. (not essential, but helpful)

A learning resource aide would be hired and assist the media specialist in his duties. The aide's duties and requirements would be as follows:

1. Be interested in vocational education.

2. Be willing to expend energy to help improve instruction and communication between students and instructors.

3. Be able to organize and maintain a learning resource facility under the direction of a media specialist.

4. Be able to remain abreast of current changes and trends in education.

5. Be proficient or be able to use many different types of teaching devices.

6. Be a high school graduate.

7. Be proficient in typing.

8. Be able to communicate with and understand other people.

9. Be able to learn techniques of organizing materials and operating equipment.

It was proposed that the educational resource center be located at the main entrance of the Carver Center, with ample space for all regular library furnishing, plus eleven study carrels, a large conference table and an office/supply room for the media specialist. A special work room would be available to the teachers to prepare instructional materials if they so desired. The facilities would be available to any other agency for their use also for post secondary programs in afternoons and adult education classes at night.

Materials, equipment, and supplies would be purchased by the county. All materials used would be as many different kinds of audio-visual aides that could be purchased. Training on each piece of equipment would be given to the teachers during a pre-school workshop and periodically throughout the school year. Students would be shown how to use each piece of equipment also.

The staff proposed the learning resource coordinator would extend services outward from the center to the students in the classes. The learning resource coordinator will have the responsibility for initiating communications. He would be responsible for monthly evaluations on the progress of the center.

The Carver Center would serve approximately 15% of the pupil population from seven high school areas of 6,500 students. The resource center would be open to all students, average, above and below average, retarded, handicapped and educationally disadvantaged.

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Results

A media specialist was hired and began work July 15, 1970. The last two weeks of July were devoted to in-service for the teachers of Carver and one day was conducted by Carolyn Skidmore on the Methods and Use of Instructional Materials. The Carver staff was then allowed to move into the new school and at that time the media specialist began working individually with the teachers. She aided the teachers in the making of lesson plans, setting up a course outline, writing objectives for the course and making list of matierals and equipment to be ordered for each subject area. Due to the work needed to be completed on the physical plant of the building the requisitions for materials for the Educational Resource Center were not given to the purchasing department until late in the year of 1970. This delayed the obtaining of the majority of the order until late spring of 1971.

In-services were conducted thoughout the year on the use of the Educational Resource Center and the Media Specialist. The audiovisual equipment was available shortly after the beginning of the year and a great deal of time was spent in teaching the instructors how to use the equipment properly. The close-circuit television was not set up until the beginning of 1971.

In the first quarterly period in the ERC the time was spent in receiving, inventoring and arranging the furniture, cataloging and accessioning equipment that arrived, devising means of recording daily traffic, scheduling of equipment, means of referring students to the ERC; previewing materials of the various areas; providing in-service for teachers and individual help for them; helping teachers select materials for purchase; ordering and receiving supplies, developing and producing materials to be used by the teachers and photographing different areas for public relations and instructional uses. (appendix)

In the second quarterly period, time was devoted to receiving and accessioning ERC equipment, receiving CCIV equipment, receiving and accessioning some material that arrived, planning in-service for the teachers and providing individual help for teachers concerning AV methods, requisitioning AV materials for the different areas, developing and producing materials, photographing different areas and the hiring of a media aide.

By the end of the third quarter all the AV equipment had been received except a few tape recorders, all the production equipment had been received, fifty percent of the material had been received and cataloged, the CCTV equipment had been installed, teachers and students had begun to use the ERC, Diagnostic testing was started in remedial mathematics, a video tape was produced for the guidance counselor and

the following types of items were for the teacher: posters, charts, slide series, handouts, tests, booklets, transparencies and audio tapes. Another aide was hired at this time for the remainder of the year to help with cataloging of equipment and materials.

The last quarter of the school year has seen the development of in-service on the use of the ERC, helping of teachers in lesson plans for the coming year, assisting in two workshops, one for guidance counselors and the staff for the Benjamin Franklin Career Center, developing and producing more materials for the teachers, ordering free films for the coming year, collecting lists of instructional media items needed for the coming year, and preparing different rooms for the use of instructional media.

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Conclusion

The idea of a "vocational instructional learning center to create a bridge between school and earning a living for young people" has gotten well underway during its first year of operation. The success of this project is coming about in spite of the slowness in ordering materials and the arrival of the materials. It is succeeding in spite of the resistance at first of the instructors. It is succeeding in spite of the lack of material that has arrived for use in aiding in remedial reading and mathematics.

It is concluded that if the specialist had been hired earlier in the year, equipment and materials would have been available at the opening of school. Due to the physical condition of the building at the opening of school it would have been quite beneficial to the instructors to have had on hand instructional materials to use until they could have entered their shops. As it was, it was impossible to enter the shops and no materials were available to begin teaching. There was a breakdown in communications with the onset of the school year. However, the teachers and students worked quite well with the ERC under such circumstances.

It is concluded that if materials and equipment had been available at the beginning of the school year the problem of teacher and student utilization of the ERC would have been nearly nil. The funding for equipment and material was not available through this project; consquently, local funds were not available early enough for equipment and material to be received in time to start any resource program.

It is concluded that many instructors not used to being able to call upon a media specialist or a resource center to serve as their right hand; therefore, they needed to adapt to such a facility being available to them. It is with the newness of the facility, the school and the instructors that at first they were reluctant picking one or two instructors and helping them in every way possible and soon all the instructors were wanting the benefits of the ERC.

It is concluded that the students will use the ERC and media specialist more since the materials are available. At the beginning of the year, no materials were available and the media specialist spent a great deal of time aiding the instructor so that the student found no need in the ERC. However, during the latter part of the year teachers began sending their students for testing and help in the ERC. After the instructors were well aware of the use of the ERC they then wanted it to be available to the students. The instructor must first see the need of the Educational Resource Center before he will send a student for help.

Recommendations

With the beginning of a new project there is always room for improvement. It is with this in mind that the following recommendations are being made for anyone planning such a project:

It is recommended that:

1. The media specialist be hired six months to a year before the faculty begins work.

2. The equipment and materials be ordered and received before the opeining of the school year. (under direction of the faculty to be working at the school)

3. The equipment and materials all be previewed before purchasing.

4. All the teachers be given extensive in-service on the use of the ERC and methods for using media.

5. All the material be available at the beginning of the year for the remedial programs.

6. The CCTV system be ready to work at the beginning of school.

7. Extensive training be given to all the students in the school on the use of the ERC and the Media Specialist.

4282

Glossary

4283

Glossary

ERC	Educational Resource Center
CCTV	Closed Circuit Television
AV	Audiovisual

Instructional Media

Devises or materials which present a body of information and are largely self supporting rather than supplementary in the teaching-learning process.

4284

Appendix

4285

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date _____ evaluator's name _____

INSTRUCTIONAL MATERIALS EVALUATION FORM

Instructions: Complete this form immediately after viewing preview material and then return to C. Skidmore in ERC.

to be completed by ERC personnel.

Type of Media _____ Snd or Slt Clr or B/W Lngth: Cost: _____

Title _____

Producer or Distributer _____

TO BE COMPLETED BY INSTRUCTOR OR EVALUATOR. More than one person may evaluate a single item. These are to be evaluated with intent of purchase. All media for evaluation may be used in the classroom with the student. Indicate your opinion for the following areas: (circle your choice) *column for comments*

1. *Coorelation with Curriculum: good fair poor* _____
2. *Authenticity and accuracy: accurate misleading* _____
3. *Organization: (Does it tell the story simply & effectively?)* *yes no uncertain* _____
4. *Is it important? (Does it make a significant contribution to your area?)* *much little none* _____
5. *Does it effectively develop concepts that are difficult to communicate in other ways?* *yes uncertain* *Other methods better* _____
6. *Are the pictures good, clear & effective? yes no fair* _____
7. *If sound, is it good? yes no fair* _____
8. *In what subject areas can it be used?* _____
9. *What is your overall evaluation? good fair poor* _____
10. *Do you reccomment it for immediate purchasing, later purchasing, not purchasing* _____

Referral To ERC

Room No. _____ Date _____

Name: _____

Assignment: _____

_____

_____

Time Sent: _____ Expected Return: _____

ERC Personnel: _____ Instructor _____
(Initial Please)

WORK ORDER FOR PRODUCTION OF INSTRUCTIONAL MATERIALS REQUEST

SUBMIT TO ERC

NO. OF SHEETS IN ORIGINAL	NO. OF COPIES NEEDED	PAPER SIZE
_____CHART OR POSTER	_____	8 1/2 x 11_____
_____PHOTOGRAPHY	_____	8 1/2 x 14_____
_____MOUNTING	_____	other _____
_____LAMINATING	_____	PLEASE ATTATCH SAMPLE
_____COPIES	_____	
_____TRANSPARENCIES	_____	

NAME_____DATE NEEDED_____

PLEASE PLACE SPECIAL INSTRUCTIONS ON THE BACK.

4287

SCHEDULE OF EQUIPMENT
from ERC
month of _____

Equipment																			

ERC DAILY TRAFFIC CHART

Date:

Name	Area From	Time ERC	Equipment Used	Material Used	Assignment	Comment
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
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15						
16						
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21						

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